Proposed Development

Geotechnical Investigation Report

Project Location:

18-24 & 28 Elizabeth Street North
31-33 George Street North
Brampton, ON

Prepared for:

Greenwin Corp.
19 Lesmill Road
Toronto, ON

Prepared by:

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May 9, 2022

MTE File No.: 46372-301

Engineers, Scientists, Surveyors.

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Appendices

1.0 Introduction

MTE Consultants Inc. (MTE) was retained by Greenwin Corp. to conduct a geotechnical investigation for the proposed development located at 18 to 28 Elizabeth Street North and 31-33 George Street North in Brampton, Ontario. The subject area (the site) currently comprises a historical house at 28 Elizabeth Street North, residential houses at 18, 20, 22 and 24 Elizabeth Street North, as well as a multiunit commercial building at 31-33 George Street North with parking lot areas between, as shown on **Figure 1 in Appendix A**.

It is understood that the proposed development includes removal of the existing commercial building and all four residential homes for construction of two mixed use high rise buildings connected with a podium to the historical house, which is to remain onsite.

The north portion of the site (31-33 George Street North) is proposed to comprise a 7 to 9 storey hotel podium, with a 42 storey tower in the area of the existing parking lots. The south portion of the site (18 to 24 Elizabeth Street North) is proposed to comprise a 5 to 8 storey podium, with a 37 storey tower. The two towers would be connected by a 1 storey podium structure. Additionally, below grade parking would be provided, comprising 4 levels below grade at the lower George Street North side of the site, becoming 5 levels below grade at the higher Elizabeth Street North side of the site with the lowest basement floor (P5) at Elevation 199.15 m.

The purpose of the detailed geotechnical investigation would be to determine the soil and bedrock conditions at the proposed founding elevations for the structure and provide geotechnical recommendations for the proposed foundations. Additionally the investigation would provide the information regarding the overburden soil conditions for proposed shoring measures during construction.

2.0 Previous and Concurrent Investigation

In 2019 and 2020, MTE completed a Phase 2 Environmental Site Assessment (ESA) and a Preliminary Geotechnical Investigation and a Hydrogeological Assessment for the 28 Elizabeth Street North and 31-33 George Street North portions of the site. The borehole logs for the previous investigation are included in **Appendix B** and the locations of the boreholes are shown on the Site Plan, **Figure 1 in Appendix A**.

Concurrent with this investigation, MTE is completing Phase Two ESA, Hydrogeological Assessment, and Excess Soil Characterization work for the subject site, the results of which will be issued under separate cover.

3.0 Field and Laboratory Program

Previous geotechnical investigative fieldwork at the site was carried out by MTE on March 2 to 4, 2020 and involved the drilling of four (4) boreholes at three (3) locations (Boreholes MW201A/B-20, MW202-20, and BH203-20) to depths of 9.8 to 18.6 m.

The current fieldwork for this investigation was carried out on January 4 to 7, 11 to 13, and 18 to 19, 2022. The investigation involved the drilling of 20 boreholes at various locations throughout the site (Boreholes BH301-22 to MW320-21) to depths of 2.1 to 14.3 m. The locations of the boreholes are shown on the Site Plan, **Figure 1 in Appendix A**

Private and public utility companies were contacted prior to the start of drilling activities for both preliminary and secondary investigations in order to isolate underground utilities near the boring locations.

The boreholes for the preliminary investigation were advanced with a CME55 truck mounted drill rig supplied and operated by Geo-Environmental Drilling Inc (GEDI). The boreholes for the second investigation were advanced with a LC 55 truck mounted drill rig supplied and operated by GEDI. For both investigations, the overburden soils were drilled using hollow stem augers and a PQ diameter cased soil core barrel. The bedrock was cored using an HQ diameter core barrel.

Representative soil samples were recovered throughout the depths explored. Standard Penetration Tests (SPT) were carried out during sampling operations in the boreholes using conventional split spoon equipment. Samples of encountered cohesive deposits were testing using handheld pocket penetrometer to determine the approximate shear strengths. The SPT N-values and approximate shear strengths recorded are plotted on the borehole logs in **Appendix B**.

The bedrock core specimens were measured in the field to determine the Rock Quality Designation (RQD) (ASTM 6032) and returned to our office for further classification. Five samples of the recovered bedrock from the previous and current investigation were submitted for unconfined compressive strength testing.

During the previous investigation, monitoring wells were installed in Boreholes MW201A-20, MW201B-20, and MW202-20 to allow measurement of stabilized groundwater levels and to allow for groundwater sampling and testing to occur at a later date. Boreholes MW201A-20 and MW201B0-20 were drilled in the same location to permit the installation of shallow and deep monitoring wells. The installations comprised filtered screens and bentonite seals above the screens. Details of the installations and groundwater observations and measurements are provided on the appended borehole logs.

During the current investigation monitoring wells were installed in Boreholes MW302-22, MW309-22, MW310A-22, MW310B-22, MW314-22, MW319-22 and MW320-22. The monitoring wells allow measurement of stabilized groundwater levels and allow for groundwater sampling and testing to occur at a later date. Boreholes MW310A-22 and MW310B-22 were drilled in the same location to permit the installation of shallow and deep monitoring wells. The installations comprised filtered screens and bentonite seals above the screens. Details of the installations and groundwater observations and measurements are provided on the appended borehole logs.

Upon completion of drilling, all boreholes from both investigations which did not have monitoring wells installed were backfilled with bentonite in accordance with Ontario Regulation 468/10 (formerly O. Reg. 903) under the provinces Water Resources Act.

All fieldwork was monitored throughout by a member of our geotechnical engineering staff, who directed the drilling procedures; recorded SPT tests, conducted shear strength testing, measured the bedrock cores for RQD, documented the soil and bedrock stratigraphies; monitored the groundwater conditions; and transported the recovered soil and bedrock samples to our office for further classification.

The geodetic ground surface elevations at the borehole locations from both investigations were surveyed by MTE.

All of the soil samples collected from both investigations were submitted for moisture content testing with the results provided on the borehole logs in **Appendix B**. Additionally, three soil samples from the previous investigations and four samples from the current investigation were submitted for particle size distribution analyses and the results are provided in **Appendix C**. The remaining soil samples will be stored for a period of 1 month and will be discarded of at that time without prior request from the client to extend storage time.

4.0 Soil Conditions

Reference is provided to the appended borehole logs for soil stratigraphy details, SPT N-values, approximate shear strengths, bedrock RQD values, moisture content profiles, and groundwater observations and measurements. Soil conditions encountered at the site typically include asphaltic concrete and/or fill overlying native deposits of glacial till, sand/sand and gravel and shale bedrock.

4.1 Pavement Structure and Fill

Boreholes BH203-20, BH301-22, MW302-22 and MW319-22 were drilled through the existing asphalt pavement structure at the site. The thickness of asphaltic concrete ranged from 75 mm to 150 mm with an average thickness of 125 mm. The asphalt pavement structure for each borehole was overlying granular fill material. The granular fill material located beneath the asphaltic concrete ranged in thickness of 225 mm to 4,450 mm with an average thickness of 2,225 mm.

Borehole BH318-22 was drilled through existing concrete at the site, with a thickness of 50 mm. The concrete was overlying 1,350 mm of granular fill material.

Variable fill materials were encountered underlying the pavement structure, concrete, or at the surface at each locations and extended to depths of 0.5 to 2.1 m (average depth of about 1.5 m). The fill materials ranged from sand and gravel with trace silt, to silt with trace sand and gravel. At several borehole locations, debris such as wood, brick, and/or organics were encountered within the fill.

SPT N-values measured within the fill deposits range from 3 to 37 blows per 300 mm penetration of the split spoon sampler, indicating very loose to dense conditions. Insitu moisture contents in the fill range from approximately 8 to 26% indicating moist to saturated conditions.

4.2 Glacial Till Deposits

Glacial till deposits were encountered at each borehole location underlying fill soils with the exceptions of Boreholes BH306-22 to BH308-22, BH313-22 and MW319-22. Boreholes BH306-22, BH307-22 and BH308-22 terminated drilling within the layer of fill soils. Boreholes BH313-22 and MW319-22 had a silt deposit directly underlying fill soils, with a glacial till deposit found directly beneath the silt deposit.

The glacial till deposits encountered extended to either underlying granular deposits, bedrock surface, or the borehole was terminated within the glacial till deposit depth. The depth of granular deposits directly underlying a glacial till deposit ranges from 7.6 to 9.1 m (average depth of 8.4 m). The depth of bedrock surface directly underlying a glacial till deposit ranges from 5.5 to 10.7 m (average depth of 8.5 m)

The glacial till deposits ranged in composition from cohesive clayey silt till to non-cohesive silt and sand till. The results of several particle size distribution analyses conducted on samples of the till are provided in **Appendix C** and summarized in the following table;

Table 1 – Results of Till Particle Size Distribution Analyses

Borehole Number	Sample Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH203-20	4.6 – 5.0	13	42	35	10
MW302-22	4.6 – 5.2	3	26	40	31
MW309-22	6.1 – 6.7	4	28	42	26
MW314-22	4.6 – 5.2	23	30	36	11
MW320-22	9.1 – 9.8	8	30	41	21

SPT N-values measured in the non-cohesive portions of the till range from 3 to 46 blows per 300 mm penetration of the split spoon sampler indicating very loose to dense conditions. Approximate shear strengths measured in cohesive portions of the till range from 50 to greater than 200 kPa, indicating firm to hard consistencies.

Insitu moisture contents in the till range from about 5 to 29% indicating very moist to saturated conditions or drier than to wetter than the plastic limit.

4.3 Granular Soil Deposits

Native granular deposits comprised of silt, trace sand and gravel were encountered directly beneath the granular fill in Boreholes BH313-22 and MW319-22. The thickness of the silt was 0.7 and 0.8 m respectively.

Native granular soil deposits ranging from sand and silt to sand and gravel were encountered underlying the glacial till and overlying the shale bedrock at Boreholes MW201A/B-20, MW202-20, BH304-22, BH311-22 and ranged in thickness of 0.5 to 1.5 m respectively (average thickness of 0.9 m). The results of two particle size distribution analyses conducted on samples of the granular soils are provided in **Appendix C** and summarized in the following table;

Table 2 – Results of Granular Soil Particle Size Distribution Analyses

Borehole Number	Sample Depth (m)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
MW201A-20	9.1 – 9.6	0	50	44	6
MW202-20	7.6 – 7.8	40	40	15	5

SPT N-values measured in the granular soils were 14 to greater than 50 blows per 300 mm penetration of the split spoon sampler indicating compact to very dense conditions.

Insitu moisture contents in the native granular soils range from about 9 to 20% indicating moist to saturated conditions.

4.4 Shale Bedrock

Shale bedrock of the Queenston Formation, as per the Ontario Geological Survey (OGS), Paleozoic Geology of Southern Ontario mapping was encountered underlying the native soil deposits at the site, at depths of 4.6 to 10.7. The elevation of encountering bedrock ranges from 205.0 to 207.7 m. It is noted that it is often difficult to distinguish where the interbedded overburden/shale complex ends and the bedrock begins, particularly where the bedrock surface is highly weathered. As such, variations in the bedrock surface of 1 to 2 m or more should be expected.

The Queenston Formation bedrock typically comprises reddish brown, highly weathered, fine to very fine grained, weak to moderate strength shale interbedded with medium strong to very strong siltstone and limestone layers. The encountered bedrock is consistent with typical Queenston Formation bedrock and was reddish brown in colour, with occasional clay seams and grey limestone layers noted throughout the depths explored.

The Rock Quality Designation (RQD) of the bedrock was measured in the field by MTE and was found to range from 22 to 88%, indicating very poor to good quality. The very poor portion of bedrock was encountered at Borehole BH203-20, at a depth of about 11 m below the ground surface (Elevation 201.0 m), and multiple clay seams were noted within the recovered core. The average RQD measured was at approximately 50%, indicative of overall 'fair' quality.

Five bedrock core samples from the previous investigation were submitted to CTA Laboratories for unconfined compressive strength testing and the results are summarized in the following table;

Table 3 – Results of Compressive Strength Testing

Borehole Number	Sample Depth (m)	Sample Elevation (m)	Sample Density (kg/m^3)	Compressive Strength (MPa)
MW201A-20	17.3 – 17.4	198.9 – 198.8	2.188	4.2
MW201A-20	17.4 – 17.6	198.8 – 198.6	2.091	3.3
MW201A-20	18.3 – 18.4	197.9 – 197.8	2.378	10.4
MW202-20	14.7 – 14.9	199.4 – 199.2	2.426	10.2
MW203-20	12.5 – 12.7	199.5 – 199.3	2.553	6.4

Two core samples from the current investigation were submitted to Golder for unconfined compressive strength testing and the results are summarized in the following table;

Table 4 – Results of Compressive Strength Testing

Borehole Number	Sample Depth (m)	Sample Elevation (m)	Sample Density (Mg/m^3)	Compressive Strength (MPa)
BH313-22	13.1 – 13.3	203.5 – 203.3	2.34	7.8
MW319-22	13.3 – 13.5	202.7 – 202-5	2.32	7.5

5.0 Groundwater Conditions

Groundwater observations and measurements were carried out in the open boreholes at the time of drilling and are summarized on the borehole logs. A total of seven (7) monitoring wells were installed during this investigation and water level measurements taken on March 25, 2022 are summarized in the following table;

Table 5 – Water Level Measurements Taken March 25, 2022

Monitoring Well Number	Ground Surface Elevation (m)	Groundwater Depth (m)	Groundwater Elevation (m)
MW302-22	212.9	4.4	208.5
MW309-22	214.1	5.0	209.0
MW310A-22	216.1	6.5	209.7
MW310B-22	216.1	2.0	214.2
MW314-22	216.0	2.6	213.4
MW319-22	216.0	6.9	209.1
MW320-22	215.2	7.4	207.8

Reference is provided to MTEs concurrent hydrogeological assessment for full details on the site groundwater conditions, including water levels taken in previously installed monitoring wells.

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations and local variations.

6.0 Discussion and Recommendations

6.1 General

MTE Consultants Inc. (MTE) was retained by Greenwin Corp. to conduct a geotechnical investigation for the proposed development located at 18-28 Elizabeth Street North and 31-33 George Street in Brampton, Ontario. The subject area (the site) currently comprises a historical house at 28 Elizabeth Street North, residential houses at 18-24 Elizabeth Street North and a multiunit commercial building at 31-33 George Street North with parking lot areas between, as shown on **Figure 1 in Appendix A**.

It is understood that the proposed development includes removal of the existing commercial building and all four residential homes for construction of two mixed use high rise buildings connected with a podium to the historical house, which is to remain onsite.

The north portion of the site (31-33 George Street North) is proposed to comprise a 7 to 9 storey hotel podium, with a 42 storey tower in the area of the existing parking lots. The south portion of the site (18 to 24 Elizabeth Street North) is proposed to comprise a 5 to 8 storey podium, with a 37 storey tower. The two towers would be connected by a 1 storey podium structure. Additionally, below grade parking would be provided, comprising 4 levels below grade at the lower George Street North side of the site, becoming 5 levels below grade at the higher Elizabeth Street North side of the site with the lowest basement floor (P5) at Elevation 199.15 m.

The subsurface stratigraphy at the site comprises asphaltic concrete and/or fill overlying native deposits of predominately glacial till with layers of granular deposits overlying shale bedrock. Groundwater was measured in monitoring wells installed during this investigation at depths ranging from 2.0 to 7.4 m (Elevation 207.8 to 214.2 m).

The purpose of this geotechnical investigation is to determine the soil, bedrock and groundwater conditions in the area of the proposed development and provide geotechnical engineering recommendations including foundations, earth pressures, excavations, and temporary shoring.

6.2 Foundation Design

It is anticipated that the proposed structure will be founded on the Queenston shale bedrock encountered at Elevation 205.0 to 207.7 m at the borehole locations. The finished floor elevation of the lowest level of parking garage is proposed to be at approximate Elevation 199.15 m, and foundations are expected to be located 1 to 2 m below this level.

It is noted that due to a design change after the completion of fieldwork which increased the number of underground parking levels, the boreholes from the current investigation do not extend beyond the proposed founding depths and it is recommended to complete supplemental borehole drilling to a depth below the proposed foundations to confirm the competency of the bedrock.

Based on the results of this investigation, conventional footings founded on the Queenston shale bedrock in the range of ±198.0 m may be designed for a factored geotechnical bearing resistance at Ultimate Limit States (ULS) of 1,500 kPa and soil bearing resistance for 25 mm of settlement at Serviceability Limit States (SLS) of 1,000 kPa, subject to confirmatory drilling to below the founding elevations.

The footing areas must be inspected by qualified geotechnical personnel to ensure that the rock conditions encountered at the time of construction are suitable to support the design resistances prior to pouring concrete. Any loose, disturbed, or deleterious material identified during the inspection should be removed from the footing areas and replaced with concrete.

The shale materials are highly susceptible to disintegration of the clay rich material when exposed to water and/or alternate cycles of wetting and drying, and freeze and thaw. It is recommended the length of time the shale is exposed be minimized in the excavation base prior to pouring concrete. It is strongly recommended to pour a working slab of concrete on the exposed bedrock following excavation and inspection.

All exterior floor slabs and footings in unheated areas must be provided with a minimum 1.2 m of earth cover after final grading in order to minimize the potential of damage due to frost action, as per Ontario Provincial Standard Drawing, OPSD 3090.101, dated November 2010. If construction is undertaken during the winter, the subgrade and concrete should be protected from freezing.

Where spread footings are constructed at different elevations, the difference in elevation in the individual footing should not be greater than one half of the clear distance between the footings. The lower footing should be constructed first so that if it is necessary to construct the lower footings at a greater depth than anticipated, the elevation of the upper footings can be adjusted accordingly.

For foundations constructed on the shale bedrock, a Site Classification ‘C’ should be used for earthquake load and effects in accordance with Table 4.1.8.4.A. of the 2012 Ontario Building Code. It may be feasible to reclassify the site to Site Classification ‘B’; however, site specific shear wave velocity testing would be required.

6.3 Earth Pressure on Below Grade Walls

It is understood that the proposed structure will be constructed with four to five levels of parking below grade. The groundwater table measured in the overburden monitoring wells is located at 2.6 to 6.7 m depth below ground surface (Elevation 208.6 to 210.1 m). It is anticipated that the basement will be constructed with a perimeter drainage system to prevent the buildup of hydrostatic pressures. The lateral earth pressure acting at any depth may be calculated using the following formula:

$$P_{soil} = K_1 (\gamma_1 h_1 + q)$$

$$P_{rock} = K_2 (\gamma_1 H_1 + q + \gamma_2 h_2)$$

where:

P = lateral earth pressure acting at depth h_1 or h_2 (kPa)

K_1 = earth pressure coefficient – assume 0.4 for soil pressure

K_2 = rock pressure coefficient – assume 0.25 for shale pressure

γ_1 = unit weight of soil backfill – assume 22 kN/m^3

γ_2 = unit weight of bedrock – assume 25 kN/m^3

h_1 = depth below ground surface (m)

H_1 = depth of bedrock below ground surface (m)

h_2 = depth below bedrock/overburden interface (m)

q = value of surcharge (kPa)

The above equation assumes that hydrostatic pressures will be dissipated by a perimeter drainage layer. If this is not the case and the below grade parking garage is constructed as a water-tight ‘tanked’ design, then hydrostatic pressure must be accounted for in the design. If a secant caisson wall is used for temporary shoring and the foundation wall is poured against the caisson wall, both the caisson wall and the foundation wall must be designed to resist hydrostatic pressures. If required, the magnitude of the hydrostatic uplift may be calculated using the following formula:

$$P = \gamma \times d$$

where:

P = hydrostatic uplift pressure acting on the base of the structure (kPa)

γ = unit weight of water - use 9.81 kN/m3

d = depth of base of the structure below the design high water level (m)

The Queenston Formation shale bedrock contains substantial locked-in horizontal stresses. When released, these stresses can impose significant loading on underground structures often referred to as ‘rock squeeze’. This deformation is slow developing over time and will continue past initial elastic deformations. The building foundation should not be designed to resist these forces and it is recommended that a layer of compressible material should be placed between the structure and the rock.

6.4 Basements and Floor Slab

Basements at this site should be provided with perimeter and subfloor weeping tile systems. The drain tile or pipe should be laid on well compacted soil so that the top of the tile or pipe (minimum 100 mm diameter) is below the bottom of the basement floor slab. The top and sides of the drain tile or pipe shall be surrounded with not less than 150 mm of crushed stone or other clean coarse granular material containing no more than 10% of material that will pass the 4 mm sieve. The crushed stone should be wrapped with filter cloth. The weeping tile must drain to a sump equipped with an automatic pump that will discharge water into a storm sewer service or other suitable frost free outlet.

If the proposed basement level is constructed using conventional slab-on-grade floor techniques, the proposed subgrade will comprise the undisturbed shale bedrock.

Any additional material required to raise grades below the floor slabs should be comprised of sand and gravel and be compacted to 100% SPMDD. A minimum 200 mm thick layer of clear crushed stone (19 mm maximum aggregate) should be placed and compacted directly beneath the slab for leveling and support purposes.

A modulus of subgrade reaction of 40 to 50 MPa/m should be used in the design of the floor slab on bedrock.

The water to cement ratio and slump of the concrete utilized in the floor slab should be strictly controlled to minimize shrinkage of the slab. Control joints should be sawed into the slabs at regular intervals within 12 hours of initial concrete placement in order to prelocate shrinkage cracks.

Concrete testing should be performed onsite to determine the slump, temperature, and air entrainment; and concrete cylinders should be cast for compressive strength testing.

6.5 Excavations and Dewatering

It is anticipated that excavations will be required to extend into the shale bedrock. It is anticipated that excavations will generally be feasible using a large excavator equipped with a single tooth ripper. Where harder limestone layers are encountered, jackhammer equipment may be required to break through the layers.

All excavations at the site should be carried out in conformance with the Ontario Occupational Health and Safety Act and Regulations for Construction Projects. The predominate native soils encountered at the site are classified as Type 3 soils, and temporary side slopes through this material must be cut at an inclination of 1.0 horizontal to 1.0 vertical or less from the base of the excavation. The shale bedrock would be considered Type 1 soils and temporary site slopes through this material can be cut near vertical in the bottom 1.2 m and must be cut at an inclination of 1.0 horizontal to 1.0 vertical or less from this level. Where wet to saturated conditions are encountered, excavation side slopes should be expected to slough to flatter inclinations, potentially 3.0 horizontal to 1.0 vertical or flatter.

Minor groundwater inflow should be expected where excavations extend into the wet to saturated fill and glacial till deposits and when excavations proceed through the shale bedrock. It is anticipated that conventional sump pumping techniques will be sufficient to control the inflow in these areas.

Moderate to significant groundwater inflow should be expected where the excavations extend into the saturated granular deposits encountered immediately above the shale bedrock. It is anticipated that significant pumping would be required in order to control the groundwater inflow in these locations. Depending on the design of the shoring at the site, proactive dewatering of these deposits may be required to prevent significant groundwater inflows and undermining of the excavation sides from sloughing soils at this depth. Additional dewatering information and recommendations are provided in MTE's concurrent hydrogeological assessment.

It should be noted that an Environmental Activity and Sector Registry (EASR) or Permit to Take Water (PTTW), issued by the Ministry of Environment, Conservation and Parks, will be required if the dewatering system/sumps result in a water taking of more than 50,000 L/day or 400,000 L/day, respectively. The design of the dewatering system should be left to the contractor's discretion to control groundwater at least 0.5 m below the excavation level in order to provide stable excavation base. The contractor should notify the prime consultant in the event that they feel that an EASR or PTTW will be needed.

6.6 Temporary Shoring System

It is anticipated that excavations at the above safe excavation inclinations as per the Ontario Occupational Health and Safety Act and Regulations for Construction Projects will be considered not practicable given the proposed depth of excavation and adjacent site constraints and shoring installation will be required at the site. It is anticipated that conventional shoring systems such as soldier piles with lagging, secant caisson wall or sheet piling would be generally suitable at the site, however, the method of shoring should be left to the contractor's discretion.

If an excavation may affect the stability of the adjacent structure, the contractor shall take precautions to prevent damage to the adjacent building as per O.Reg 213/91, s. 229. Temporary shoring measures must be designed as per the Canadian Foundation Engineering Manual. The surcharge loading from adjacent structures must be accounted for in the design of the shoring system.

The following soil parameters can be utilized in the design of shoring systems at the site;

Table 6 – Shoring Design Parameters

Soil	Unit Weight (kN/m^3)	Friction Angle	K_o	K_a	K_p
Overburden Deposits	22	30	0.50	0.33	3.00
Shale Bedrock	25	35	0.43	0.27	3.69

The at rest earth pressure coefficient (K_0) should be utilized when movement adjacent to the wall must be minimal. The active earth pressure coefficient (K_a) can be utilized when minor movements can be tolerated.

Movement of any shoring system is inevitable but provided sound design and construction practices are employed, horizontal movements would be anticipated in the range of 0.1 to 0.25% of the height retained. Monitoring of the shoring system should be provided on a periodic basis by the site contractor.

Soil anchors at the site may be designed for 30 kPa and rock anchors may be designed with a skin friction of 350 kPa. These design values must be confirmed onsite at the time of construction by load testing carried out to twice the design load.

6.7 Methane Gas

Although not measured during this investigation, methane gas is known to exist within the shale bedrock in the Greater Toronto Area. Appropriate measures should be taken, including monitoring of methane, during construction.

7.0 Limitations of Report

Services performed by MTE Consultants Inc. (MTE) were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the Geotechnical Engineering & Consulting profession practicing under similar conditions in the same geographic area were the services are provided. No other warranty or representation expressed or implied as to the accuracy of the information, conclusions or recommendations is included or intended in this report.

This report was completed for the sole use of the Client. This report is not intended to be exhaustive in scope or to imply a risk-free site. As such, this report may not deal with all issues potentially applicable to the site and may omit aspects which are or may be of interest to the reader.

In addition, it should be recognized that a soil sample result represents one distinct portion of a site at the time it is collected, and that the findings of this report are based on conditions as they existed during the time period of the investigation. The material in the report reflects our best judgment using the information available at the time the report was written. The soil and groundwater conditions between and beyond the test holes may differ from those encountered in the test holes. Should subsurface conditions arise that are different from those in the test holes MTE should be notified to determine whether or not changes should be made as a result of these conditions.

It should be recognized that the passage of time may affect the views, conclusions and recommendations (if any) provided in this report because groundwater conditions of a property can change, along with regulatory requirements. All design details were not known at the time of submission of this report and it is recommended MTE should be retained to review the final design documents prior to construction to confirm they are consistent with our report recommendations. Should additional or new information become available, MTE recommends that it be brought to our attention in order that we may determine whether it affects the contents of this report.

Any use which another party makes of this report, or any reliance on, or decisions to be made based upon it, are the responsibility of such parties. MTE accepts no responsibility for liabilities incurred by or damages, if any, suffered by another party as a result of decisions made or actions taken, based upon this report. Others with interest in the site should undertake their own investigations and studies to determine how or if the condition affects them or their plans. The contractors bidding on this project or undertaking the construction should make their own interpretation of the factual information and draw their own conclusions as to how subsurface conditions may affect their work.

The benchmark and elevations provided in this report are primarily established to identify differences between the test hole locations and should not be used for other purposes such as, planning, development, grading, and excavation.

All of which is respectfully submitted,

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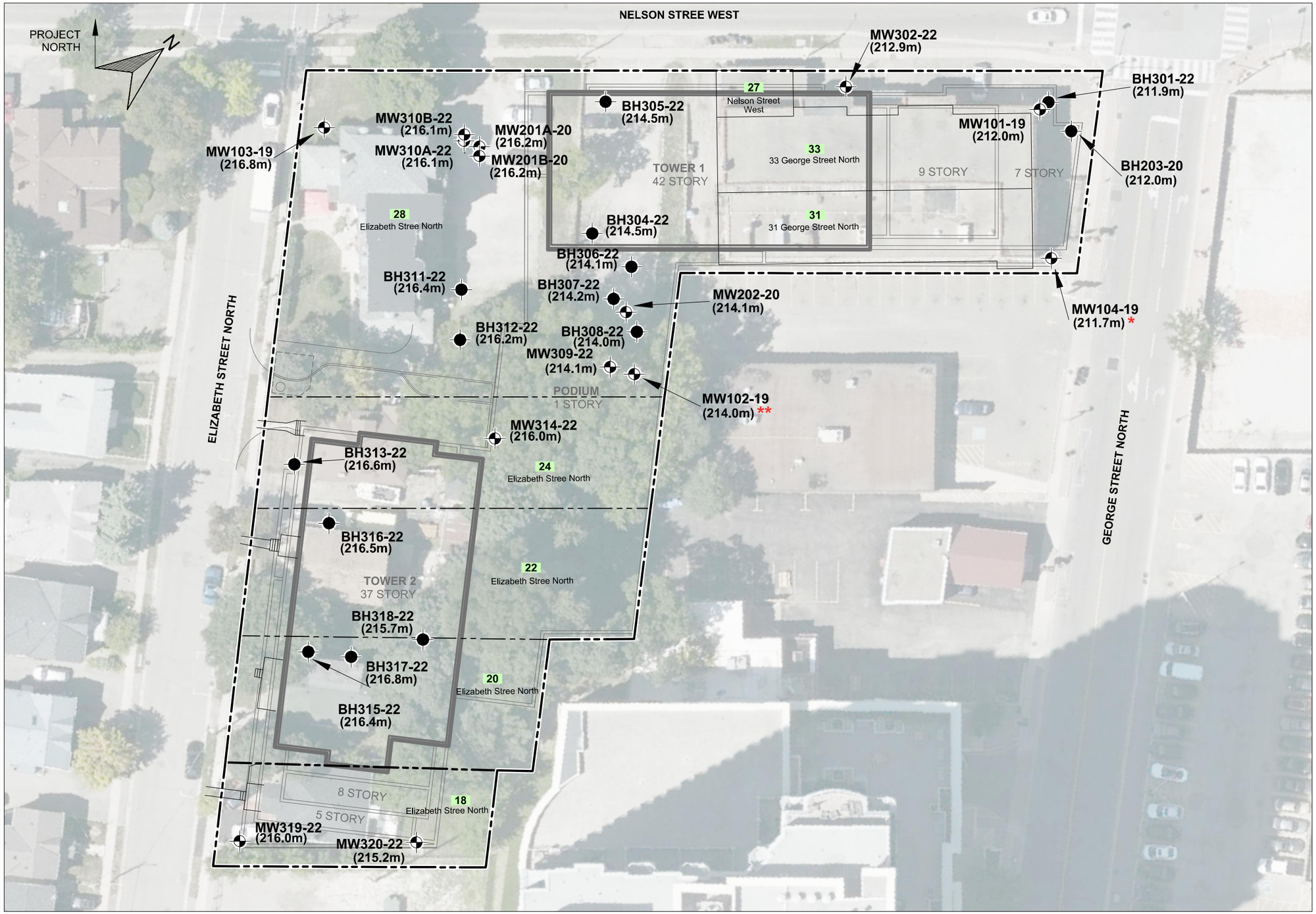
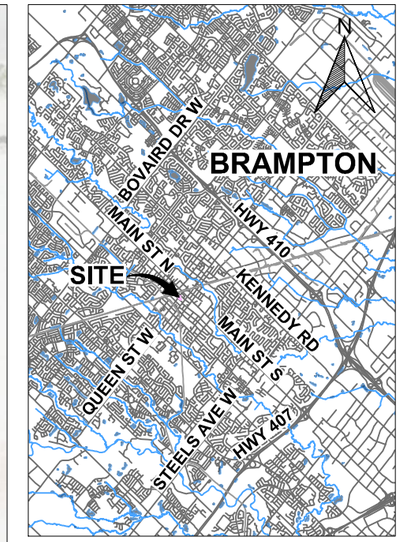
Appendix A

Figures

Figure 1- Site Plan





KEY PLAN

LEGEND

- SITE BOUNDARY
- 14 MN ADDRESS
- CONCEPT PLAN TOWER
- BOREHOLE
- BOREHOLE/MONITORING WELL
- (216.5m) ELEVATION (m amsl)
- * Ground surface inferred from MW101-19
- ** MW102-19 Buried under snow and ice at the time of survey. Ground surface inferred from vicinity of MW102-19

REFERENCES

BING IMAGERY AS OF MAY 9 - 2022 (IMAGE DATE UNKOWN);
VLADIMIR DOSEN SURVEYING, SURVEYOR'S REAL PROPERTY REPORT; APRIL 24 - 2018; AND
GREENWIN CORP. CONCEPT PLAN, AUTOCAD FILE "220422_28 Elizabeth Brampton-Sheet - AZ101 - Site Plan & Zoning Info.dwg", APRIL 22 - 2022.

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

BING IMAGERY USED FOR ILLUSTRATION PURPOSES ONLY AND NOT TO BE USED FOR MEASUREMENTS.

ALL LOCATIONS ARE APPROXIMATE.

MTE
Engineers, Scientists, Surveyors

PROJECT
GEOTECHNICAL INVESTIGATION
18-24 & 28 ELIZABETH STREET NORTH
and 31-33 GEORGE STREET NORTH
BRAMPTON, ONTARIO

TITLE
SITE PLAN

Drawn DCH	Scale AS SHOWN	**FIGURE 1**
Checked	Project No. 46372-301	
Date May 9/22	Rev No. 0	

Client: Greenwin Corp.

CAD: \\MTE85.LOCAL\MTE\DWG\P\46372\301\2_PROD\46372-301-R01 GEOTECHNICAL INVESTIGATION\46372-301-R01001.DWG

25mm Original Format in Tabloid (279mm x 432mm: 11" x 17")

Appendix B

Borehole Logs

Abbreviations and Symbols

BH301-22 to MW320-22
MW201A-20, MW201B-20, MW202-20, and BH203-20
MW101-19 to MW104-19

The following are abbreviations and symbols commonly used on borehole logs, figures and reports.

Sample Types

AS	Auger Sample
CS	Chunk Sample
BS	Bulk Sample
GS	Grab Sample
WS	Wash Sample
SS	Split Spoon
RC	Rock Core
SC	Soil Core
TW	Thinwall, Open
TP	Thinwall, Piston

Soil Tests

PP	Pocket Penetrometer
FV	Field Vane
SPT	Standard Penetration Test
CPT	Cone Penetration Test
WC	Water Content
WL	Water Level

Penetration Resistance

Standard Penetration Test, N (ASTM D1586)	The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) open spilt spoon sampler for a distance of 300 mm (12 in.).
Dynamic Cone Penetration Resistance	The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive an uncased 50 mm (2 in.) diameter, 60o cone attached to “A” size drill rods for a distance of 300 mm (12 in.).

Soil Description

Cohesive Soils	Undrained Shear Strength (Cu)	
Consistency	kPa	psf
Very Soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1,000
Stiff	50 to 100	1,000 to 2,000
Very Stiff	100 to 200	2,000 to 4,000
Hard	Above 200	Above 4,000

Cohesionless Soils	
Relative Density	SPT N Value
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	Above 50

WH	Sampler advanced by static weight of hammer
WR	Sampler advanced by static weight of drilling rods
PH	Sampler advanced by hydraulic force
PM	Sampler advanced by manual force

DTPL	Drier than Plastic Limit
APL	About Plastic Limit
WTPL	Wetter than Plastic Limit
mbgs	Metres below Ground Surface

ID No.: BH301-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/19/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	211.9						
		ASPHALTIC CONCRETE 150mm	0.0	1	SS	24		17	
		FILL compact brown sand and gravel, some silt, wet		2	SS	15		15	
		compact brown silt, trace sand, gravel, and organics, very moist to wet	210.4 / 1.5	3	SS	4		22	
		loose	209.6						
		loose brown sand and silt, trace gravel, wet	2.3	4	SS	3		24	
		CLAYEY SILT TILL firm grey clayey silt, trace sand and gravel, APL	208.9 / 3.0	5	SS	6	50	27	Bentonite
		SHALE dense to very dense red shale with grey seams, damp	207.3 / 4.6	6	SS	40		10	
			205.7	7	SS	50/75mm		5	Dry Cave
		Drilling Terminated	6.2						Borehole dry upon drilling completion

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: MW302-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/19/2022

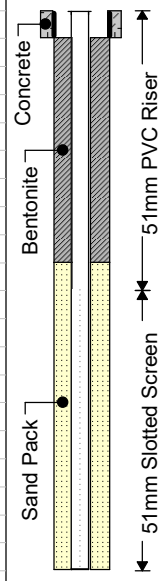
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Flushmount Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	212.9						
		ASPHALT 150mm	0.0	1	SS	13		20	
		FILL compact brown sand and gravel, some silt, wet	212.1 / 0.8	2	SS	6		17	
		compact brown silt, trace to some sand, trace gravel, organics, and brick fragments, wet		3	SS	6		23	
		loose		4	SS	6		26	
		loose brown/grey sand and silt, trace gravel, wet	209.5 / 3.4	5	SS	6		26	
		CLAYEY SILT TILL very stiff grey clayey silt, trace sand and gravel, DTPL	208.3 / 4.6	6	SS	10	150	13	
		SHALE very dense red shale	206.8 / 6.1	7	SS	50/125mm		12	
		Drilling Terminated							



Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

Sheet: 1 of 1

ID No.: BH304-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/7/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	214.5						
0		**FILL** compact light brown sand and gravel, trace silt, very moist	0.0	1	SS	10		16	
2		**SILT TILL** compact brown silt, trace sand and gravel, moist		2	SS	11		12	
6				3	SS	23		12	
8				4	SS	23		9	
10			211.1	5	SS	13	>200	8	
12		**CLAYEY SILT TILL** hard to very stiff grey clayey silt, trace sand and gravel, DTPL	3.4						← Bentonite
16				6	SS	14	150	20	
20		firm to stiff	208.4 / 6.1	7	SS	13	50	13	
24			206.9						
26		**SILTY SAND** dense reddish grey silty sand, trace gravel, saturated	7.6 / 206.3	8	SS	41		18	← Wet Cave
28		**SHALE** dense red shale with grey seams	8.2 / 205.4	9	GS				Water encountered at 7.6mbgs during drilling
30		Drilling Terminated	9.1						

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: BH305-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/7/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	214.5						
		FILL compact brown sand and gravel, trace silt, moist	0.0	1	SS	21		10	
		compact brown silt, some sand, trace gravel and brick fragments, moist	213.7 / 0.8	2	SS	26		10	
		SILT TILL compact to dense brown silt, some sand, trace gravel, moist		3	SS	30		10	
				4	SS	45		8	
		CLAYEY SILT TILL hard grey clayey silt, some gravel, trace sand, DTPL	211.1 / 3.4	5	SS	27		8	
				6	SS	16	>200	15	
				7	SS	12	>200	15	
		SHALE very dense red shale with grey seams	206.9 / 7.6	8	SS	59		14	
			205.4	9	GS			15	
		Drilling Terminated	9.1						

Bentonite

Dry Cave

Borehole dry upon drilling completion

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: BH306-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/11/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0		Ground Surface	214.1						
0		**FILL** compact brown sand and gravel, trace silt, organics, and brick fragments, wet	0.0	1	SS	18		17	Bentonite
2		compact dark brown silt, some sand, trace gravel, organics, and brick fragments, wet	213.3 / 0.8	2	SS	8		16	Dry Cave
6 / 2		loose brown sandy silt, trace gravel, black peat, and brick fragments, wet	212.0 / 2.1	3	SS	6		17	Borehole dry upon drilling completion
		Drilling Terminated							

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: BH307-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/11/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Subsurface Profile				Sample		Dynamic Cone / Standard Penetration	Shear Strength (PP) / Shear Strength (FV)	Water Content	Groundwater Observations and Standpipe Details
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	20 40 60 80	50 100 150 200 kPa	10 20 30 %	
		Ground Surface	214.2						
		FILL compact brown sand and gravel, trace silt and organics, wet	0.0 / 213.4	1	SS	12		23	Bentonite
		compact dark brown to brown silt, some sand, trace gravel, organics, and brick fragments, wet	0.8 / 212.7	2	SS	7		16	Dry Cave
		loose	1.5 / 212.1	3	SS	10		17	Borehole dry upon drilling completion
		compact	2.1						
		Drilling Terminated							

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: BH308-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/11/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	214.0						
		FILL compact brown sand and gravel, trace silt and organics, wet	0.0 / 213.2	1	SS	21		33	Bentonite
		compact brown silt, trace sand, gravel, and brick fragments, wet	0.8 / 212.5	2	SS	7		22	Dry Cave
		loose dark brown sandy silt, trace gravel and organics, wet	1.5 / 211.9	3	SS	5		15	Borehole dry upon drilling completion
		loose brown silt, trace sand, gravel, and organics (peat), very moist	2.1						
		Drilling Terminated							

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: MW309-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/11/2022

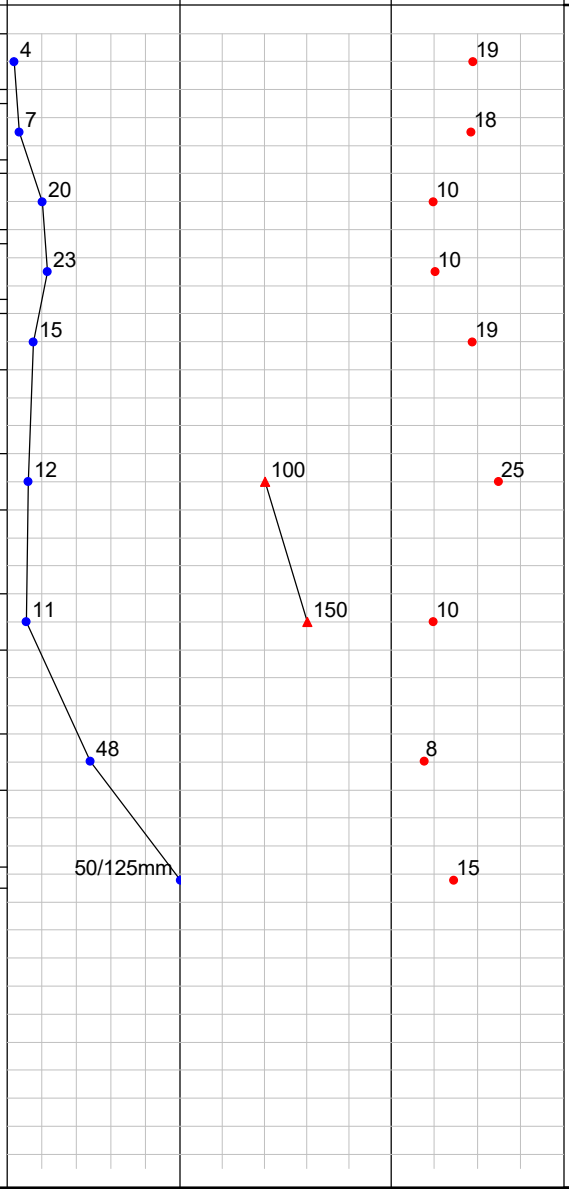
Drilling Contractor: Geo-Environmental Drilling Inc.

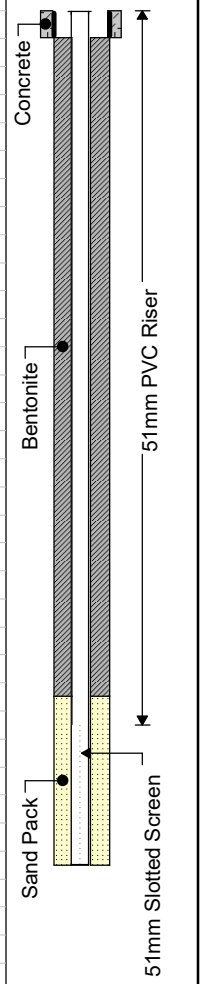
Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
		Ground Surface	214.1		
		FILL loose brown sand and gravel, some silt and organics, wet	0.0 / 213.3	1	SS
		loose dark brown sandy silt, trace gravel and organics, wet	0.8 / 212.5	2	SS
		compact brown silt, trace to some sand and organics, very moist	1.5 / 211.0	3	SS
				4	SS
		SILT TILL compact brown silt, some sand, trace gravel and clay, wet	3.0 / 209.5	5	SS
		CLAYEY SILT TILL stiff grey clayey silt, trace sand and gravel, APL	4.6 / 208.0	6	SS
		very stiff, DTPL	6.1 / 206.4	7	SS
		SHALE dense to very dense red shale	7.6 / 204.8	8	SS
				9	SS
		Drilling Terminated	9.3		





Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

Sheet: 1 of 1

ID No.: MW310A-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/6/2022

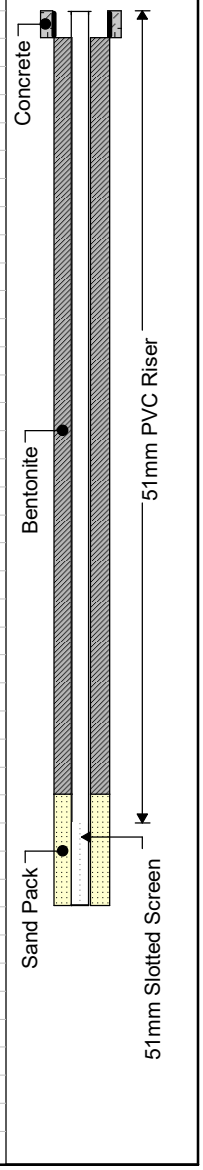
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Flushmount Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	216.1						
		FILL dense brown sand and gravel, trace silt, very moist	0.0 / 215.3	1	SS	15		13	
		compact dark brown sandy silt, some gravel and brick fragments, very moist	0.8	2	SS	18		10	
		SILT TILL compact to dense mottled brown/grey silt, some sand, trace gravel and clay, moist		3	SS	22		10	
				4	SS	46		9	
				5	SS	39		9	
		CLAYEY SILT TILL hard to very stiff grey clayey silt, some sand, trace gravel, DTPL	211.5 / 4.6	6	SS	20	>200	9	
				7	SS	17	150	20	
		stiff	208.5 / 7.6	8	SS	13	75	12	
		SHALE dense red shale with grey seams	207.0 / 9.1	9	SS	35		18	
		Drilling Terminated	206.3 / 9.8						



Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

Sheet: 1 of 1

ID No.: MW310B-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/6/2022

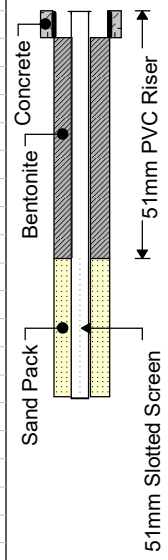
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Flushmount Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	216.1						
0		**FILL** dense brown sand and gravel, trace silt, very moist	0.0	1	SS	15		13	
		compact dark brown sandy silt, some gravel and brick fragments, very moist	215.3 / 0.8	2	SS	18		10	
6 / 2		**SILT TILL** compact to dense mottled brown/grey silt, some sand, trace gravel and clay, moist		3	SS	22		10	
8				4	SS	46		9	
10				5	SS	39		9	
14 / 4			211.9 / 4.2						
		Drilling Terminated							



Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Sheet: 1 of 1

Notes:
Stratigraphy inferred from MW310A-22

ID No.: BH311-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/6/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

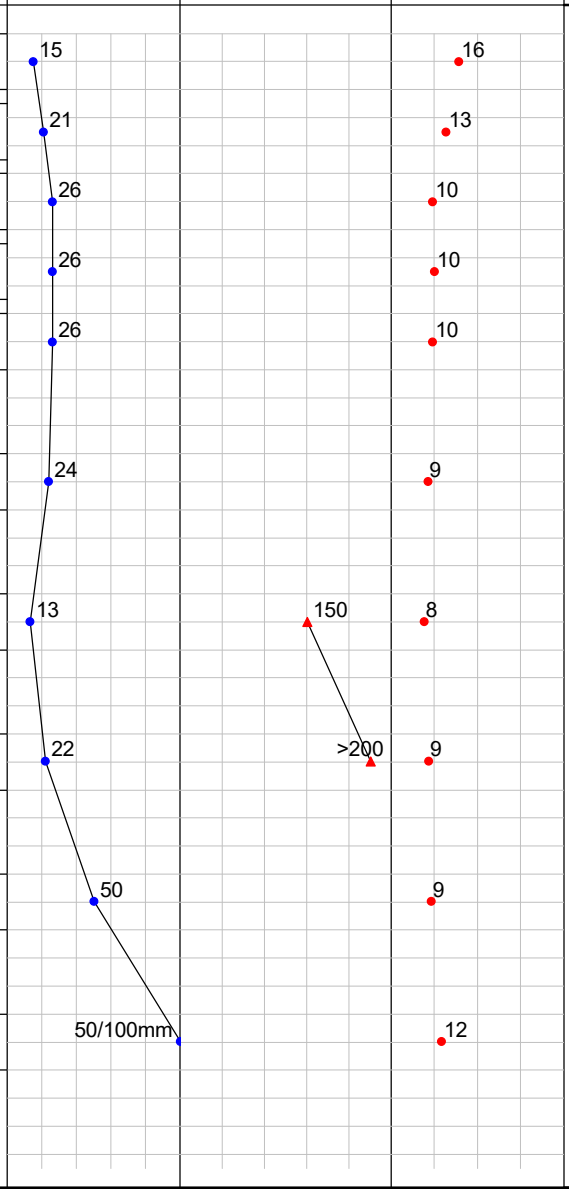
Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
		Ground Surface	216.4		
0		**FILL** compact brown sand and gravel, wet	0.0	1	SS
		compact brown sandy silt, trace organics, wet	215.6 / 0.8	2	SS
		SILT TILL compact brown silt, some sand, trace gravel and clay, very moist to moist		3	SS
				4	SS
				5	SS
				6	SS
		CLAYEY SILT TILL very stiff to hard grey clayey silt, trace sand and gravel, DTPL	210.3 / 6.1	7	SS
				8	SS
		SILTY SAND very dense brown silty sand, trace gravel, moist	207.3 / 9.1	9	SS
		SHALE very dense red shale	206.8 / 9.6	10	SS
		Drilling Terminated	205.1 / 11.3		

Subsurface Profile; Sample



Groundwater Observations and Standpipe Details

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: BH312-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/5/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	216.1						
0		**FILL** dark brown silt (topsoil), some sand, wet	0.0	1	SS	8		22	
2		loose black ash, aome glass and brick fragments, wet		2	SS	19		12	
4		**SILT TILL** compact brown silt, some sand, trace to some gravel, very moist to moist		3	SS	28		10	
6				4	SS	37		11	
8				5	SS	44		10	
10									
12									
14			211.5						
16		grey	4.6	6	SS	25		8	← Bentonite
18									
20		**CLAYEY SILT TILL** very stiff grey clayey silt, trace sand and gravel, APL	210.0 / 6.1	7	SS	12	125	24	
22									
24			208.5						
26		stiff to very stiff	7.6	8	SS	13	100	13	
28									
30			206.8	9	SS	50/125mm		16	
32		**SHALE** very dense red shale with grey seams	9.3						
34				10	SS	50/75mm		11	
36									
38				11	GS				
40			203.9						← Dry Cave
		Drilling Terminated	12.2						

Field Technician: DMG

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

Sheet: 1 of 1

ID No.: BH313-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/12/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Coring Casing Advance

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	216.6						
		FILL loose dark brown sandy silt, trace gravel and organics, wet	0.0 / 215.8	1	SS	6		19	
		SILT compact brown/grey mottled silt, trace sand and gravel, very moist	0.8 / 215.1	2	SS	14		13	
6 / 2		**SILT TILL** dense mottled brown silt, trace sand, gravel, and clay, very moist to moist	1.5	3	SS	45		12	
8				4	SS	32		10	
10				5	SS	42		9	
14			212.0						
16		**CLAYEY SILT TILL** hard grey clayey silt, trace sand and gravel, APL	4.6	6	SS	30	>200	12	
20 / 6				7	SS	24	200	9	Bentonite
24			209.0						
26 / 8		stiff	7.6	8	SS	11	75	29	
30				9	SS	13	50	11	
34 / 10			205.9			50/100mm		8	
36		**SHALE** very dense red shale	10.7	10					
38 / 12		core run 1, RQD = 32.6%		11	RC				
40									

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 2

ID No.: BH313-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/12/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Coring Casing Advance

Protective Cover: N/A

Subsurface Profile				Sample		Dynamic Cone × / Standard Penetration ● (20 40 60 80)	Shear Strength (PP) ▲ kPa / Shear Strength (FV) ■ kPa (50 100 150 200)	Water Content ● % (10 20 30)	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type				
			204.0						
42		core run 2, RQD = 72.9%	12.6						
44				12	RC				
46	14		202.5						← Dry Cave
		Drilling Terminated	14.1						Borehole dry upon drilling completion
48									
50									
52	16								
54									
56									
58	18								
60									
62									
64									
66	20								
68									
70									
72	22								
74									
76									
78	24								
80									

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

ID No.: MW314-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/5/2022

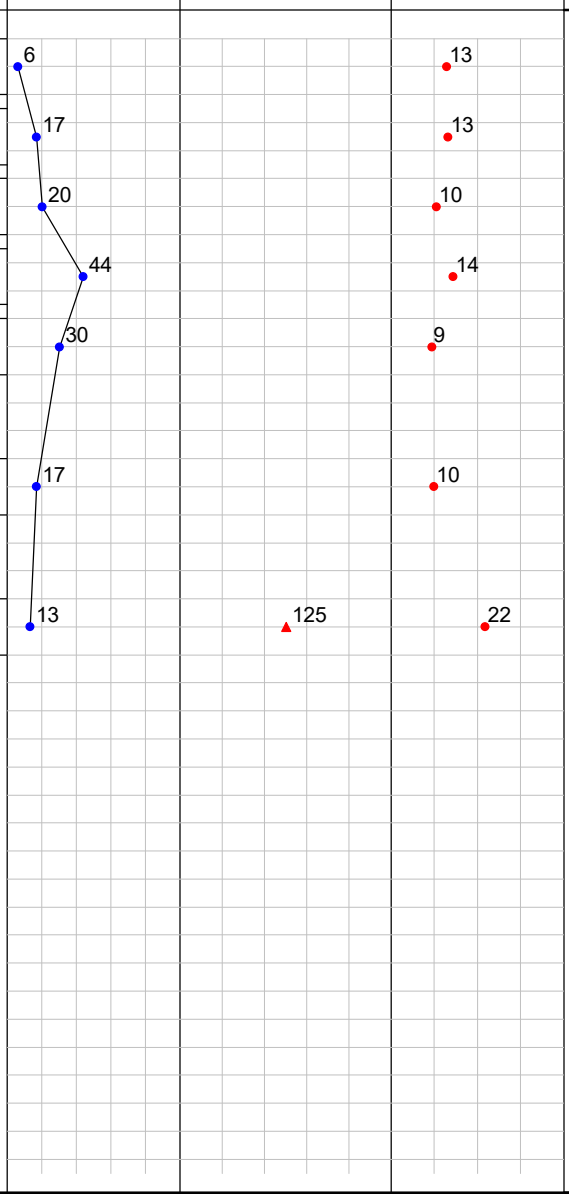
Drilling Contractor: Geo-Environmental Drilling Inc.

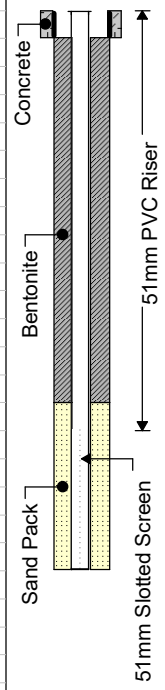
Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
		Ground Surface	216.0		
		FILL dark brown silt (topsoil), some sand, wet	0.0 / 215.3	1	SS
		loose red/black/brown brick debris, some metal and wood fragments, very moist	0.8	2	SS
		SANDY SILT TILL compact to dense brown sandy silt, some clay, trace gravel, very moist		3	SS
				4	SS
				5	SS
		CLAYEY SILT TILL very stiff grey clayey silt, trace to some sand and gravel, DTPL to APL	211.4 / 4.6	6	SS
			209.3 / 6.7	7	SS
		Drilling Terminated			





Groundwater Observations and Standpipe Details

Field Technician: DMG

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

Sheet: 1 of 1

ID No.: BH315-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/18/2022

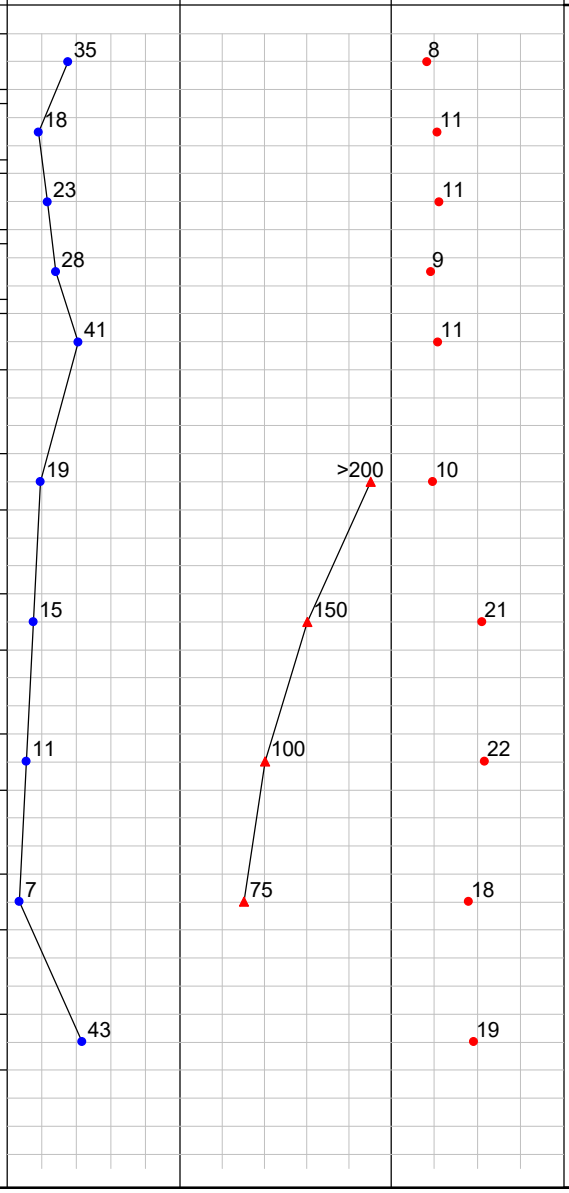
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
		Ground Surface	216.4		
0 / 0		**FILL** dense brown sand and gravel, some asphalt and concrete fragments, moist	0.0	1	SS
		compact dark brown sandy silt, trace gravel and organics, very moist	215.6 / 0.8	2	SS
		compact brown silt, trace sand, gravel, and organics, very moist	214.9 / 1.5	3	SS
		SILT TILL compact to dense mottled brown silt, trace sand, gravel, and clay, very moist		4	SS
				5	SS
		CLAYEY SILT TILL hard to very stiff mottled grey/brown clayey silt, trace sand and gravel, DTPL to APL	211.8 / 4.6	6	SS
				7	SS
		stiff	208.8 / 7.6	8	SS
				9	SS
		SHALE dense red shale	205.7 / 10.7	10	SS
		Drilling Terminated	205.1 / 11.3		



Groundwater Observations and Standpipe Details

← Bentonite

← Dry Cave

Borehole dry upon drilling completion

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

MTE

Sheet: 1 of 1

ID No.: BH316-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/13/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
		Ground Surface	216.5						
		FILL compact dark brown sandy silt, trace gravel, organics, glass and brick fragments, wet	0.0 / 215.7	1	SS	15		18	
		SILT TILL compact to dense brown silt, trace sand, gravel, and clay, very moist to moist	0.8 / 211.9	2	SS	19		11	
				3	SS	29		12	
				4	SS	24		10	← Bentonite
				5	SS	34		9	
		CLAYEY SILT TILL hard grey clayey silt, trace sand and gravel, DTPL	4.6 / 211.3	6	SS	23	>200	9	← Dry Cave
		Drilling Terminated	5.2						Borehole dry upon drilling completion

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Sheet: 1 of 1

ID No.: BH317-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/18/2022

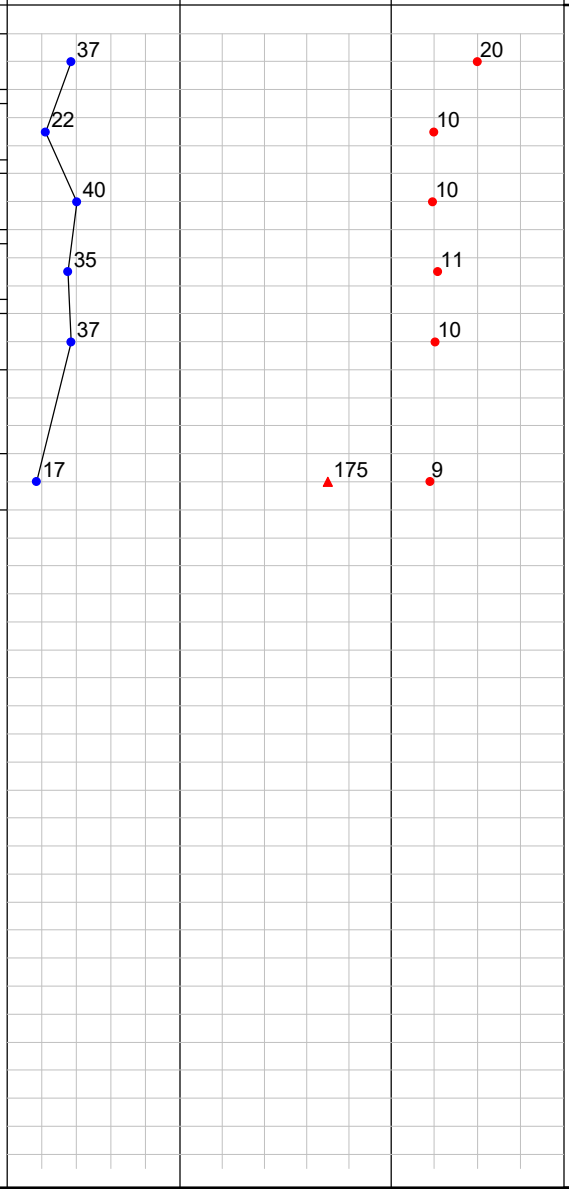
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
		Ground Surface	216.8		
0 / 0		**FILL** dense brown sand and gravel, trace silt, wet	0.0	1	SS
		dense dark brown sandy silt, trace sand and gravel, wet	216.0 / 0.8	2	SS
		compact brown silt, trace sand, gravel, and organics, moist	215.2 / 1.5	3	SS
2		**SILT TILL** dense brown silt, trace sand, gravel, and clay, moist		4	SS
				5	SS
4		**CLAYEY SILT TILL** very stiff grey clayey silt, trace sand and gravel, DTPL	212.2 / 4.6	6	SS
		Drilling Terminated	211.6 / 5.2		



Borehole dry upon drilling completion

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Sheet: 1 of 1

ID No.: BH318-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46732-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/18/2022

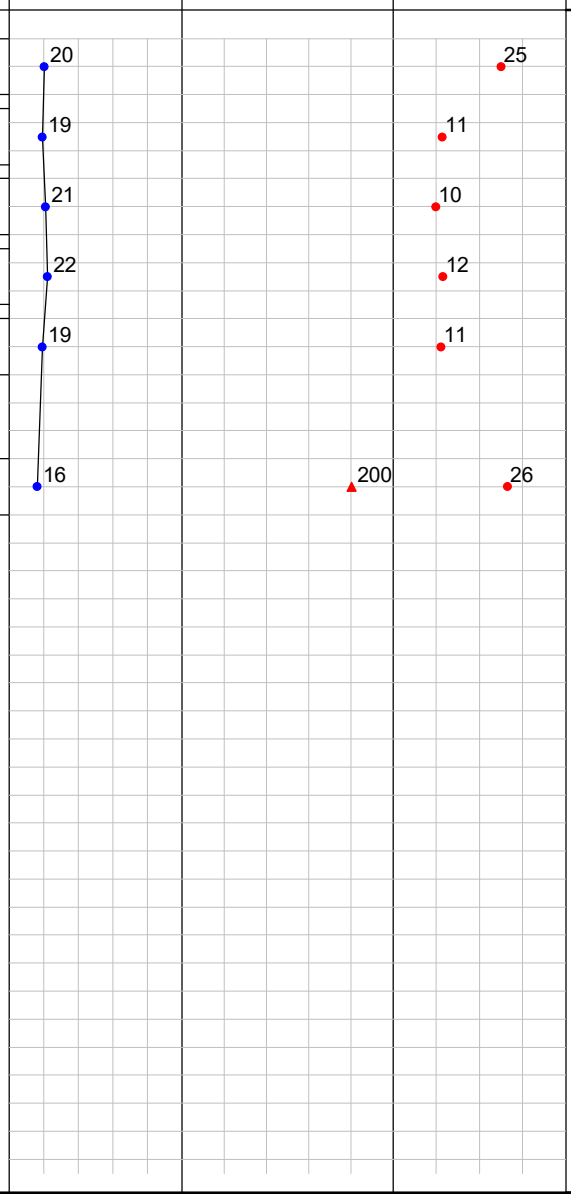
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
		Ground Surface	215.7		
		CONCRETE 50mm	0.0 / 215.0	1	SS
		FILL compact dark brown sandy silt, trace gravel and organics, wet	0.8 / 214.2	2	SS
		compact brown silt, trace sand, gravel, and organics (rootlets), very moist	1.5	3	SS
		SILT TILL compact mottled brown silt, trace sand, gravel, and clay, moist to very moist		4	SS
				5	SS
		CLAYEY SILT TILL hard grey clayey silt, trace sand and gravel, DTPL	4.6 / 211.1	6	SS
		Drilling Terminated	5.2 / 210.5		



Borehole dry upon drilling completion

Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Sheet: 1 of 1

ID No.: MW319-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/12/2022

Drilling Contractor: Geo-Environmental Drilling Inc.

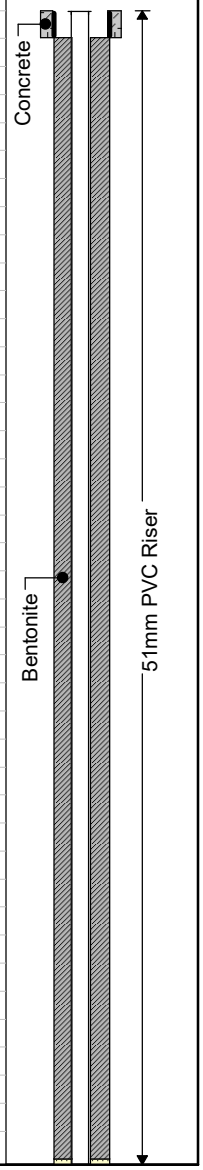
Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Flushmount Casing

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)
		Ground Surface	216.0					
		ASPHALTIC CONCRETE 125mm	0.0	1	SS	14		13
		FILL compact brown sand and gravel, trace silt, very moist		2	SS	18		12
		compact brown silt, trace sand, gravel, and organics, very moist	214.5 / 1.5	3	SS	30		10
		SILT dense brown silt, trace sand and gravel, moist	213.7 / 2.3	4	SS	43		11
		SILT TILL dense mottled brown silt, trace sand, gravel, and clay, moist		5	SS	44		9
		CLAYEY SILT TILL hard grey clayey silt, trace sand and gravel, DTPL to APL	211.4 / 4.6	6	SS	19	>200	9
				7	SS	19	75	21
		stiff	208.4 / 7.6	8	SS	17	75	19
				9	SS	8	50	19
		SHALE very dense red shale with grey seams	205.3 / 10.7	10	SS	50/75mm		9
		core run 1: RQD = 54.1%	204.7 / 11.3	11	RC			

Groundwater Observations and Standpipe Details



Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

ID No.: MW319-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/12/2022

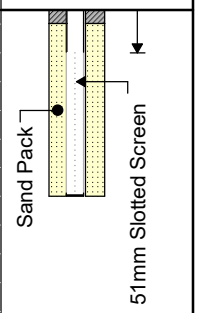
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Flushmount Casing

Subsurface Profile				Sample		Dynamic Cone × Standard Penetration ● 20 40 60 80	Shear Strength (PP) ▲ kPa ▲ Shear Strength (FV) ■ kPa ■ 50 100 150 200	Water Content ● % ● 10 20 30	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type				
			203.2						
		core run 2: RQD = 42.9%	12.8	12	RC				
			201.7						
		Drilling Terminated	14.3						



Field Technician: HXS

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

ID No.: MW320-22

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North

MTE File No.: 46372-301

Client: Greenwin Corp.

Site Location: Brampton, ON

Date Completed: 1/4/2022

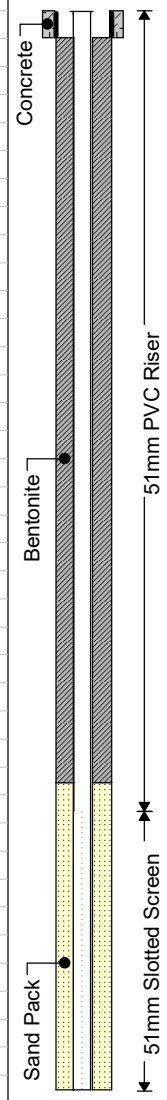
Drilling Contractor: Geo-Environmental Drilling Inc.

Drill Rig: LC 55

Drill Method: Hollow Stem Augers

Protective Cover: Monument Casing

Depth (ft)	Depth (m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	Dynamic Cone / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)
			Ground Surface	215.2					
			FILL compact brown/grey/black sandy silt, some clay, organics, brick, wood, and metal fragments, moist	0.0	1	SS	16		10
					2	SS	10		10
				213.7					
			loose, wet	1.5 / 213.2	3	SS	7		18
			SILT TILL loose brown silt, some sand and clay, trace gravel, very moist to moist	2.0	4	SS	9		12
				212.2					
			compact	3.0	5	SS	16		11
					6	SS	24		10
				209.1					
			CLAYEY SILT TILL very stiff grey clayey silt, trace to some sand, trace gravel, APL	6.1	7	SS	15	125	17
				207.6					
			stiff, WTPL	7.6	8	SS	7	75	22
				205.5	9	SS	10	75	21
			occasional shale fragments	9.8					
				204.5					
			SHALE very dense red highly weathered shale	10.7	10	SS	50/75mm		
				203.4	11	GS			
			Drilling Terminated	11.8					



Field Technician: DMG

Drafted by: HXS

Reviewed by: DMG

Notes:
Borehole dry upon drilling completion

Sheet: 1 of 1

ID Number: MW201A-20

Project: Proposed Development

Project No: 46372-300

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth Street North, Brampton, ON

Drill Date: 3/2/2020

Drilling Contractor: GEDI

Drill Rig: CME 55 Truck Mounted

Drill Method: Hollow Stem Augers / Coring

Protective Cover: Flushmount

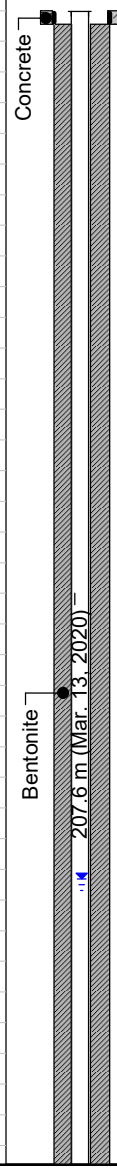
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)
		Ground Surface	216.2
		FILL compact brown sand and gravel, some silt	0.0
		black, some brick and wood, wet	215.3 / 0.9
		SILT TILL compact to dense mottled grey/brown silt, some clay, trace to some sand and gravel, very moist	214.7 / 1.5
		occasional red shale fragments	
		CLAYEY SILT TILL stiff to hard grey clayey silt, some gravel, trace to some sand, occasional cobbles, DTPL	212.4 / 3.8
		SAND AND SILT dense grey fine sand and silt, trace clay, saturated	207.3 / 8.9
		SHALE poor to fair weathered red shale (Queenston Formation), with grey limestone layers	206.4 / 9.8

Depth scale: ft 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36; m 0, 2, 4, 6, 8, 10

Sample

Number	Type	Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)
1	SS	27		16, 10
2	SS	24		10
3	SS	32		10
4	SS	34		7
5	SS	22	>200	5
6	SS	19	>200	7
7	SS	17	>200	10
8	SS	17	175	14
9	SS	12	100	9
10	SS	45		19
11	SS	50/50mm		

Groundwater Observations and Standpipe Details



Field Technician: M. Dalgliesh

Drafted by: W. Raza

Reviewed by: D. Gonser

MTE

Sheet: 1 of 2

Notes:
Water encountered at 8.9mbgs during drilling.
Water level measured at 8.6mbgs on March 13, 2020.

ID Number: MW201A-20

Project: Proposed Development

Project No: 46372-300

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth Street North, Brampton, ON

Drill Date: 3/2/2020

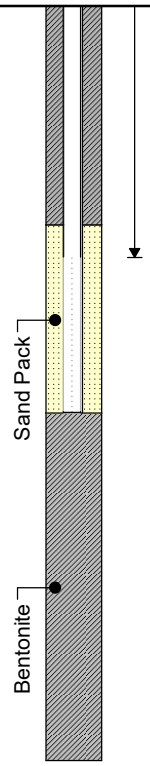
Drilling Contractor: GEDI

Drill Rig: CME 55 Truck Mounted

Drill Method: Hollow Stem Augers / Coring

Protective Cover: Flushmount

Subsurface Profile				Sample		RQD / Standard Penetration (20 40 60 80)	Shear Strength (PP) / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type				
38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74	12, 14, 16, 18, 20, 22			12	CS	50			
				13	CS	55			
				14	CS	74			
				15	CS	38			
				16	CS	61			
			197.6						
		Drilling Terminated	18.6						



51mm Slotted Screen Installed at 13.7 to 15.2mbgs

Field Technician: M. Dalgliesh

Drafted by: W. Raza

Reviewed by: D. Gonser

MTE

Sheet: 2 of 2

Notes:
Water encountered at 8.9mbgs during drilling.
Water level measured at 8.6mbgs on March 13, 2020.

ID Number: MW201B-20

Project: Proposed Development

Project No: 46372-300

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth Street North, Brampton, ON

Drill Date: 3/3/2020

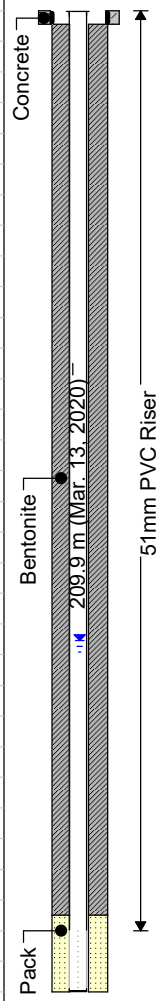
Drilling Contractor: GEDI

Drill Rig: CME 55 Truck Mount

Drill Method: Hollow Stem Augers

Protective Cover: Flushmount

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type	RQD / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
0 / 0		Ground Surface	216.2						
		FILL brown sand and gravel, some silt	0.0						
2		black, some brick and wood, wet	215.3						
4 / 2		**SILT TILL** mottled grey/brown silt, some clay, trace to some sand and gravel, occasional red shale fragments, very moist	0.9						
12			212.4						
14 / 4		**CLAYEY SILT TILL** grey clayey silt, some gravel, trace to some sand, occasional cobbles, DTPL	3.8						
26 / 8			207.8						
28		very stiff	8.4 / 207.3	1	SS	14	125	13, 20	
30		**SAND AND SILT** compact grey fine sand and silt, trace clay, saturated	8.9						
32 / 10			206.4						
		Drilling Terminated	9.8						



Field Technician: M. Dalgliesh

Drafted by: D. Gross

Reviewed by: D. Gonser

MTE

Sheet: 1 of 1

Notes:
Water encountered at 8.9 mbgs during drilling.
Water level measured at 6.3mbgs on March 13, 2020.

ID Number: MW202-20

Project: Proposed Development

Project No: 46372-300

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth Street North, Brampton, ON

Drill Date: 3/3/2020

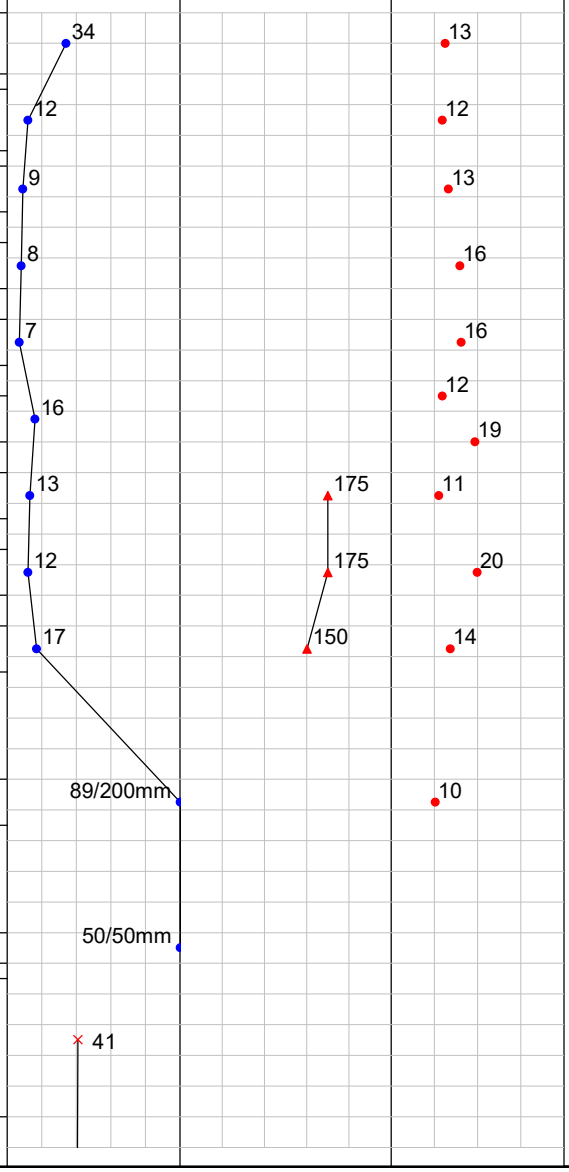
Drilling Contractor: GEDI

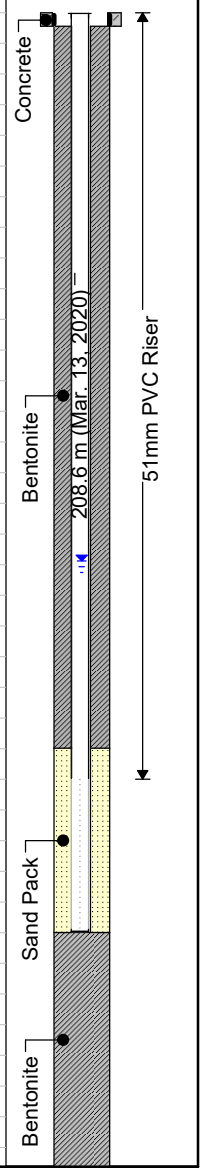
Drill Rig: CME 55 Truck Mounted

Drill Method: Hollow Stem Augers / Coring

Protective Cover: Flushmount

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Sample Number	Sample Type
		Ground Surface	214.1		
0 / 0		**FILL** dense brown silty sand and gravel, saturated	0.0	1	SS
		dense to compact dark brown/black silt, some sand and gravel, some organics and red brick, wet to very moist	212.6 / 1.5	2	SS
				3	SS
6 / 2		**SANDY SILT TILL** loose to compact brown sandy silt, trace to some gravel, trace clay, very moist	211.8 / 2.3	4	SS
		grey, wet to saturated		5	SS
12 / 4				6	SS
		CLAYEY SILT TILL very stiff grey clayey silt, trace to some sand and gravel, DTPL	209.5 / 4.6	7	SS
				8	SS
20 / 6				9	SS
		SAND AND GRAVEL very dense red sand and gravel, some silt, trace clay, occasional shale fragments, saturated	206.5 / 7.6	10	SS
28 / 8					
		SHALE poor to good weathered red shale (Queenston Formation), with grey limestone layers	205.0 / 9.1	11	SS
34 / 10				12	CS





Field Technician: M. Dalgliesh

Drafted by: W. Raza

Reviewed by: D. Gonser

Sheet: 1 of 2

Notes:
Water encountered at 7.6mbgs during drilling.
Water level measured at 5.5mbgs on March 13, 2020.

ID Number: MW202-20

Project: Proposed Development

Project No: 46372-300

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth Street North, Brampton, ON

Drill Date: 3/3/2020

Drilling Contractor: GEDI

Drill Rig: CME 55 Truck Mounted

Drill Method: Hollow Stem Augers / Coring

Protective Cover: Flushmount

Subsurface Profile				Sample		RQD / Standard Penetration (20 40 60 80)	Shear Strength (PP) kPa / Shear Strength (FV) kPa (50 100 150 200)	Water Content % (10 20 30)	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type				
38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74	12, 14, 16, 18, 20, 22			13	CS	41			Bentonite
			201.6						
		100mm clay seam, WTPL	12.5	14	CS	26			
				15	CS	51			
				16	CS	76			
			197.0						
		Drilling Terminated	17.1						51mm Slotted Screen Installed at 7.6 to 9.1mbgs

Field Technician: M. Dalgliesh

Drafted by: W. Raza

Reviewed by: D. Gonser

MTE

Sheet: 2 of 2

Notes:
Water encountered at 7.6mbgs during drilling.
Water level measured at 5.5mbgs on March 13, 2020.

ID Number: BH203-20

Project: Proposed Development

Project No: 46372-300

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth Street North, Brampton, ON

Drill Date: 3/4/2020

Drilling Contractor: GEDI

Drill Rig: CME 55 Truck Mounted

Drill Method: Hollow Stem Augers / Coring

Protective Cover: N/A

Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)
		Ground Surface	212.0
		ASPHALTIC CONCRETE 75mm	0.0
		GRANULAR FILL compact brown silty sand and gravel, wet (225mm)	210.9 / 1.1
		FILL compact black/brown silt, some sand, gravel, and wood, trace clay, wet	
		SANDY SILT TILL very loose to compact brown sandy silt, trace to some gravel, trace clay, wet	209.3 / 2.7
		grey, saturated	208.8 / 3.2
		CLAYEY SILT TILL firm to stiff grey clayey silt, some sand, trace to some gravel, WTPL to DTPL	207.3 / 4.7
		SILT AND SAND TILL dense grey silt and sand, some gravel and clay, very moist	206.5 / 5.5
		SHALE very poor to good red shale (Queenston Formation), with grey limestone layers	
		450mm clay seam	203.8 / 8.2
		multiple clay seams	201.0 / 11.0

Sample Number	Type	RQD / Standard Penetration	Shear Strength (PP) / Shear Strength (FV) kPa	Water Content %
1	SS	12		20
2	SS	15		11
3	SS	3		11
4	SS	5		12
5	SS	10	50	10
6	SS	7	100	10
7	SS	38		9, 10
8	SS	50/50mm		
9	SS	50/75mm		
10	CS	35		
11	CS	47		
12	CS	50		

Groundwater Observations and Standpipe Details: ← Bentonite

Field Technician: M. Dalgliesh

Drafted by: W. Raza

Reviewed by: D. Gonser

MTE

ID Number: BH203-20

Project: Proposed Development

Project No: 46372-300

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth Street North, Brampton, ON

Drill Date: 3/4/2020

Drilling Contractor: GEDI

Drill Rig: CME 55 Truck Mounted

Drill Method: Hollow Stem Augers / Coring

Protective Cover: N/A

Subsurface Profile				Sample		RQD / Standard Penetration (20 40 60 80)	Shear Strength (PP) ▲ / Shear Strength (FV) ■ kPa (50 100 150 200)	Water Content ● % (10 20 30)	Groundwater Observations and Standpipe Details
Depth	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type				
38									
40	12			13	CS	22			
42									
44				14	CS	64			← Bentonite
46	14								
48				15	CS	88			
50			196.5						
52	16	Drilling Terminated	15.5						Water encountered at 2.7mbgs during drilling
54									
56									
58	18								
60									
62									
64									
66	20								
68									
70									
72	22								
74									

Field Technician: M. Dalgliesh

Drafted by: W. Raza

Reviewed by: D. Gonser

MTE

ID Number: MW101-19

Project: Phase II ESA

Project No: 46372-100

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth St N and 31-33 George St N, Brampton, ON

Drill Date: 9/9/2019

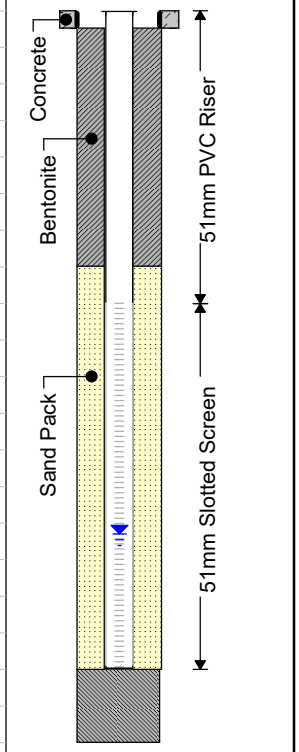
Drilling Contractor: Strata Drilling Group

Drill Rig: Geoprobe 7822DT

Drill Method: Direct Push

Protective Cover: Flushmount

SUBSURFACE PROFILE			SAMPLE					HEADSPACE	
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	Soil Sample Lab Analysis	PID ppm (20 40 60 80) / Hydrocarbon ppm (100 200 300 400)	Well Completion Details
		Ground Surface	95.4						
0		**ASPHALTIC CONCRETE**	0.0						
		GRAVEL FILL brown, coarse, moist					metals, EC, SAR, PAHs	0	
2		**SILTY SAND FILL** brown, trace gravel, some organics, moist		1	DP	60			
4		**SILTY SAND** brown, some gravel, moist	94.2 / 1.2						
6 (2 m)		wet at 3.0m		2	DP	60		0	
10							PHCs, VOCs	0	
12 (4 m)		**CLAYEY SILT** grey, some sand, some gravel, moist	91.7 / 3.7	3	DP	70			
16				4	DP	80		0	
18		**SHALE** red, moist	89.9 / 5.5						
20 (6 m)			89.3 / 6.1						
		Drilling Terminated							
26 (8 m)									
30									



Field Technician: ADP

Drafted by: ADP

Reviewed by: SCA

MTE

Sheet: 1 of 1

ID Number: MW102-19

Project: Phase II ESA

Project No: 46372-100

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth St N and 31-33 George St N, Brampton, ON

Drill Date: 9/9/2019

Drilling Contractor: Strata Drilling Group

Drill Rig: Geoprobe 7822DT

Drill Method: Direct Push

Protective Cover: Flushmount

SUBSURFACE PROFILE			SAMPLE					HEADSPACE	
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	Soil Sample Lab Analysis	PID ppm (20 40 60 80) / Hydrocarbon ppm (100 200 300 400)	Well Completion Details
		Ground Surface	97.4						
0		**TOPSOIL**	0.0						
		SILTY SAND FILL brown, trace gravel, some organics, moist		1	DP	50	metals, EC, SAR, pH, PAHs	0	Concrete; Bentonite; 51mm PVC Riser; 51mm Slotted Screen; Sand Pack
				2	DP	90	metals, pH	0	
		SILTY SAND brown, some gravel, moist	95.0 / 2.4						
				3	DP	90		0	
		CLAYEY SILT light brown, some sand, some gravel, moist; grey at 4.6m; wet at 6.1m	93.1 / 4.3						
				4	DP	100	PHCs, VOCs	0	
				5	DP	100		0	
		SHALE red, moist	89.9 / 7.5						
		Drilling Terminated							

Field Technician: ADP

Drafted by: ADP

Reviewed by: SCA

MTE

Sheet: 1 of 1

ID Number: MW103-19

Project: Phase II ESA

Project No: 46372-100

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth St N and 31-33 George St N, Brampton, ON

Drill Date: 9/9/2019

Drilling Contractor: Strata Drilling Group

Drill Rig: Geoprobe 7822DT

Drill Method: Direct Push

Protective Cover: Flushmount

SUBSURFACE PROFILE			SAMPLE					HEADSPACE	
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) Depth (m)	Number	Type	Recovery (%)	Soil Sample Lab Analysis	PID ppm (20 40 60 80) / Hydrocarbon ppm (100 200 300 400)	Well Completion Details
		Ground Surface	100.1						
0		**TOPSOIL**	0.0						
		SILTY SAND FILL brown, trace gravel, some organics, moist		1	DP	50	metals, EC, SAR, PAHs	0	Concrete
4		**SILTY SAND** brown, some gravel, moist	98.9 / 1.2						
6				2	DP	90		0	
10				3	DP	90		0	Bentonite; 51mm PVC Riser
16		grey at 5.8m		4	DP	100		0	
20		**CLAYEY SILT** grey, some sand, some gravel, moist	94.0 / 6.1	5	DP	100		0	
24		wet at 7.5m					PHCs, VOCs	0	Sand Pack; 51mm Slotted Screen
28								0	
30		Drilling Terminated	91.0 / 9.1						

Field Technician: ADP

Drafted by: ADP

Reviewed by: SCA

MTE

Sheet: 1 of 1

ID Number: MW104-19

Project: Phase II ESA

Project No: 46372-100

Client: The Six Real Estate Developments Inc.

Site Location: 28 Elizabeth St N and 31-33 George St N, Brampton, ON

Drill Date: 9/10/2019

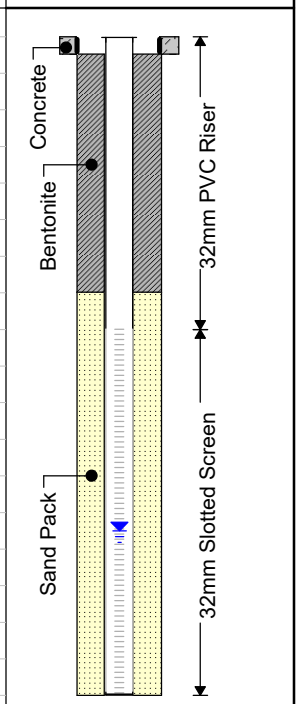
Drilling Contractor: Strata Drilling Group

Drill Rig: Geoprobe 420M

Drill Method: Direct Push

Protective Cover: Flushmount

SUBSURFACE PROFILE			SAMPLE					HEADSPACE	
Depth (ft / m)	Symbol	Soil Description	Elevation (masl) / Depth (m)	Number	Type	Recovery (%)	Soil Sample Lab Analysis	PID ppm (20 40 60 80) / Hydrocarbon ppm (100 200 300 400)	Well Completion Details
		Ground Surface	95.1						
0		**ASPHALTIC CONCRETE**	0.0						
		GRAVEL FILL brown, coarse, moist		1	DP	70	metals, EC, SAR, PAHs	0	
2		**SILTY SAND FILL** brown, trace gravel, some organics, moist							
4		**SILTY SAND** brown, some gravel moist	93.9 / 1.2	2	DP	60			
6		wet at 3.0m						0	
8				3	DP	80			
10							PHCs, VOCs	0	
12		**CLAYEY SILT** grey, some sand, some gravel, moist	91.5 / 3.7	4	DP	100			
14		red shale in sample tip							
16				5	DP	100		0	
18			89.6 / 5.5						
		Drilling Terminated							
20									
22									
24									
26									
28									
30									



Field Technician: ADP

Drafted by: ADP

Reviewed by: SCA

MTE

Sheet: 1 of 1

Appendix C

Laboratory Test Results

Table 101

Table 102

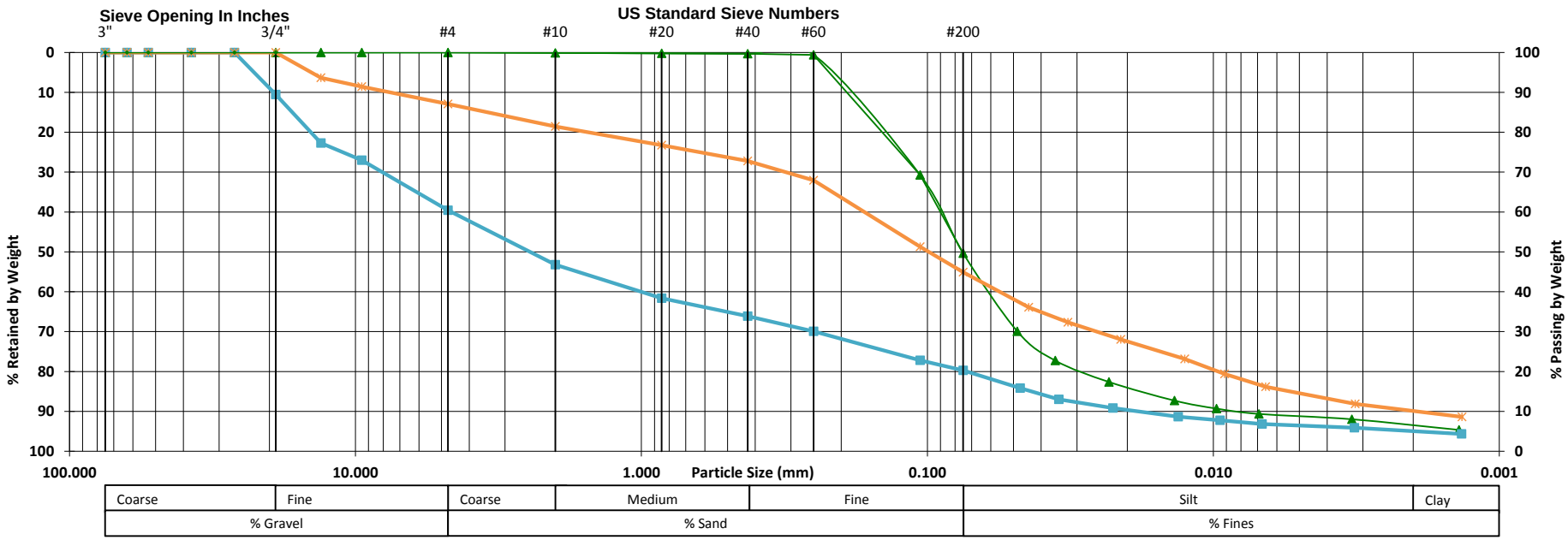
Particle Size Distribution Analysis Test Results

Project Name: Proposed Developemnt
Client: The Six Real Estate Developments Inc.
Project Location: 28 Elizabeth Street North, Brampton, ON

Date Sampled: Mar. 2-4, 2020
Date Tested: Mar. 11-13, 2020

MTE File No.: 46372-300
Table No.: 101

Unified Soil Classification



Symbol	Borehole ID	Sample #	*Sample Depth*	Description
▲	MW201A-20	SS-10	9.1-9.6 mbgs	SAND and SILT, trace Clay
■	MW202-20	SS-9	7.6-7.8 mbgs	SAND and GRAVEL, some Silt, trace Clay
✳	BH203-20	SS-6	4.6-5.0 mbgs	SILT and SAND TILL, some Gravel and Clay

NOTES:

CERTIFIED BY CCIL
Canadian Council of Independent Laboratories
For specific tests as listed on www.ccil.com

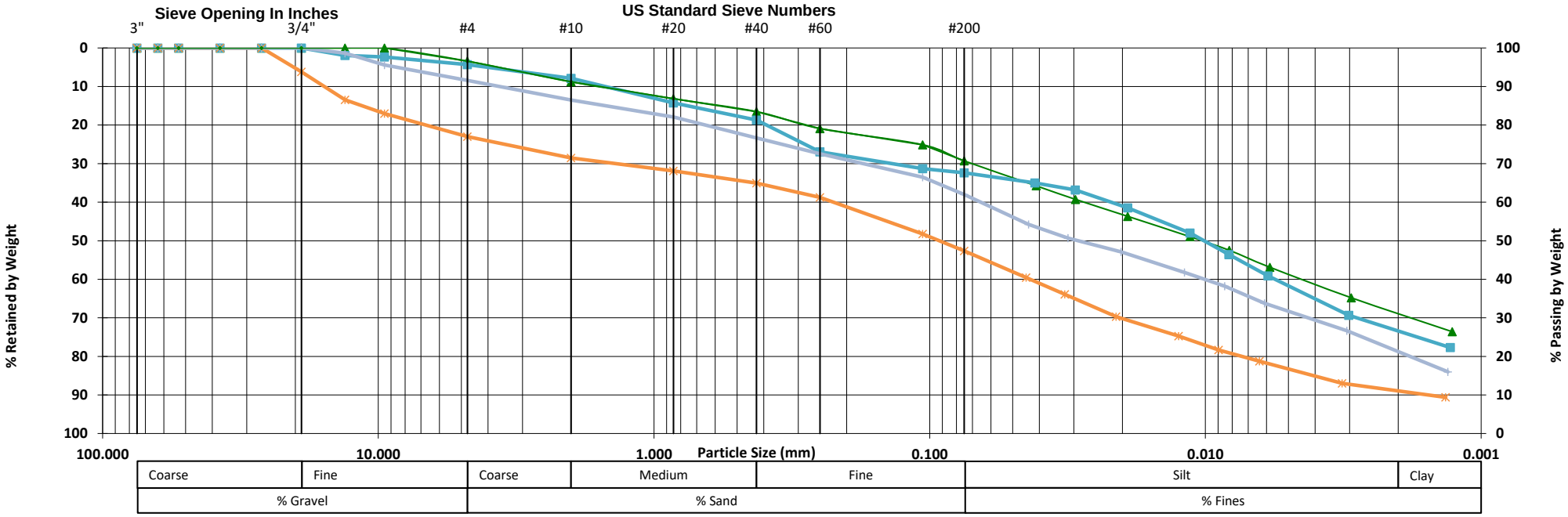
Particle Size Distribution Analysis Test Results

Project Name: 18-24 & 28 Elizabeth St North; 31-33 George St North
Client: Greenwin Corp.
Project Location: Brampton, ON

Date Sampled: Jan. 4-19, 2022
Date Tested: Mar. 4-9, 2022

MTE File No.: 46372-301
Table No.: 102

Unified Soil Classification



Symbol	Borehole ID	Sample #	Sample Depth	Description
▲	MW302-22	SS-6	4.6-5.2 mbgs	Clayey Sandy SILT, trace Gravel
■	MW309-22	SS-7	6.1-6.7 mbgs	Sandy Clayey SILT, trace Gravel
✳	MW314-22	SS-6	4.6-5.2 mbgs	Sandy Gravelly SILT, some Clay
+	MW320-22	SS-9	9.1-9.8 mbgs	Sandy Clayey SILT, trace Gravel

CERTIFIED BY CCIL
Canadian Council of Independent Laboratories
For specific tests as listed on www.ccil.com

NOTES: