Geotechnical Investigation
Proposed Highrise Building
4721 & 5061 Stouffville Road
Whitchurch-Stouffville, Ontario

PREPARED FOR:
Times Group Corporation

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1. INTRODUCTION

DS Consultants Ltd. (DS) was retained by Times Group Corporation to carry out a supplementary geotechnical investigation at 4721 & 5061 Stouffville Road for the proposed high-rise buildings.

It is understood that the proposed high-rise buildings range from 19 to 29 stories with 2 levels of underground parking (P2) at the west portion of the site, and with 3 levels of underground parking (P3) at the east portion of the site. The finished floor elevation of P2 is at Elev. 252.15 m, and is at Elev. 249.35 m for P3.

In 2019 and 2021, DS conducted preliminary geotechnical and hydrogeological investigations on the site, drilling six (6) boreholes (BH21-1 to BH21-5 and BH19-5) to depths of 12.3 to 15.8 m below existing grade. The locations plan and logs of these boreholes are included in **Appendix A**.

The purpose of this supplementary geotechnical investigation was to obtain additional borehole information about the subsurface conditions and from the findings in the boreholes to provide recommendations for the proposed high-rise buildings.

Concurrently with the geotechnical investigation program, a hydrogeological study has been carried out by DS, and the results are addressed separately

This report is provided on the basis of the terms of reference presented above and, on the assumption, that the design will be in accordance with the applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning the geotechnical aspects of the codes and standards, this office should be contacted to review the design. It may then be necessary to carry out additional borings and reporting before the recommendations of this office can be relied upon.

The format and contents are guided by client specific needs and economics and do not conform to generalized standards for services. Laboratory testing for most part follows ASTM or CSA Standards or modifications of these standards that have become standard practice.

This report has been prepared for Times Group Corporation and its architect and designers. Third party use of this report without DS consent is prohibited.

2. FIELD AND LABORATORY WORK

Twelve (12) boreholes BH24-1 to BH24-12 were drilled between October and November 2024, to depths of 15.3 to 23.4 m below existing grade. One (1) additional deep borehole BH25-1 was drilled to a depth of 37.1 m below existing grade on February 26, 2025. The previous five (5) boreholes (BH21-1 to BH21-5) were drilled in 2020 to depths ranging from 12.3 to 15.8 m and one

borehole BH19-5 was drilled in 2019 to a depth of 15.2 m below existing ground surface. The borehole locations are shown on **Drawing 1**.

Boreholes were drilled with hollow stem continuous flight augers and mud-rotary drill equipment by a drilling sub-contractor under the direction and supervision of DS personnel. Samples were retrieved at regular intervals with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and returned to the DS laboratory for detailed examination by the project engineer and for laboratory testing.

As well as visual examination in the laboratory, all soil samples from geotechnical boreholes were tested for moisture contents. Grain size analyses of twenty-four (24) selected soil samples were conducted and the results are presented in **Drawing 18** to **Drawing 21**. Atterberg Limits testing was conducted on selected ten (10) soil samples and results are presented on the respective borehole logs and in **Drawing 22** to **Drawing 24**.

Water level observations were made during and upon completion of drilling. Twelve (12) boreholes (BH19-5, BH21-1 to BH21-5, BH24-1, BH24-4, BH24-5, BH24-8, BH24-9 and BH25-1) were equipped with 50 mm dia. monitoring wells to measure stabilized groundwater levels and for hydrogeological study.

The geodetic ground surface elevations at the locations of the boreholes/monitoring wells were established by DS using differential GPS system. It should be noted that the elevations at the as-drilled borehole/well locations were not provided by a professional surveyor and should be considered to be approximate. Contractors performing any work referenced to the borehole/well elevations should confirm the borehole elevations for their work.

3. SITE AND SUBSURFACE CONDITIONS

The borehole location plan is shown on **Drawing 1**. General notes on sample description are provided on **Drawing 1A**. The subsurface conditions in the boreholes (BH24-1 to BH24-12 and BH25-1) are presented in the individual borehole logs on **Drawings 2** to **14**. Generalized Subsurface Profiles for Cross Sections A-A (BH24-1 to BH24-4), B-B (BH21-1, BH21-2, BH24-6, BH21-5 and BH24-5) and C-C (BH24-7 to BH24-12, BH21-3, BH21-4, BH19-5 and BH25-1) are shown on **Drawing 15** to **Drawing 17**. Generalized Subsurface Profiles for deep boreholes (BH24-1, BH24-3, BH24-5, BH24-8, BH24-9, BH24-12 and BH25-1) are shown on **Drawing 17A**. Logs of previous boreholes (BH21-1 to BH21-5 and BH19-5) are attached in **Appendix A**.

3.1 SOIL CONDITIONS

Topsoil/Fill:

A surficial layer of topsoil of 125 to 380 mm thick was found in all boreholes. It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative for the site and should not be relied on to calculate the amount of topsoil at the site.

Fill and Weathered/Disturbed Materials:

Below the topsoil, fill materials and/or weathered/disturbed soils consisting of clayey silt to silty clay and sandy silt to silty sand were encountered in all boreholes, extending to depths varied from 0.8 to 2.4 m below ground surface. These soils were found traces of rootlets and topsoil inclusions. The fill materials and weathered/disturbed soils were found in a soft to hard consistency/very loose to dense state, with measured SPT 'N' values ranging from 3 to 30 blows per 300 mm penetration.

Clayey Silt to Silty Clay (Till):

Cohesive deposits of clayey silt to silty clay (till) were encountered in all boreholes, extending to depths ranging from 9.0 m to 37.1 m below existing ground surface. Boreholes BH24-3 to BH24-5, BH24-9, BH24-12 and BH25-1 were terminated in the clayey silt to silty clay (till). These cohesive deposits were found to have a firm to hard consistency with measured SPT 'N' values ranging from 8 to over 50 blows per 300mm of penetration. Occasional sand seams and cobble/boulder were present within the clayey silt to silty clay (till) deposits.

Grain size analyses of thirteen (13) clayey silt to silty clay (till) samples (BH21-1/SS8, BH21-2/SS9, BH21-4/SS7, BH24-1/SS7, BH24-3/SS18, BH24-4/SS6, BH24-5/SS8, BH24-8/SS9, BH24-10/SS11, BH24-11/SS12, BH24-12/SS15, BH25-1/SS9 and BH25-1/SS26) were conducted and the results are presented in **Drawing 17** to **Drawing 21** and **in Appendix A**, with the following fractions:

Clay: 13% - 36%

Silt: 37% - 76%

Sand: 2% - 41%

Gravel: 0 - 4%

Atterberg limits tests on selected ten (10) soil samples (BH21-1/SS8, BH21-1/SS9, BH21-4/SS7, BH24-1/SS7, BH24-3/SS18, BH24-12/SS15, BH24-11/SS12, BH24-10/SS11, BH25-1/SS9 and BH25-1/SS26) were conducted and the results are shown on the borehole logs and on **Drawing 22** to **Drawing 24** and **in Appendix A.** They are summarized as follows:

Liquid limit (W_L): 14% to 27%

Plastic limit (W_P): 8% to 16%
Plasticity index (PI): 5 to 11

Sandy Silt to Silty Sand Till:

Sandy silt to silty sand till deposits were encountered in all boreholes, extending to depths of 12.0 to 23.4 m below existing grade. Sandy silt to silty sand till deposits were found to be in a compact to very dense state, with measured SPT 'N' values ranging from 10 to more than 50 blows per 300 mm of penetration. Occasional sand seams and cobble/boulder were present within the sandy silt to silty sand till deposits.

Grain size analyses of eight (8) sandy silt to silty sand till samples (BH19-5/SS5, BH21-2/SS5, BH21-3/SS5, BH21-3/SS10, BH24-1/SS11, BH24-8/SS16, BH25-1/SS12 and BH25-1/SS16) were conducted and the results are presented in **Drawing 18** to **Drawing 21** and in **Appendix A**, with the following fractions:

Clay: 7% - 15%

Silt: 35% - 57%

Sand: 30% - 48%

Gravel: 4% - 19%

Cohesionless Sandy Soils (Silt, Sandy Silt to Silty Sand and Sand):

Cohesionless water bearing soils consisting of silt, sandy silt to silty sand and sand were encountered at various depths in all boreholes except for boreholes BH24-4 to BH24-6 and BH25-1. The cohesionless soils were present in a compact to very dense state, with measured SPT 'N' values ranging from 19 to more than 50 blows per 300mm of penetration.

Grain size analyses of three (3) samples (BH24-7/SS15, BH24-9/SS4 and BH25-1/SS14) were conducted and the results are presented in **Drawing 18** to **Drawing 21**, with the following fractions:

Clay: 1% - 4%

Silt: 9% - 88%

Sand: 9% - 73%

Gravel: 0 - 15%

3.2 GROUNDWATER CONDITIONS

Based on the hydrogeological information, the site is within the physiographic region of the Oak Ridges Moraine (ORM), which contains granular water bearing strata within its core referred to as

the Oak Ridges Moraine Aquifer Complex (ORMAC). During drilling, artesian conditions were encountered at site, with water flowing out of the boreholes.

In recent boreholes (BH24-1, 24-4, 24-5,24-8,24-9), artesian conditions were not encountered as well as the screens were placed at higher elevations, at the levels of the proposed excavation depths. The groundwater levels in the deep well screened at depths of 16.7 to 21.4 m in borehole BH25-1 ranged from 0.2 m below existing grade to 0.2 m above existing grade, corresponding to Elev. 254.1 to 254.5 m.

Groundwater levels in the monitoring wells were found at 0.2 m above existing grade to 5.0 m below existing grade, corresponding to Elevations 250.8 to 256.5 m, as summarized on **Table 1.**

Table 1: Groundwater Levels Observed in Monitoring Wells

Well ID	Ground Elevation (masl)	Screened Interval (mbgs)	Date	Stick-up (m)	WL (top of pip) (m)	Depth to Water (mbgs)	Groundwater Elevation (masl)
BH21-1	254.5	12.2-15.2	25-Feb-21	0.8	1.1	0.3	254.2
			13-Apr-21		2.2	1.4	253.1
			18-May-21		2.1	1.3	253.2
			21-Jun-21		2	1.3	253.2
			16-Jul-21		2.3	1.5	253
			23-Aug-21		2.4	1.6	252.9
			14-Sep-21		2.5	1.7	252.8
			13-Oct-21		2.5	1.7	252.8
			15-Nov-21		2.5	1.7	252.8
			13-Dec-21		2.5	1.7	252.8
			11-Jan-22		2.3	1.5	253.0
			15-Feb-22		2.3	1.5	253.0
			14-Mar-22		2.2	1.4	253.1
			19-Apr-22		2	1.2	253.3
BH21-2	255.2	9.1-12.1	25-Feb-21	0.9		Frozen	
			13-Apr-21		2	1.1	254.1
			18-May-21		1.3	0.4	254.8
			21-Jun-21		2.4	1.5	253.7
			16-Jul-21		1.7	0.8	254.4
			23-Aug-21		2	1.1	254.1
			14-Sep-21		2	1.1	254.1
			13-Oct-21		1.7	0.8	254.5
			15-Nov-21		1.5	0.6	254.6
			13-Dec-21		1.3	0.4	254.9
			11-Jan-22		1.3	0.3	254.9

			15-Feb-22		1.5	0.6	254.6
			14-Mar-22		1.2	0.3	254.9
			19-Apr-22		1.2	0.3	254.9
BH21-3	256.6	4.5-6.0	25-Feb-21	1	4.4	3.4	253.2
			13-Apr-21		4.1	3.1	253.5
			18-May-21		4.1	3.1	253.5
			21-Jun-21		4	3	253.6
			16-Jul-21		4.7	3.7	252.9
			23-Aug-21		4.8	3.8	252.8
			14-Sep-21		4.9	3.9	252.7
			13-Oct-21		4.9	3.9	252.7
			15-Nov-21		4.8	3.8	252.8
			13-Dec-21		4.4	3.4	253.2
			11-Jan-22		4.2	3.2	253.4
			15-Feb-22		4.5	3.5	253.1
			14-Mar-22		4.3	3.3	253.3
			19-Apr-22		3.8	2.8	253.8
BH21-4	256.7	10.7-12.2	25-Feb-21	0.9	2.6	1.7	255
			13-Apr-21		1.2	0.3	256.4
			25-Feb-21			Frozen	
			18-May-21		1.1	0.2	256.5
			21-Jun-21		1.1	0.2	256.5
			16-Jul-21		1.3	0.4	256.3
			23-Aug-21		1.3	0.4	256.3
			14-Sep-21		1.4	0.5	256.2
			13-Oct-21		1.4	0.5	256.2
			15-Nov-21		1.4	0.5	256.2
			13-Dec-21		1.4	0.5	256.2
			11-Jan-22		1.4	0.5	256.2
			15-Feb-22		1.4	0.5	256.2
			14-Mar-22		1.4	0.5	256.2
			19-Apr-22		1.4	0.5	256.2
BH21-5	255.6	9.2-12.2	13-Apr-21	0.9	2.9	2	253.6
			18-May-21		1	0.1	255.5
			21-Jun-21		2.1	1.2	254.4
			23-Aug-21		1.8	0.9	254.7
			14-Sep-21		1.6	0.7	254.9
			13-Oct-21		1.2	0.4	255.3
			15-Nov-21		1.1	0.3	255.3
			13-Dec-21		0.8	0	255.6
			11-Jan-22		0.9	0.1	255.5
			15-Feb-22		1.1	0.3	255.3

			14-Mar-22		0.8	-0.1*	255.7
			19-Apr-22		0.7	-0.2*	255.8
BH19-5	254.3	12.2-15.2	13-Apr-21	0.8	0.8	0	254.3
			18-May-21		0.9	0.1	254.2
			21-Jun-21		1	0.2	254.1
			16-Jul-21		1.3	0.5	253.8
			23-Aug-21		-		
			14-Sep-21		1.5	0.7	253.6
			13-Oct-21		1.2	0.4	253.9
			15-Nov-21		1	0.3	254.0
			13-Dec-21		0.8	0	254.3
			11-Jan-22		0.7	-0.1*	254.4
			15-Feb-22		0.7	-0.1*	254.4
			14-Mar-22		0.7	-0.1*	254.4
			19-Apr-22		0.7	-0.1*	254.4
			07-Oct-24		1.2	0.4	253.9
BH24-1	256.6	6.1-9.1	13-Nov-24	0.9	2.7	1.8	254.8
BH24-4	255.4	4.6-7.6	13-Nov-24	0.9	2.2	1.3	254.1
BH24-5	254.9	4.6-7.7	13-Nov-24	0.9	2.3	1.4	253.5
BH24-8	254.5	4.1-7.1	13-Nov-24	0.9	2.3	1.4	253.1
BH24-9	255.8	5.6-8.6	13-Nov-24	0.9	3.1	2.2	253.6
BH25-1	254.3	16.3-21.3	07-Mar-25	0.94	1.09	0.2	254.1
			24-Mar-25		0.78	-0.2*	254.5

*denotes groundwater level above existing grade.

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

Further groundwater monitoring must be carried out to confirm the groundwater conditions. Refer to DS's hydrogeological report for more information regarding long-term groundwater levels at the site to major weather events.

4. GEOTECHNICAL DISCUSSION AND RECOMMENDATIONS

4.1 ARTESIAN CONDITIONS & SAFE EXCAVATION DEPTHS (SED)

Based on the hydrogeology report prepared for the subject site, the northern part of the site is located within the physiographic region of the Oak Ridges Moraine (ORM), which contains granular water bearing strata within its core referred to as the Oak Ridges Moraine Aquifer Complex (ORMAC). During drilling, artesian conditions were encountered at site, with water flowing out of the boreholes.

Groundwater levels in a number of boreholes as shown on **Table 1** were measured at up to 0.2m above the existing grade (artesian conditions). The upward hydraulic head in the cohesionless soil deposits of the Oak Ridges Aquifer Complex (ORAC) creates uplift pressure on overlying till deposits. If the uplift pressure in the aquifer exceeds the overlying weight of the soil, failure of the till unit can occur in excavations in the form of groundwater upwelling and fracturing within the till unit. Remediation of uplift failures can be very difficult and costly. The upward hydraulic pressures from the underlying aquifer create constraints to safe excavations for the basement construction.

Long-term monitoring of groundwater table is recommended to establish stabilized long-term groundwater levels. This office should be retained to review the artesian groundwater conditions for the proposed excavations for the basement foundations prior to the final design of the proposed development. **Table 2** provides the preliminary safe excavation depths at borehole locations, without positive dewatering or de-pressurization of the aquifer. A factor of Safety of 1.25 was used to calculate the safe excavation depths.

Table 2: Approximate Preliminary Safe Excavation Depths in Boreholes Without Positive Dewatering/Depressurization

Borehole No.	Ground Surface Elevation (m)	Depth/Elevation of Groundwater Level (m)	Safe Excavation Depth / Elevation without Positive Dewatering/ Depressurization**
BH19-5	254.3	-0.1/254.4*	5.1/249.2
BH21-1	254.5	0.3/254.2	4.9/249.6
BH21-2	255.2	0.3/254.9	4.9/250.3
BH21-5	255.6	-0.2/255.6*	4.0/251.6
BH25-1	254.3	-0.2/254.5*	5.7/248.6

* groundwater level above existing grade

**Safe Excavation Depths will vary with groundwater table elevations

Dewatering and depressurization of groundwater will be required prior to any excavation below the safe excavation depths and/or groundwater table.

4.2 FOUNDATIONS

It is understood that the proposed high-rise buildings rang from 19 to 29 stories with 2 levels of underground parking (P2) at the west portion of the site, and with 3 levels of underground parking (P3) at the east portion of the site. The finished floor elevation of P2 is at Elev. 252.15 m, and is at Elev. 249.35 m for P3.

4.2.1 Available Bearing Capacity Value for Footings and Raft Foundation

Based on the borehole information, the bearing capacity values of 200 to 400 kPa at SLS (Serviceability Limit States) and 300 to 600 kPa at ULS (Ultimate Limit States) are available for conventional footings and raft foundations founded on the undisturbed native soils, as listed in **Table 3**.

Table 3: Bearing Values and Founding Levels of Conventional Footings/Raft Foundations on Native Soil

Proposed Buildings	BH No.	Ground Surface Elevation At Borehole (m)	Bearing Capacity at SLS (kPa)	Factored Geotechnical Resistance at ULS (kPa)	Minimum Depth below Existing Ground (m)	Founding Level at or below Elevation (m)
Building A (19 Storeys)	BH24-1	256.6	300 400	450 600	2.5 4.6	254.1 252.0
	BH24-2	256.3	300 400	450 600	3.1 6.1	253.2 250.2
Daycare Building F (1 Storey)	BH24-3	256.2	300	450	4.5	251.7
	BH24-4	255.4	300	450	2.3	253.1
Building E (29 Storeys)	BH24-5	254.9	300	450	3.1	251.8
	BH24-6	254.4	200	300	1.5	252.9
	BH21-5	255.6	300	450	2.6	253.0
Building D (27 Storeys)	BH24-7	254.8	300	450	2.5	252.3
	BH24-8	254.5	300	450	2.5	252.0
Building C (24 Storeys)	BH24-9	255.8	300 400	450 600	2.6 5.8	253.2 250.0
	BH24-10	256.0	300	450	3.3	252.7
	BH21-4	256.7	300 400	450 600	3.4 5.7	253.3 251.0
Building B (21 Storeys)	BH24-11	256.3	350	525	3.8	252.5
	BH24-12	256.6	350	525	4.5	252.1
Underground Parking Area	BH19-5	254.3	300	450	2.5	251.8
	BH21-1	254.5	300	450	3.2	251.3
	BH21-2	255.2	300	450	2.5	252.7

	BH21-3	256.6	350	525	3.2	253.4
	BH25-1	254.3	200	300	2.5	251.8

Foundations designed to the specified bearing capacity of 200 to 400 kPa at the serviceability limit states (SLS) are expected to settle less than 30 mm total and 25 mm differential.

The recommended modulus of subgrade reaction values for the design of raft foundations are listed as follows:

K_t = 7 MPa/m for the design of raft foundations with 200 kPa at SLS.

K_t = 10 MPa/m for the design of raft foundations with 300 kPa at SLS

K_t = 12 MPa/m for the design of raft foundations with 350 kPa at SLS

K_t = 14 MPa/m for the design of raft foundations with 400 kPa at SLS

4.2.2 Combined Raft Foundation and CFA Piles

In the areas where the raft foundation pressure exceeds the recommend bearing capacity specified in **Table 3**, the raft foundation can be augmented with CFA (Continuous Flight Auger) piles to support the loads exceeding the recommended bearing capacity of 200 to 400 kPa at SLS in **Table 3**.

CFA pile of 600 mm diameter with pile toe elevations as specified in **Table 4** can be designed for a bearing capacity value of 2000 kN/pile at SLS and 2700 kN/pile at ULS, provided it is confirmed by the pile load testing.

Table 4: Bearing Capacity and Founding Elevations of CFA Piles

Proposed Buildings	Borehole No.	Bearing Capacity at SLS (kN/Pile)	Factored Geotechnical Resistance at ULS (kN/Pile)	Pile Tip at or below Elevation (m)	Minimum Depth of Pile Tip below P2 Floor (Elev. 250.6 m) (m)
Building A (19 Storeys)	BH24-1 BH24-2	2000	2700	235.0	15.6
Daycare Building F (1 Storey)	BH24-3 BH24-4	2000	2700	234.0	16.6
Building E (29 Storeys)	BH24-5 BH24-6	2000	2700	230.0	20.6
Building D (27 Storeys)	BH24-7 BH24-8	2000	2700	231.0	19.6

Building C (24 Storeys)	BH24-9 BH24-10	2000	2700	233.0	17.6
Building B (21 Storeys)	BH24-11 BH24-12	2000	2700	234.0	16.6

The test piles must be loaded to at least 1.67 times the ULS bearing resistance, i.e. to 4500 kN per pile. Depending on the load test results, deeper/longer piles may be required to achieve the design bearing resistances.

The bearing resistances of CFA piles will be highly dependent on the contractor's experience, the quality and procedure of the pile installation, and the skills of the installation operator(s). The CFA contractor must review the borehole information and evaluate bearing capacity of the piles based on their experience. The quality and the design bearing resistance of the piles must be ensured by the CFA contractor. A specialty contractor should be retained to design and install the CFA piles based on the performance specification and design bearing resistances.

Prior to the pile construction, the contractor should submit the details of the installation plan, load test program, installation procedure, automated monitoring system and control parameters, grout/concrete mix design, and reinforcement installation etc. for the review by the structural engineer and the geotechnical engineer. All pile installation must be inspected by this office.

In order to avoid group effect on the bearing capacity of the piles, the horizontal spacing of adjacent piles should be at least 3 times its diameter.

4.2.3 Other Comments on Foundations

Prior to the placement of concrete, all foundation bases must be inspected by this office to confirm the design bearing values. The subgrade of foundation base should be covered with 50 mm thick lean concrete slab immediately after inspection and cleaning.

All footings/piles exposed to seasonal freezing conditions must have at least 1.2 metres of soil cover for frost protection.

Where it is necessary to place footings/piles at different levels, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line drawn up from the base of the lower footing. The lower footing must be installed first to help minimize the risk of undermining the upper footing.

It should be noted that the recommended bearing capacities have been calculated by DS Consultants Ltd. from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of the underground conditions becomes

available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by DS Consultants Ltd. to validate the information for use during the construction stage.

4.3 FLOOR SLAB AND PERMANENT DRAINAGE

The floor slab can be supported on grade provided the fill, and surficially softened soils are removed and the base thoroughly rolled. The fill required to raise the grade can consist of inorganic soil, placed in shallow lifts and compacted to 98 percent of Standard Proctor Maximum Dry Density (SPMDD).

A moisture barrier consisting of at least 200mm of 19mm clear crushed stone should be installed under the floor slab.

A perimeter and underfloor drainage system will be required. Typical drainage and backfill recommendations are illustrated on **Drawing 25** and **Drawing 26** for the shored excavation system and on **Drawing 27** for open cut excavation. Feasibility of installing permanent perimeter and underfloor drainage in the basement must be carried out with hydrogeological investigations to estimate the seepage rates. If the City does not give permission to drain into the storm sewers, then the building foundations must be designed as watertight structures.

Where the exposed subgrade consists of cohesionless soil below the water table, all openings including the subgrade must be entirely covered or wrapped with geotextile filter fabric, typically a Class II non-woven textile with a filtration opening size (F.O.S.) of 50 to 100 μm.

4.4 EXCAVATION AND GROUNDWATER CONTROL

Excavations can be carried out with heavy hydraulic backhoe. Stabilized groundwater levels in the monitoring wells were found at 0.2 m above existing grade to 5.0 m below existing grade, corresponding to Elevations 250.8 to 256.5 m.

Dewatering and depressurization of groundwater will be required prior to any excavation below the safe excavation depths and/or groundwater table. Safe excavation depth (SED) values at the borehole locations are listed on Table 2 in Section 4.1 of this report.

More comments regarding the type and extent of groundwater control required at site during construction and permanent drainage are provided in our hydrogeology report. This office should be retained to review the artesian groundwater conditions for the proposed excavations prior to the final design of the proposed development.

It should be noted that the till is a non-sorted sediment and therefore may contain boulders. Possible large obstructions such as buried concrete pieces are also anticipated in the fill material.

Provisions must be made in the excavation contract for the removal of possible boulders in the till or obstructions in the fill material.

All temporary excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the fill material and cohesionless deposits (sand, sandy silt to silty sand and sand and gravel) can be classified as Type 3 Soil above groundwater table and Type 4 Soil below groundwater table. The very stiff to hard clayey soils can be classified as Type 2 soil above the groundwater table and Type 3 Soil below the groundwater table.

The select inorganic fill and native soils free from topsoil and organics can be used as general construction backfill where it can be compacted with sheep's foot type compactors. Loose lifts of soil, which are to be compacted, should not exceed 200 mm.

Imported Granular 'B' fill is recommended in areas where free draining material is required, i.e. backfill behind foundation walls and in trenches.

Imported granular fill, which can be compacted with hand-held equipment, should be used in confined areas.

Depending on the time of construction and weather, some excavated material may be too wet to compact and will require aeration prior to its use.

It should be noted that the excavated soils are subject to moisture content increase during wet weather which would make these materials too wet for adequate compaction. Stockpiles should therefore be compacted at the surface or be covered with tarpaulins to help minimize moisture uptake.

4.5 EARTH PRESSURES

The lateral earth pressures acting on walls may be calculated from the following expression:

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

where p = Lateral earth pressure in kPa acting at depth h

K = Earth pressure coefficient equal to 0.4 for vertical walls and horizontal backfill.

γ = Unit weight of backfill, a value of 21 kN/m^3 may be assumed

h = Depth to point of interest in metres

q = Equivalent value of surcharge on the ground surface in kPa

The above expression assumes that the perimeter drainage system prevents the build up of any hydrostatic pressure behind the wall.

4.6 EARTHQUAKE CONSIDERATIONS

Based on the borehole information and according to Table 4.1.8.4.A of OBC 2012, the subject site for the proposed building with two levels of basement can be classified as 'Class C' for seismic site response.

4.7 TEMPORARY SHORING

The proposed excavation may be supported by a temporary shoring system consisting of timber lagging and soldier piles. A caisson wall may be required to support adjacent structures (e.g. surrounding buildings and utilities). The requirement for caisson walls to support adjacent structures is given on **Drawing 28**.

The shoring system must be designed in accordance with the 4th Edition of the Canadian Foundation Engineering Manual. The surcharge loading from adjacent structures must be considered. The soil parameters estimated to be applicable for this design are as follows:

1) Earth Pressure Coefficient for shoring:
   - (a) where movement must be minimal, K=0.45
   - (b) where minor movement (.002H) can be tolerated K=0.30
   - (c) passive earth pressure for soldier piles (unfactored) K_p=3.5 for dense to very dense soils and very stiff to hard soils

2) For stability check

   $\phi = 30°$

   C = 0

   $\gamma = 21$ kN/m^3

   surcharge is to be determined by shoring contractor

3) For anchors

   A bond stress of 100 kPa can be used for post-grouted anchors in dense to very dense soil and very stiff to hard soils, and 50 kPa in stiff/compact soils

The bond value is for preliminary design purpose. The actual bond values will depend on anchor installation methods and grouting procedures. Gravity poured concrete can result in low bond

values while pressure grouted anchors will give higher values and produce a more satisfactory anchor. Casing will be required during the construction of the tiebacks to prevent caving of soils. The soldier piles should be installed in pre-augered holes taken below the deepest excavation. The holes should be filled with concrete below the excavation level and half bag mix above the base of the excavation. The concrete strength must be specified by the shoring designer. Temporary liners may be required to help prevent caving during the installation period. Positive measures may be required to prevent the loss of soil through the spaces between the lagging boards. This could probably be achieved by placing well-graded sand and gravel behind the lagging boards or by installing a geotextile filter cloth.

Soil anchors will be required to support the shoring. The anchors must be of a length that meets the Canadian Foundation Manual recommendations. It is important to note that the minimum length lies beyond the 45 - $\phi/2$ + .15H line drawn from the base of the soldier pile and the overall stability of the system must be checked at each anchor level, where H is the shoring height.

The top anchor must not be placed lower than 3.0 meters below the top of level ground surface. Anchors will require casing when penetrating through wet sandy/silty soils. The bond values of anchors are preliminary since the contractor's installation procedures will determine the actual soil to concrete bond value. Hence, the contractor must decide on a capacity and confirm its availability. All anchors must be tested as indicated in the Foundation Manual, 4th edition.

Adhesion on the buried caisson shaft or behind the shoring system must be neglected when designing this shoring system.

Movement of the shoring system is inevitable. Vertical movements will result from the vertical load on the soldier piles resulting from the inclined tiebacks and inward horizontal movement results from earth and water pressures. The magnitude of this movement can be controlled by sound construction practices, and it is anticipated that the horizontal movement will be in the range of 0.1 to 0.25%H.

To ensure that movements of the shoring are within an acceptable range, monitoring must be carried out. Vertical and horizontal targets on the soldier piles must be located and surveyed before excavation begins. Weekly readings during excavation should show that the movements will be within those predicted; if not, the monitoring results will enable directions to be given to improve the shoring.

4.8 PAVEMENTS

The recommended pavement structures provided in **Table 5** are based upon an estimate of the subgrade soil properties determined from visual examination and textural classification of the soil samples. The values may need to be adjusted based on the city standards. Consequently, the

recommended pavement structures should be considered for preliminary design purposes only. If required, a more refined pavement structure design can be performed based on specific traffic data and design life requirements and will involve specific laboratory tests to determine frost susceptibility and strength characteristics of the subgrade soils, as well as specific data input from the client.

Table 5: Recommended Pavement Structure Thickness

Pavement Layer	Compaction Requirements	Light Duty Parking (Cars)	Heavy Duty Parking/Driveway (Delivery Trucks)
Asphaltic Concrete	92.0 to 96.5% Maximum Relative Density (MRD)	40 mm HL 3 or SP 12.5 50 mm HL 8 or SP 19.0	40 mm HL 3 or SP 12.5 80 mm HL 8 or SP 19.0
OPSS Granular A Base (or 19mm Crusher Run Limestone)	100% SPMDD*	150 mm	150 mm
OPSS Granular B (or 50mm Crusher Run Limestone)	100% SPMDD	250 mm	350 mm

The subgrade must be compacted to 98% SPMDD for at least the upper 500 mm unless accepted by DS Consultants Ltd.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over-emphasized. The finished pavement surface and underlying subgrade should be free of depressions and should be sloped (preferably at a minimum grade of two percent) to provide effective surface drainage toward catch basins. Surface water should not be allowed to pond adjacent to the outside edges of pavement areas. Subdrains should be installed to intercept excess subsurface moisture and prevent subgrade softening. This is particularly important in heavy-duty pavement areas.

Additional comments on the construction of parking areas and access roadways are as follows:

1) As part of the subgrade preparation, proposed parking areas and access roadways should be stripped of topsoil and other obvious objectionable material. Fill required to raise the grades to design elevations should conform to backfill requirements outlined in previous sections of this report. The subgrade should be properly shaped, crowned then proof-rolled in the full-time presence of a representative of this office. Soft or spongy subgrade

areas should be sub-excavated and properly replaced with suitable approved backfill compacted to 98% SPMDD.

2) The locations and extent of sub-drainage required within the paved areas should be reviewed by this office in conjunction with the proposed lot grading. Assuming that satisfactory crossfalls in the order of two percent have been provided, subdrains extending from and between catch basins may be satisfactory. In the event that shallower crossfalls are considered, a more extensive system of sub-drainage may be necessary and should be reviewed by DS Consultants Ltd.

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

4) It is recommended that DS Consultants Ltd. be retained to review the final pavement structure designs and drainage plans prior to construction to ensure that they are consistent with the recommendations of this report.

5. GENERAL COMMENTS AND LIMITATIONS OF REPORT

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

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to DS at the time of preparation. Unless otherwise agreed in writing by DS, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation.

The benchmark and elevations used in this report are primarily to establish relative elevation differences between the test hole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of test holes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

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. DS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

DS CONSULTANTS LTD.

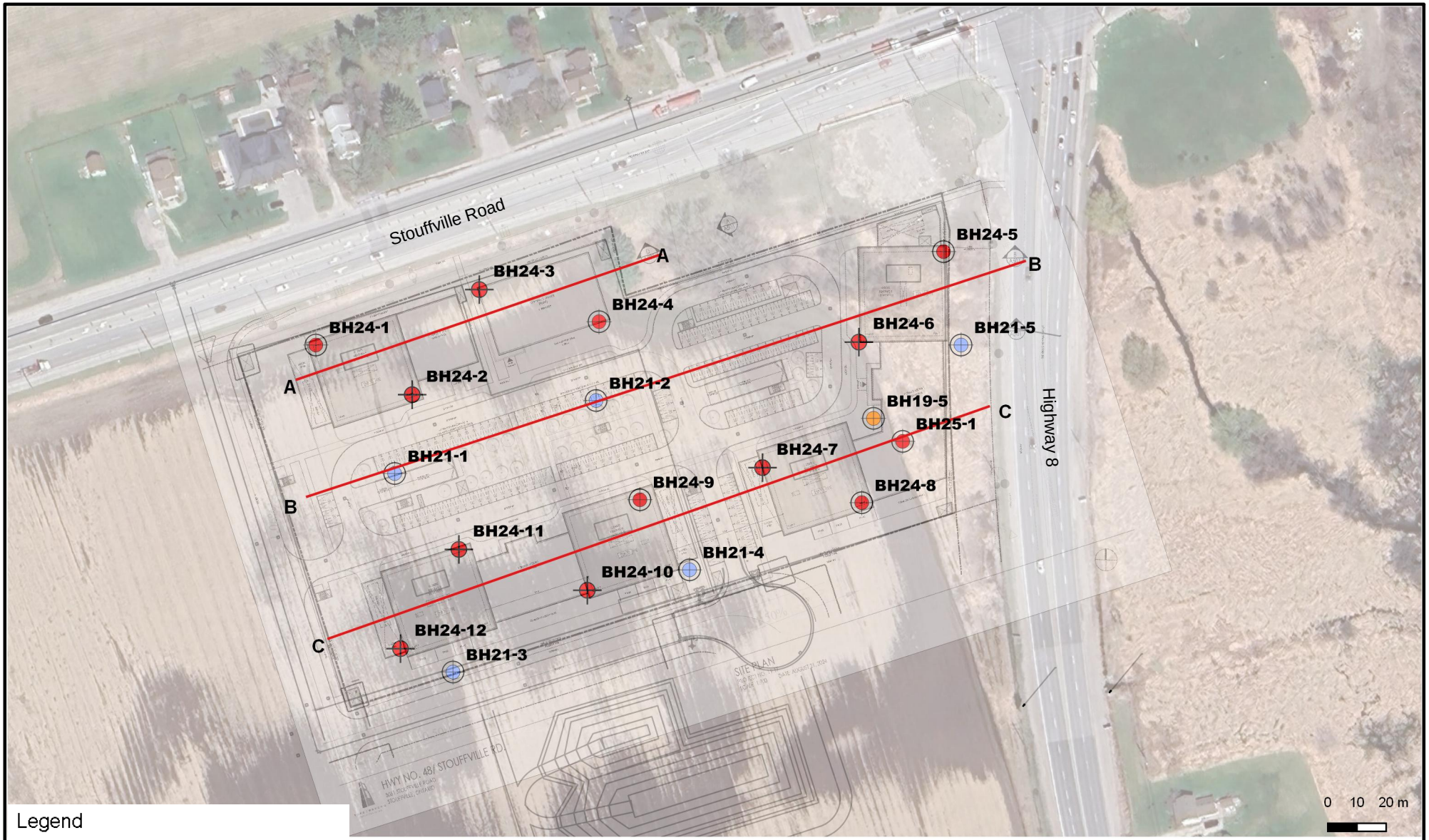
Derek Wang, P.Eng.
Senior Geotechnical Engineer

Fanyu Zhu, PhD., P.Eng.
Principal Geotechnical Engineer

Shabbir Bandukwala, M.Eng., P.Eng.
Principal Geotechnical Engineer

Drawings

J:\2019 Projects\19-043-103 Geo - Hydro - 2721 & 5061 Stouffville Road,Whitchurch-Stouffville, ON\Geotechnical\QGIS\1-QGIS\Drawing 1 Borehole Location Plan.qgs Mar-10 09:08



Legend

- Monitoring Well (DS-2019)
- Borehole (DS-2021)
- Monitoring Well (DS-2021)
- Borehole (DS - 2024/ 2025)
- Monitoring Well (DS-2024 / 2025)

DS CONSULTANTS LTD.
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Project: GEOTECHNICAL INVESTIGATION
5061 Stouffville Road, Whitchurch - Stouffville, ON

Title: **BOREHOLE LOCATION PLAN**

N

Client: TIMES GROUP CORPORATION

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.W	K.T	March 2025
Rev: 0	Scale: As Shown	Project No.: 19-043-103	Drawing No.: 1

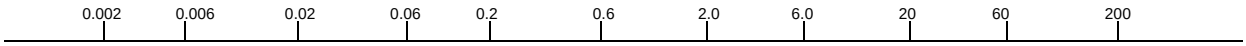
Image/Map Source: *Google Satellite Image*

Drawing 1A: Notes On Sample Descriptions

1. All sample descriptions included in this report generally follow the Unified Soil Classification. Laboratory grain size analyses provided by DS also follow the same system. Different classification systems may be used by others, such as the system by the International Society for Soil Mechanics and Foundation Engineering (ISSMFE). Please note that, with the exception of those samples where a grain size analysis and/or Atterberg Limits testing have been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

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

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

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LOG OF BOREHOLE BH25-1

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869140.7 E 637861

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Feb-26-2025

REF. NO.: 19-043-103
ENCL NO.: 14

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
254.3					
254.0 / 0.2	**TOPSOIL:** 200mm				
	FILL: clayey silt, trace organics, trace rootlets, trace sand to some sand, brown, moist, soft to stiff	1	SS	3	
		2	SS	4	
252.6					
1.7	**CLAYEY SILT TO SILTY CLAY TILL:** sandy, trace gravel, brown to grey, moist, stiff to hard	3	SS	11	
		4	SS	24	
	silty sand layer at 3.1m	5	SS	44	
	grey below 4.6m	6	SS	31	
		7	SS	36	
		8	SS	18	
	stiff at 9.1m	9	SS	9	
243.6					
10.7	**SILTY SAND TO SANDY SILT TILL:** trace to some clay, trace to some gravel, cobble/boulder, grey, very moist to wet, compact to very dense	10	SS	28	
	clayey silt till layers below 12.5m	11	SS	50/75mm	
		12	SS	21	
239.3					
15.0	**SILTY SAND:** trace clay, trace gravel, grey, very moist to wet, very dense (till - like)	13	SS	45	
		14	SS	65	
236.3					
18.0	**SILTY SAND TO SANDY SILT TILL:** trace clay, trace to some gravel, cobble/boulder, grey, very moist to wet, very dense	15	SS	50/100mm	
		16	SS	50/75mm	
233.0					
21.3		17	SS	50/75mm	

GROUND WATER CONDITIONS: W. L. 254.1 m, Mar 07, 2025

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)	GR	SA	SI	CL
Switched to Mud Rotary				
	4	23	48	25
	9	48	35	8
	8	61	27	4
	3	32	57	8

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH25-1

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869140.7 E 637861

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Feb-26-2025

REF. NO.: 19-043-103
ENCL NO.: 14

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY TO CLAYEY SILT TILL: some sand to sandy, trace gravel, occasional cobble, grey, moist, hard(Continued)						232					
			18	SS	41		231		○			
			19	SS	48		230		○			
			20	SS	42		229		○			
			21	SS	64		228		○			
	boulder at 28.9m		22	SS	50/ 50mm		227					auger grinding
			23	SS	50/ 100mm		226		○			
			24	SS	50/ 130mm		225		○			
			25	SS	50/ 130mm		224		○			
			26	SS	50/ 100mm		223		○			4 41 39 16
217.2			27	SS	73		222		○			
37.1	**END OF BOREHOLE:**						221					
	Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Mar. 7, 2025 0.20 Mar. 24, 2025 -(0.20) above ground surface						220					
							219					
							218					

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-1

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869173.7 E 637660.6

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-24-2024

REF. NO.: 19-043-103
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
256.6												
256.6 / 0.0	**TOPSOIL:** 270mm											
0.3 / 255.8	**FILL:** sandy silt, trace rootlets, trace gravel, dark brown to brown, moist, compact		1	SS	11		256					
1 / 0.8	**FILL:** clayey silt, sandy, trace organics, trace cobble, dark brown to brown, moist, stiff		2	SS	14							
255.0 / 1.6	**SANDY SILT TILL:** trace to some clay, trace gravel, occasional cobble, brown, moist, compact to dense		3	SS	21	▽	255					
2	clayey silt till layer at 2.6m		4	SS	34							
253.6 / 3.0	**SILTY SAND:** trace clay, brown, wet, dense		5	SS	34		254					Switched to Mud Rotary
4 / 252.1							253					
4.5	**SILTY CLAY TILL:** sandy, trace gravel, occasional cobble, grey, moist, hard		6	SS	75		252					
5												
6			7	SS	54		251					4 30 46 20
7 / 249.1							250					
7.5	**CLAYEY SILT:** trace sand, grey, moist, hard		8	SS	39		249					
8 / 247.6							248					
9.0	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, occasional cobble, grey, moist to very moist, very dense		9	SS	50/ 130mm		247					
10			10	SS	50/ 130mm		246					
11			11	SS	50/ 130mm		245					6 36 46 12
12			12	SS	50/ 130mm		244					
13			13	SS	50/ 130mm		243					
14			14	SS	50/		242					
15							241					
16							240					
17												

W. L. 254.7 m
Nov 19, 2024

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ 3=3% Strain at Failure

LOG OF BOREHOLE BH24-1

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869173.7 E 637660.6

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-24-2024

REF. NO.: 19-043-103
ENCL NO.: 2

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
18	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, occasional cobble, grey, moist to very moist, very dense(Continued)				130mm		239				
19			15	SS	50/ 130mm		238		○		
20			16	SS	50/ 130mm		237		○		
21	cobbles/boulders at 21.3m		17	SS	50/ 25mm		236 / 235				
22							234				
23 233.6			18	SS	50/ 75mm				○		
23.0	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 13, 2024 1.8 Nov. 19, 2024 1.9										

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-2

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869156.4 E 637693.6

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-28-2024

REF. NO.: 19-043-103
ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
256.3					
256.0 / 0.0	**TOPSOIL:** 270mm				
0.3	**FILL:** clayey silt, trace rootlets, trace organics, trace gravel, dark brown to brown, moist, stiff	1	SS	9	256
255.3		2	SS	10	
1.0	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, stiff to very stiff	3	SS	10	255
2	silt layer at 2.3m	4	SS	23	254
253.3					
3.0	**SILT:** trace to some clay, trace sand, brown, wet, dense	5	SS	36	253
4					
251.7					252
254.6 / 4.8	**SAND:** trace silt, trace clay, grey, wet, dense	6	SS	31	
5	**CLAYEY SILT TILL:** sandy, trace gravel, occasional cobble, grey, moist, hard				251
6		7	SS	50/ 100mm	250
7	silt layer at 7.6m				249
8		8	SS	33	248
9		9	SS	50/ 130mm	247
10					
245.8					246
10.5	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, grey, very moist, very dense	10	SS	50/ 130mm	
11	silt layer at 10.7m				245
12		11	SS	50/ 100mm	244
13					243
14		12	SS	50/ 130mm	
15					242
240.8		13	SS	50/ 100mm	241
15.5	**END OF BOREHOLE:**				

Notes:
1) Water encountered at 3.0m during drilling.

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 19-043-103GEO.GPJ DS.GDT 24-12-13

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

LOG OF BOREHOLE BH24-3

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869192.4 E 637716.7

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-26-2024

REF. NO.: 19-043-103
ENCL NO.: 4

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
256.2 / 0.0	**TOPSOIL:** 250mm				256
0.3 / 255.3	**FILL:** sandy silt, trace rootlets, trace gravel, dark brown to brown, moist, loose to compact	1	SS	8	
0.9	**CLAYEY SILT TILL:** sandy, trace gravel, occasional cobble, brown, moist, very stiff	2	SS	15	255
253.8		3	SS	17	
2.4 / 253.2	**SILT:** trace to some clay, trace sand, brown, moist to wet, dense	4	SS	37	254
3.0	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, stiff to hard	5	SS	12	253
		6	SS	30	252
248.7		7	SS	26	251
7.5 / 247.2	**CLAYEY SILT:** trace sand, grey, moist, very stiff	8	SS	26	250
9.0	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, occasional cobble, grey, moist to very moist, very dense	9	SS	50/ 100mm	249
		10	SS	50/ 130mm	248
		11	SS	50/ 100mm	247
		12	SS	50/ 130mm	246
		13	SS	50/ 130mm	245
		14	SS	50/	244
					243
					242
					241
					240

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

GROUND WATER CONDITIONS
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

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

Switched to Mud Rotary

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH24-3

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869192.4 E 637716.7

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-26-2024

REF. NO.: 19-043-103
ENCL NO.: 4

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SANDY SILT TO SILTY SAND TILL: trace to some clay, trace gravel, occasional cobble, grey, moist to very moist, very dense(Continued)				75mm		239				
18			15	SS	50/ 50mm		238				
19							237				
236.4											
20 19.8	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard		16	SS	50/ 100mm		236	○			
21							235				
			17	SS	50/ 130mm			○			
22							234				
23											
232.8			18	SS	50/ 130mm		233	⊖			6 39 39 16
23.4	**END OF BOREHOLE:** Notes: 1) Water encountered at 2.4m during drilling.										

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-4

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869181.5 E 637757.2

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-28-2024

REF. NO.: 19-043-103
ENCL NO.: 5

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
255.4 / 0.0	**TOPSOIL:** 250mm				
0.3 / 254.4	**FILL:** clayey silt, trace rootlets, trace organics, trace gravel, dark brown to brown, moist, stiff to very stiff	1	SS	10	255
1.0	**CLAYEY SILT TO SILTY CLAY TILL:** sandy, trace gravel, brown, moist, stiff to hard	2	SS	20	254
		3	SS	13	
	grey below 3.0 m	4	SS	42	253
		5	SS	26	252
		6	SS	32	251
	silt layer at 6.1 m	7	SS	54	249
		8	SS	19	247
246.4 / 9.0	**SANDY SILT TILL:** trace to some clay, trace gravel, occasional cobble, grey, moist, very dense	9	SS	50/ 130mm	246
		10	SS	81	245
243.4 / 12.0	**CLAYEY SILT TILL:** sandy, trace gravel, occasional cobble, grey, moist, hard	11	SS	50/ 130mm	243
		12	SS	50/ 130mm	242
239.9 / 15.5	**END OF BOREHOLE:**	13	SS	50/ 100mm	240

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

W. L. 254.0 m
Nov 19, 2024

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)	GR	SA	SI	CL
	1	22	51	26

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH24-4

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869181.5 E 637757.2

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-28-2024

REF. NO.: 19-043-103
ENCL NO.: 5

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT w_P w w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m							
	Date: Water Level(mbgl): Nov. 13, 2024 1.3 Nov. 19, 2024 1.4											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-5

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869205.3 E 637875.1

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Nov-05-2024

REF. NO.: 19-043-103
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
254.9					
254.8 0.1	**TOPSOIL:** 150mm				
254.4 0.5	**FILL:** sandy silt, trace rootlets, brown, moist, dense	1	SS	30	
1	**FILL:** clayey silt, trace to some organics, trace rootlets, dark grey, moist, firm	2	SS	5	254
253.2	mixed with organics at 0.8m				
1.7	**FILL:** silty sand, trace clay, trace gravel, brown, wet, loose to compact	3	SS	4	
2 252.5 2.4	**CLAYEY SILT TILL:** trace to some sand, trace gravel, brown, moist, stiff to hard	4	SS	13	
3		5	SS	65	252
4		6	SS	50/ 150mm	251
	grey below 4.6m	7	SS	46	250
5 249.6 5.3	**CLAYEY SILT:** silt interbeds, trace to some sand, trace gravel, grey, moist, very stiff to hard	8	SS	58	249
6		9	SS	31	
7		10	SS	35	248
8		11	SS	23	247
246.5 8.4	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, very stiff	12	SS	17	
9		13	SS	25	246
10 244.4 10.5	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, occasional cobble, grey, very moist to wet, compact to very dense				245
11		14	SS	20	244
12	very dense below 12.0m	15	SS	50/ 150mm	243
13					242
14	wet below 13.7m	16	SS	50/ 130mm	241
15					240
		17	SS	50/ 130mm	
16					239
17		18	SS	50/	238

GROUND WATER CONDITIONS: W. L. 253.4 m Nov 19, 2024

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

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

Switched to Mud Rotary

2 10 71 17

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH24-5

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869205.3 E 637875.1

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Nov-05-2024

REF. NO.: 19-043-103
ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SANDY SILT TO SILTY SAND TILL: trace to some clay, trace gravel, occasional cobble, grey, very moist to wet, compact to very dense(Continued)				130mm							
18	gravelly at 18.3m		19	SS	50/ 75mm		237					
19							236					
20			20	SS	50/ 100mm		235					
21							234					
233.6 21.3	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard		21	SS	50/ 130mm		233					
22 231.9							232					
23.0	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed beside original location. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 13, 2024 1.4 Nov. 19, 2024 1.5		22	SS	50/ 100mm							

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 19-043-103GEO.GPJ DS.GDT 24-12-13

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LOG OF BOREHOLE BH24-6

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869174.4 E 637846.4

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-31-2024

REF. NO.: 19-043-103
ENCL NO.: 7

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
254.4							
254.2 0.0	**TOPSOIL:** 230mm		1	SS	7		254
0.2	**FILL:** clayey silt, trace rootlets, trace organics, trace gravel, dark brown to brown, moist, firm						
253.5 0.9	**CLAYEY SILT TILLL:** sandy, trace gravel, occasional cobble, brown, moist, very stiff to hard		2	SS	19		253
			3	SS	21		
252			4	SS	24		252
3	grey below 3.1m		5	SS	35		251
4 249.9			6	SS	18		250
4.5	**CLAYEY SILT:** frequent silt layers, trace sand, grey, moist, stiff to very stiff		7	SS	17		
			8	SS	11		249
6	trace gravel below 6.1m		9	SS	12		248
7			10	SS	26		247
8 246.0			11	SS	21		
8.4	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, very stiff		12	SS	19		246
9			13	SS	17		245
10 243.9							244
10.5	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, grey, very moist to wet, compact to very dense		14	SS	20		243
12			15	SS	63		242
13	wet at 13.7m		16	SS	17		241
14							240
15 239.0			17	SS	50/ 75mm		239
15.4	**END OF BOREHOLE:** Notes: 1) Water encountered at 4.0m during drilling.						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

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

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 19-043-103GEO.GPJ DS.GDT 24-12-13

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LOG OF BOREHOLE BH24-7

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869131.3 E 637813.6

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Nov-01-2024

REF. NO.: 19-043-103
ENCL NO.: 8

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
254.8					
254.8 / 0.0	**TOPSOIL:** 250mm				
0.3 / 253.9	**FILL:** clayey silt, trace rootlets, trace organics, trace gravel, dark brown to brown, moist, stiff	1	SS	8	254
0.9	**CLAYEY SILT TILLL:** sandy, trace gravel, occasional cobble, brown, moist, stiff to hard	2	SS	13	
		3	SS	17	253
		4	SS	52	
		5	SS	36	252
251.0					
3.8 / 250.3	**SANDY SILT TILL:** trace to some clay, trace gravel, brown to grey, moist, very dense	6	SS	50/ 130mm	251
4.5	**CLAYEY SILT TILL:** sandy, frequent silt pockets, trace gravel, occasional cobble, grey, moist, very stiff to hard	7	SS	49	
		8	SS	27	250
		9	SS	54	
		10	SS	26	249
		11	SS	24	
		12	SS	22	248
		13	SS	25	
		14	SS	disturbed	247
242.8					
12.0	**SAND:** some gravel, trace silt, trace clay, grey, wet, very dense	15	SS	69	246
241.3					
13.5	**SANDY SILT TILL:** trace to some clay, trace gravel, grey, very moist, very dense	16	SS	63	245
239.3		17	SS	50/ 75mm	244
15.5	**END OF BOREHOLE:**				243

Notes:
1) Water encountered at 3.8 m during drilling.

242 241 240

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
15	73	9	1

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
● ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 19-043-103GEO.GPJ DS.GDT 24-12-13

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LOG OF BOREHOLE BH24-8

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869119.5 E 637847.1

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-30-2024

REF. NO.: 19-043-103
ENCL NO.: 9

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m
254.5 / 0.0	**TOPSOIL:** 250mm			
0.3 / 253.5	**FILL:** clayey silt, trace rootlets, trace organics, trace gravel, dark brown to brown, moist, firm	1	SS	6
1.0	**CLAYEY SILT TILLL:** some sand, trace gravel, occasional cobble, brown, moist, stiff to hard	2	SS	8
		3	SS	14
		4	SS	22
		5	SS	38
	grey below 3.8m	6	SS	72
		7	SS	50/100mm
		8	SS	36
248.5 / 6.0	**CLAYEY SILT:** silt seams/layers, trace sand, grey, moist, very stiff to hard	9	SS	39
		10	SS	23
		11	SS	21
		12	SS	15
	trace gravel at 9.1m	13	SS	16
243.8 / 10.7	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, grey, moist, very dense	14	SS	67
		15	SS	50/130mm
		16	SS	50/130mm
		17	SS	50/130mm

GROUND WATER CONDITIONS: W. L. 252.9 m Nov 19, 2024

ELEVATION: 254, 253, 252, 251, 250, 249, 248, 247, 246, 245, 244, 243, 242, 241, 240, 239, 238

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

Switched to Mud Rotary at 3.1m

GR	SA	SI	CL
1	8	72	18
7	44	42	7

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH24-8

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869119.5 E 637847.1

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-30-2024

REF. NO.: 19-043-103
ENCL NO.: 9

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
	SANDY SILT TO SILTY SAND TILL: trace to some clay, trace gravel, grey, moist, very dense(Continued)	18	SS	50/130mm		237
		19	SS	50/100mm		236
						235
234.5		20	SS	50/130mm		
20.0	**SILT:** trace to some clay, trace sand, trace gravel, grey, moist, very dense					234
233.2						
21.3	**SILTY SAND TO SANDY SILT TILL:** trace clay, trace gravel, grey, moist, very dense	21	SS	50/75mm		233
						232
231.1		22	SS	50/130mm		
23.4	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 13, 2024 1.4 Nov. 19, 2024 1.6					

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)
REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-9

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869120.9 E 637771.7

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-29-2024

REF. NO.: 19-043-103
ENCL NO.: 10

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
255.8 / 0.0	**TOPSOIL:** 270mm				
0.3 / 254.8	**FILL:** clayey silt, trace rootlets, trace organics, trace gravel, dark brown to brown, moist, stiff	1	SS	8	255
1.0	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, stiff to hard	2	SS	12	
2 / 253.2		3	SS	11	254
2.6	**SILT:** trace clay, trace sand, brown to grey, wet, dense	4	SS	32	253
3 / 251.3		5	SS	31	252
4.5	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, very stiff to hard	6	SS	25	251
5					
6		7	SS	34	250
7					249
8 / 246.8		8	SS	30	248
9.0	**CLAYEY SILT:** trace sand, silt layers, grey, moist, hard	9	SS	30	247
10 / 245.3					246
10.5	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, occasional cobble, grey, moist to very moist, very dense	10	SS	50/ 130mm	245
11		11	SS	50/ 130mm	244
12		12	SS	50/ 130mm	243
13		13	SS	50/ 100mm	242
14		14	SS	50/	241
15					240
16					239
17					

GROUND WATER CONDITIONS: W. L. 250.8 m, Nov 19, 2024

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)	GR	SA	SI	CL
	0	9	88	3

DS SOIL LOG-2021-FINAL 19-043-103GEO.GPJ DS.GDT 24-12-13

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH24-9

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869120.9 E 637771.7

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Oct-29-2024

REF. NO.: 19-043-103
ENCL NO.: 10

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SANDY SILT TO SILTY SAND TILL: trace to some clay, trace gravel, occasional cobble, grey, moist to very moist, very dense(Continued)				130mm							
237.7 18.1	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard sand and gravel layer at 18.4m		15	SS	50/ 130mm		238		○			
							237					
			16	SS	50/ 75mm		236		○			
							235					
			17	SS	50/ 130mm		234		○			
232.6			18	SS	50/ 30mm		233		○			
23.2	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): Nov. 13, 2024 2.2 Nov. 19, 2024 5.0											

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-10

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869089.4 E 637753

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Nov-04-2024

REF. NO.: 19-043-103
ENCL NO.: 11

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
256.0								
256.0 / 0.0	**TOPSOIL:** 150mm							
255.8 / 0.2	**FILL:** silty sand, some clay, trace gravel, trace rootlets, dark brown to brown, moist, compact		1	SS	17			
255.2 / 0.8	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, stiff to very stiff		2	SS	24		255	
	sandy silt pockets at 1.5m		3	SS	14		254	
253.5 / 2.5	**SILT:** trace to some clay, trace sand, trace gravel, brown, wet, compact to dense		4	SS	19		253	
252.7 / 3.3	**SILTY SAND:** clayey silt pockets, brown, wet, dense		5	SS	36			Switched to Mud Rotary
			6	SS	42		252	
251.4 / 4.6	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, very stiff to hard		7	SS	32		251	
			8	SS	31			
			9	SS	42		250	
	silt pockets below 6.9m		10	SS	29		249	
248.4 / 7.6	**CLAYEY SILT:** frequent silt layers, trace sand, grey, moist, very stiff		11	SS	17		248	1 2 76 21
	trace gravel at 8.4m		12	SS	27			
			13	SS	23		247	
245.5 / 10.5	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel, occasional cobble, grey, very moist to wet, very dense		14	SS	50/ 130mm		246	auger grinding
	gravelly at 12.2m		15	SS	50/ 130mm		245	
			16	SS	50/ 150mm		244	
240.7 / 15.3	**END OF BOREHOLE:** Notes: 1) Water encountered at 2.5m during drilling.		17	SS	50/ 75mm		243	
							242	
							241	

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-11

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869103.6 E 637709.7

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Nov-04-2024

REF. NO.: 19-043-103
ENCL NO.: 12

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
256.3 / 0.0	**TOPSOIL:** 250mm	1	SS	8	
255.5 / 0.8	**FILL:** silty clay, trace rootlets, trace gravel, trace organics, dark brown to brown, moist, stiff	2	SS	11	
	CLAYEY SILT TILL: sandy, trace gravel, brown, moist, stiff to hard sandy silt pockets at 1.5m	3	SS	13	
		4	SS	19	
252.9 / 3.4	**SILT:** trace sand, trace gravel, brown, very moist, dense	5	SS	33	Switched to Mud Rotary
252.5 / 3.8	**SILTY SAND:** trace clay, brown, wet, dense silt pockets at 4.6m	6	SS	40	
251.0 / 5.3	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, occasional cobble, grey, moist, very stiff to hard	7	SS	47	
		8	SS	41	
		9	SS	50/150mm	
		10	SS	50/130mm	
		11	SS	74	
247.3 / 9.0	wet silt layer, very stiff at 8.4m **SILT:** trace sand, trace clay, grey, moist, dense	12	SS	22	7 14 61 18
		13	SS	39	
245.6 / 10.7	**SANDY SILT TO SILTY SAND TILL:** trace to some clay, trace gravel, occasional cobble, grey, moist to wet, very dense	14	SS	50/150mm	
		15	SS	50/130mm	
		16	SS	50/130mm	
241.3 / 15.0	**CLAYEY SILT TILL:** sandy, trace gravel, occasional cobble, grey, moist, hard	17	SS	50/150mm	
241.0 / 15.3	**END OF BOREHOLE:** Notes: 1) Water encountered at 2.7m during drilling.				

GROUND WATER CONDITIONS

ELEVATION: 256, 255, 254, 253, 252, 251, 250, 249, 248, 247, 246, 245, 244, 243, 242, 241

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ε=3% Strain at Failure

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LOG OF BOREHOLE BH24-12

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869069.4 E 637689.9

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-23-2024

REF. NO.: 19-043-103
ENCL NO.: 13

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
256.6					
256.4 0.0	**TOPSOIL:** 250mm				
0.3 255.6	**FILL:** silty clay, trace rootlets, trace gravel, trace organics, dark brown to brown, moist, stiff	1	SS	11	256
1.0 255.1	**CLAYEY SILT:** trace sand, trace gravel, brown, moist, stiff	2	SS	11	
1.5 254.3	**SILTY SAND:** trace clay, some gravel, brown, moist, dense	3	SS	44	255
2.3 252.1	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff	4	SS	16	254
		5	SS	20	253
4.5 250.6	**SANDY SILT TO SAND:** trace clay, brown, wet, dense	6	SS	35	252
6.0 249.1	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, very stiff	7	SS	28	251
7.5 246.1	**CLAYEY SILT:** trace sand, grey, moist, very stiff to hard silt layer at 9.1m	8	SS	49	250
		9	SS	23	249
10.5 244.6	**SANDY SILT TILL:** trace to some clay, trace gravel, occasional cobble, grey, moist, very dense	10	SS	50/ 130mm	248
12.0 243.1	**SANDY SILT:** trace clay, grey, wet, very dense	11	SS	50/ 130mm	247
13.5	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel, occasional cobble, grey, moist to very moist, very dense	12	SS	50/ 100mm	246
		13	SS	50/ 130mm	245
					244
					243
					242
					241
					240

GROUND WATER CONDITIONS

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

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

Switched to Mud Rotary

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 19-043-103GEO.GPJ DS.GDT 24-12-13

LOG OF BOREHOLE BH24-12

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869069.4 E 637689.9

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Oct-23-2024

REF. NO.: 19-043-103
ENCL NO.: 13

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
18	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel, occasional cobble, grey, moist to very moist, very dense(Continued)		14	SS	50/ 130mm		239					
238.3												
18.3	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard		15	SS	50/ 130mm		238					9 41 37 13
19												
20			16	SS	50/ 130mm		237					
21							236					
22			17	SS	50/ 130mm		235					
233.6							234					
23.0	**END OF BOREHOLE:** Notes: 1) Water encountered at 4.6m during drilling.		18	SS	50/ 100mm							

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH25-1

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869140.7 E 637861

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Feb-26-2025

REF. NO.: 19-043-103
ENCL NO.: 14

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
254.3					
254.0 / 0.2	**TOPSOIL:** 200mm	1	SS	3	254
	FILL: clayey silt, trace organics, trace rootlets, trace sand to some sand, brown, moist, soft to stiff	2	SS	4	
252.6					
1.7	**CLAYEY SILT TO SILTY CLAY TILL:** sandy, trace gravel, brown to grey, moist, stiff to hard	3	SS	11	252
		4	SS	24	
	silty sand layer at 3.1m	5	SS	44	251
					250
	grey below 4.6m	6	SS	31	249
		7	SS	36	248
		8	SS	18	247
					246
	stiff at 9.1m	9	SS	9	245
243.6					244
10.7	**SILTY SAND TO SANDY SILT TILL:** trace to some clay, trace to some gravel, cobble/boulder, grey, very moist to wet, compact to very dense	10	SS	28	243
	clayey silt till layers below 12.5m	11	SS	50/75mm	242
		12	SS	21	241
239.3					240
15.0	**SILTY SAND:** trace clay, trace gravel, grey, very moist to wet, very dense (till - like)	13	SS	45	239
		14	SS	65	238
236.3					237
18.0	**SILTY SAND TO SANDY SILT TILL:** trace clay, trace to some gravel, cobble/boulder, grey, very moist to wet, very dense	15	SS	50/100mm	236
		16	SS	50/75mm	235
233.0					234
21.3		17	SS	50/75mm	233

W. L. 253.5 m
Mar 07, 2025

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)	GR	SA	SI	CL
Switched to Mud Rotary				
	4	23	48	25
	9	48	35	8
	8	61	27	4
	3	32	57	8

Continued Next Page

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ 3=3% Strain at Failure

LOG OF BOREHOLE BH25-1

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corporation
PROJECT LOCATION: 5061 Stouffville Road, Whitchurch-Stouffville, ON
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4869140.7 E 637861

DRILLING DATA
Method: Hollow Stem Auger/Mud Rotary
Diameter: 200mm
Date: Feb-26-2025

REF. NO.: 19-043-103
ENCL NO.: 14

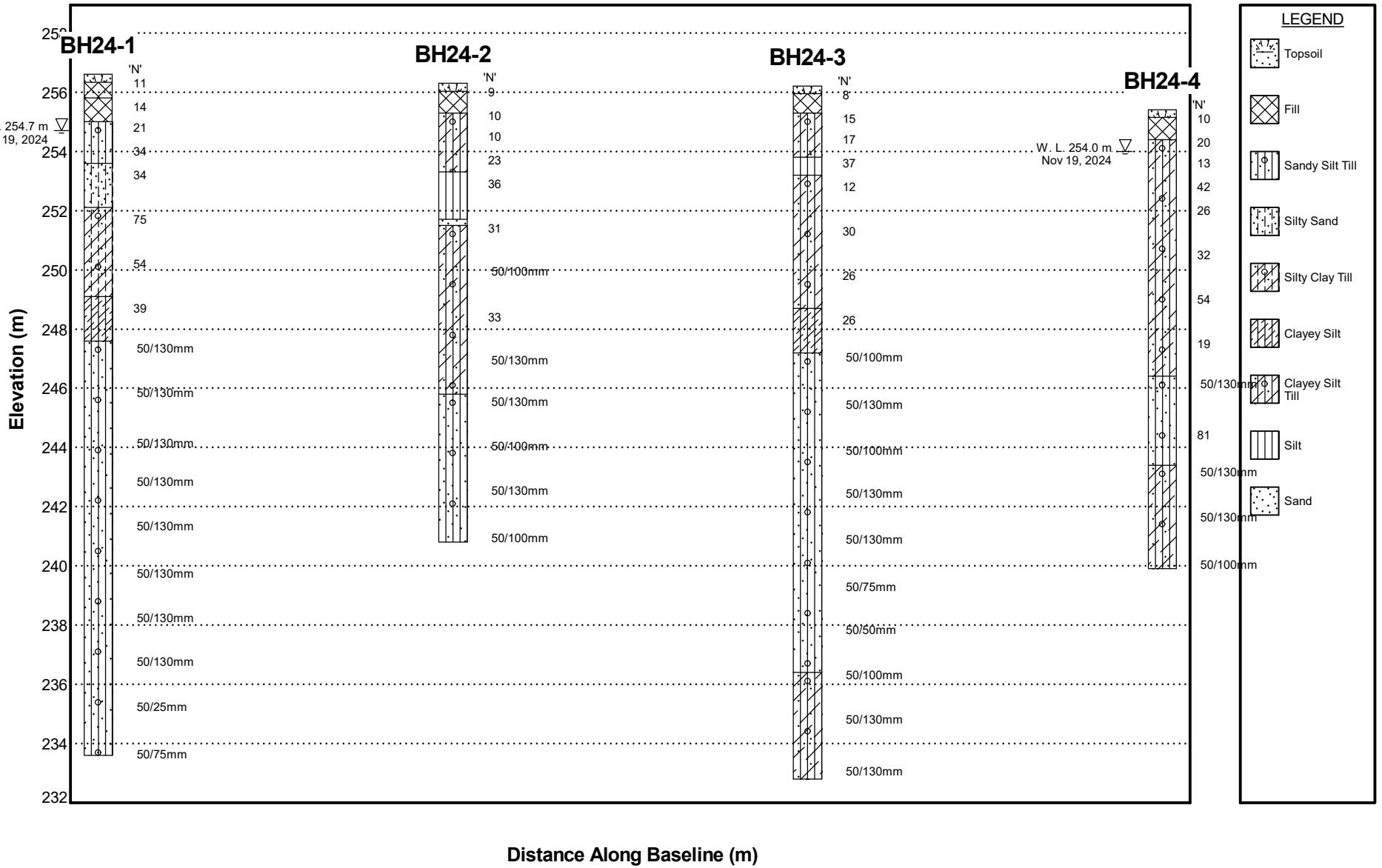
ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SILTY CLAY TO CLAYEY SILT TILL: some sand to sandy, trace gravel, occasional cobble, grey, moist, hard(Continued)						232					
			18	SS	41		231					
			19	SS	48		230					
			20	SS	42		229					
			21	SS	64		228					
							227					
	boulder at 28.9m		22	SS	50/ 50mm		226					auger grinding
			23	SS	50/ 100mm		225					
			24	SS	50/ 130mm		224					
			25	SS	50/ 130mm		223					
			26	SS	50/ 100mm		222					
							221					
			27	SS	73		220					
217.2							219					4 41 39 16
37.1	**END OF BOREHOLE:**						218					

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water Level Readings:

Date:	Water Level(mbgl):
Mar. 7, 2025	0.80

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure



Distance Along Baseline (m)

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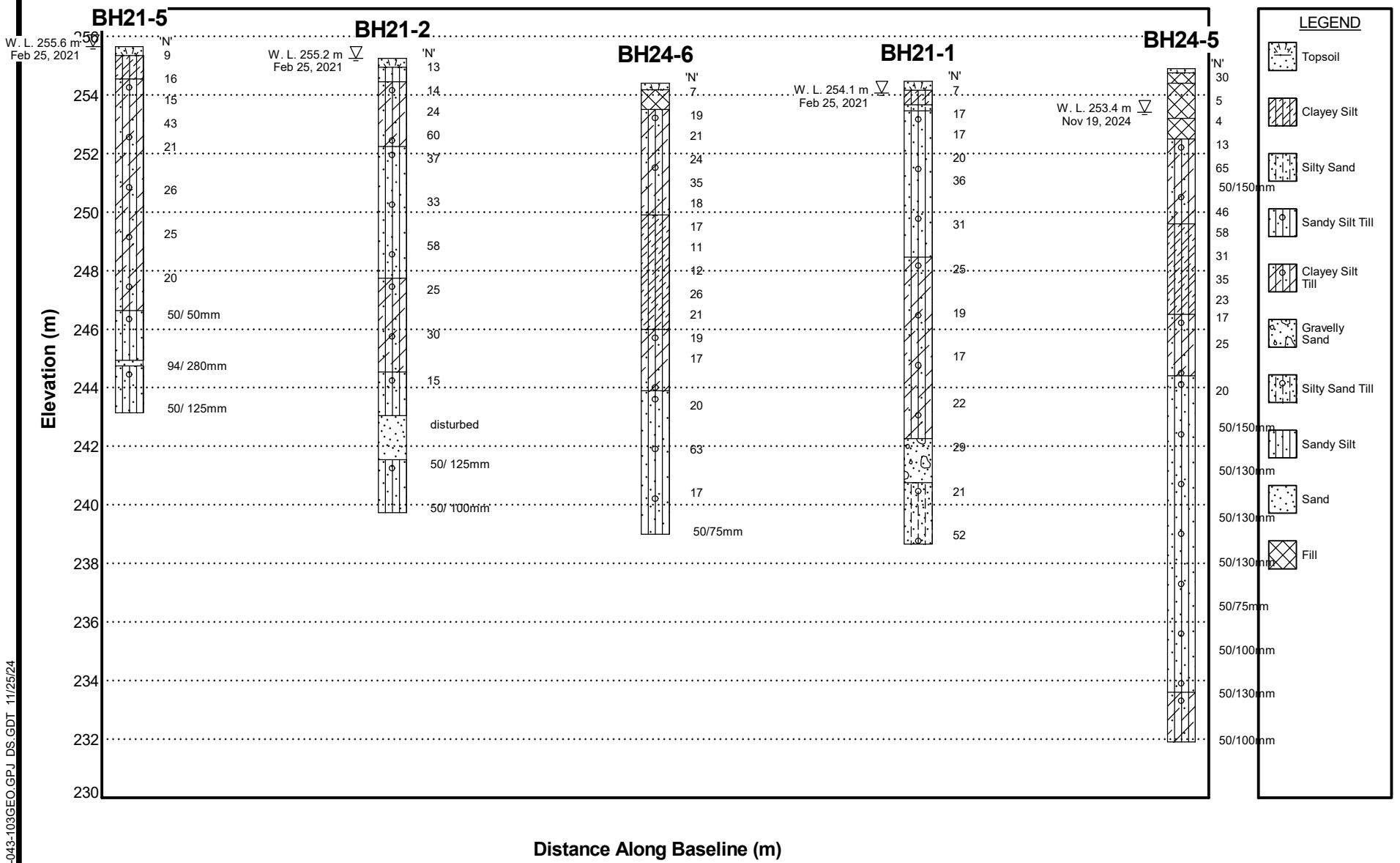
Generalized Sub-surface Profile A-A (NTS)

DRAWING NO.	15
JOB NO.	19-043-103
DATE	November, 2024

DS FENCE (M) 19-043-103GEO.GPJ DS.GDT 11/25/24



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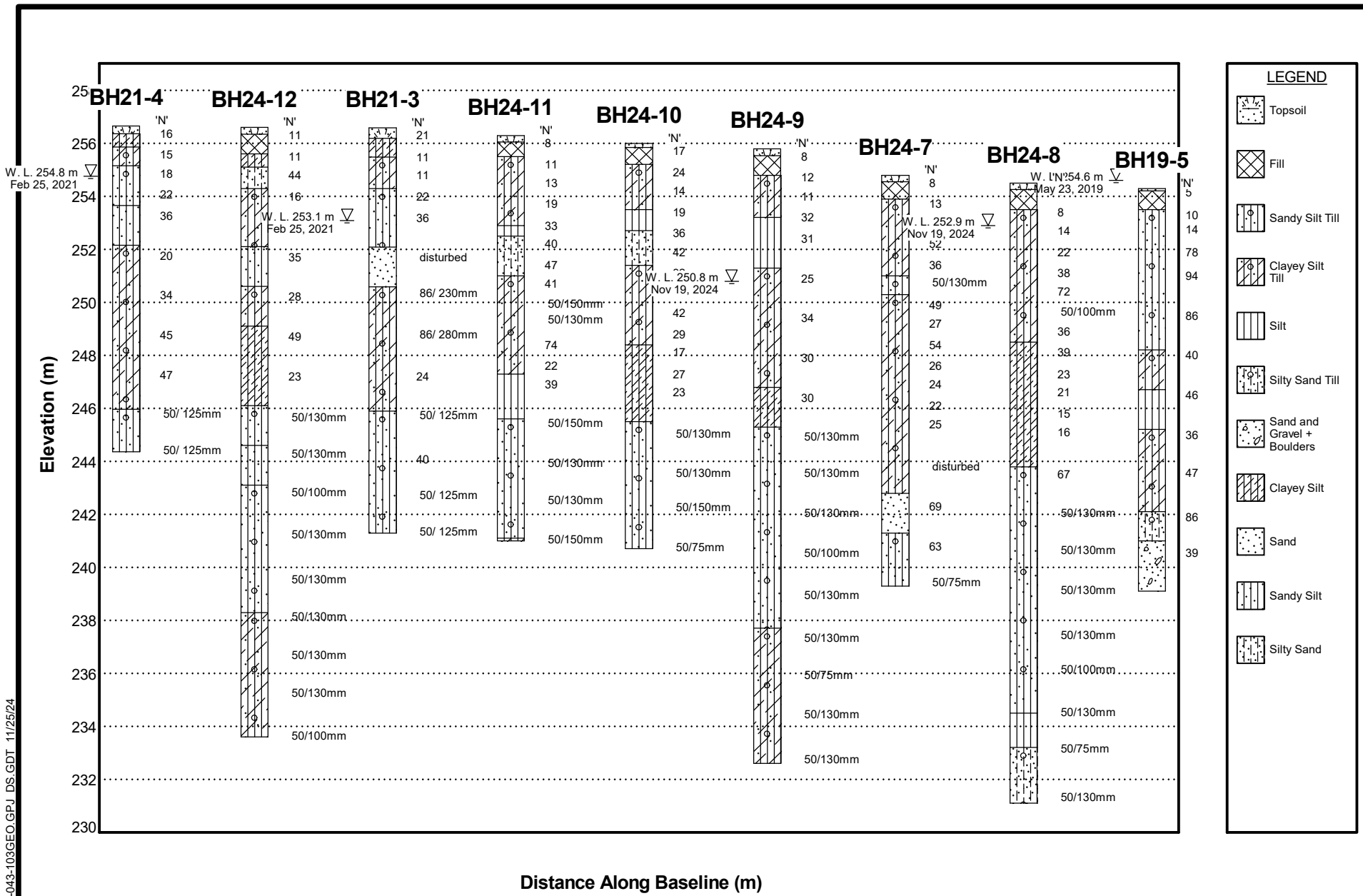
Generalized Sub-surface Profile B-B (NTS)

DRAWING NO.	16
JOB NO.	19-043-103
DATE	November, 2024

DS FENCE (M) 19-043-103GEO.GPJ DS.GDT 11/25/24



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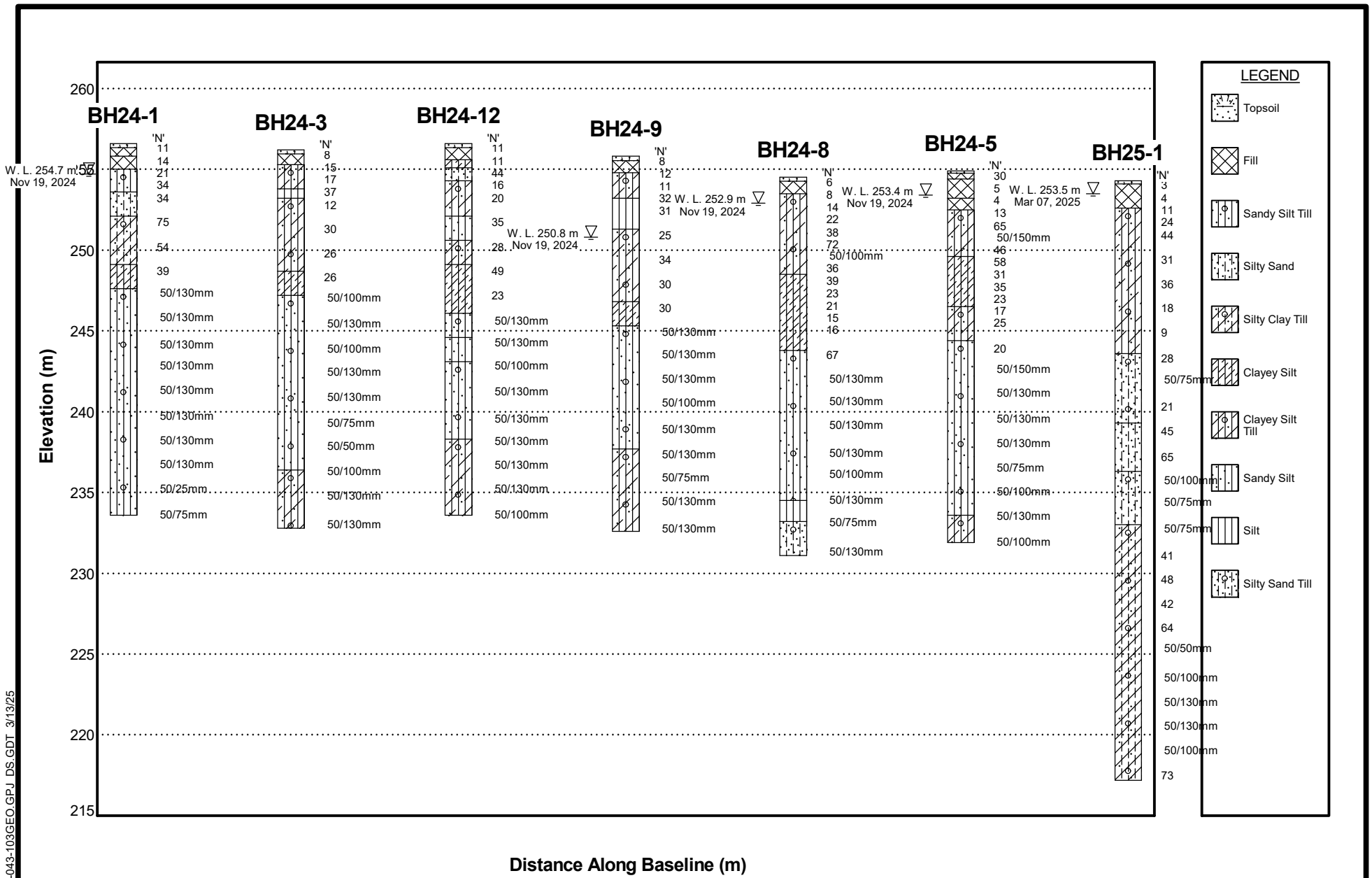
Generalized Sub-surface Profile C-C (NTS)

DRAWING NO.	17
JOB NO.	19-043-103
DATE	November, 2024

DS FENCE (M) 19-043-103GEO.GPJ DS.GDT 11/25/24



Distance Along Baseline (m)

DS CONSULTANTS LTD.
Geotechnical ◆ Environmental ◆ Materials ◆ Hydrogeology

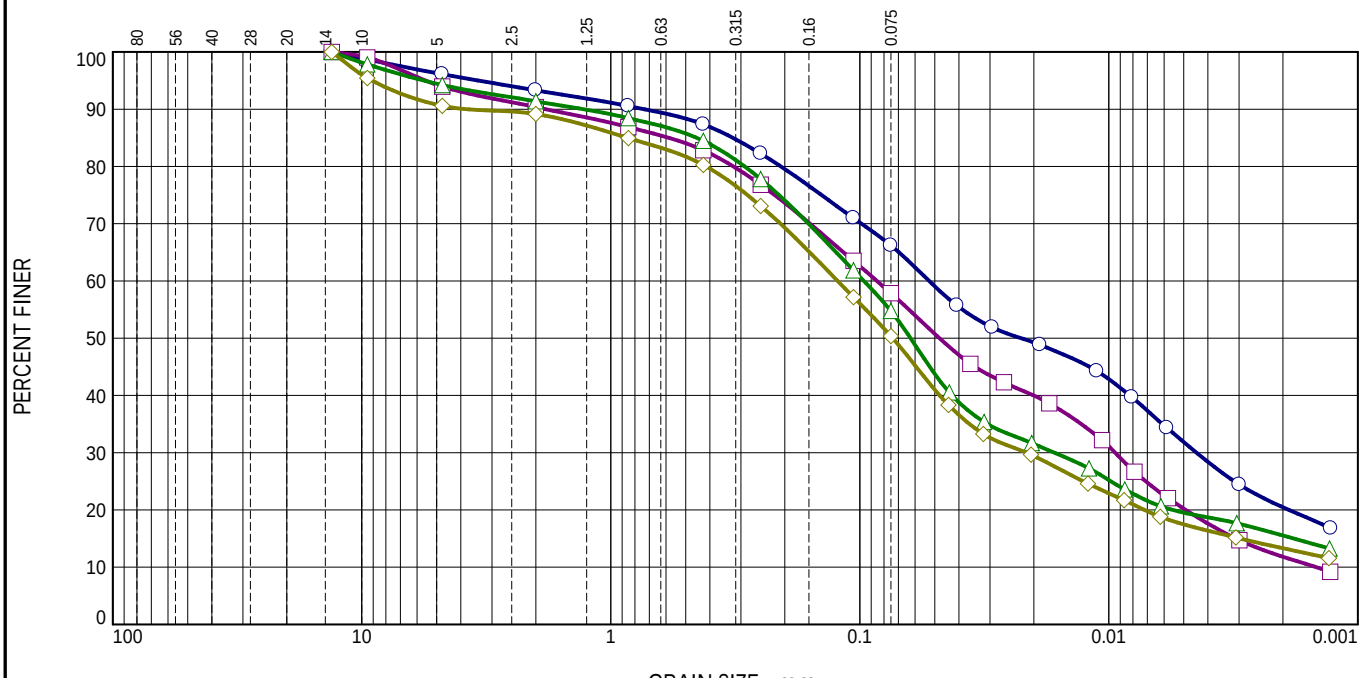
Generalized Sub-surface Profile (NTS)

DRAWING NO.	17A
JOB NO.	19-043-103
DATE	March, 2025

DS FENCE (M) 19-043-103GEO.GPJ DS.GDT 3/13/25

Particle Size Distribution Report

ASTM D422



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	3.9	2.8	6.0	21.1	45.7	20.5
□	0.0	0.0	6.1	3.5	7.6	24.9	46.1	11.8
△	0.0	0.0	5.8	2.8	6.9	29.7	39.3	15.5
◇	0.0	0.0	9.4	1.4	8.9	29.9	37.1	13.3

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	19	9	0.3235	0.0527	0.0225	0.0044				
□			0.5838	0.0853	0.0479	0.0094	0.0031	0.0015	0.71	58.15
△	15	8	0.4516	0.0963	0.0626	0.0165	0.0018			
◇	15	9	0.8571	0.1227	0.0737	0.0214	0.0030			

Material Description	USCS	AASHTO
○ Silty clay till, sandy, trace gravel	CL	A-4(3)
□ Sandy silt till, some clay, trace gravel		
△ Clayey silt till, sandy, trace gravel	CL-ML	A-4(0)
◇ Clayey silt till, sandy, trace gravel	CL-ML	A-4(0)

Project No. 19-043-103 Client: Times Group Corporation

Project: Geotechnical Investigation, 5061 Stouffville Rd., Whitchurch-Stouffville, ON

○Location: BH24-1 SS7 Sample Number: VM-6132

□Location: BH24-1 SS11 Sample Number: VM-6132

△Location: BH24-3 SS18 Sample Number: VM-6132

◇Location: BH24-12 SS15 Sample Number: VM-6132

Remarks:

○F.M.=0.71

□F.M.=0.94

△F.M.=0.90

◇F.M.=1.15

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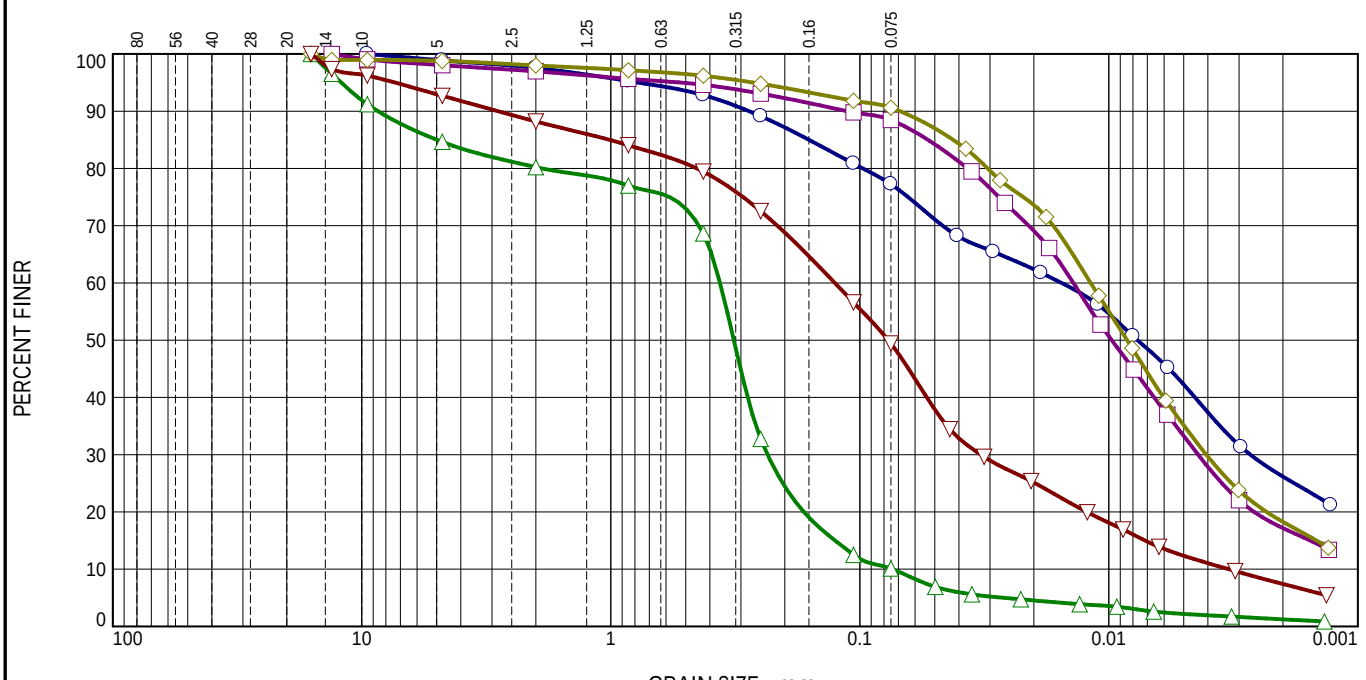
Figure 18

Tested By: ○ Helen/Nisha □Helen/Disha △Helen/Nisha ◇Helen/Nisha Checked By: Kirupa

Particle Size Distribution Report

ASTM D422



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	1.1	1.3	4.8	15.5	51.1	26.2
□	0.0	0.0	2.0	1.0	2.4	6.1	71.3	17.2
△	0.0	0.0	15.4	4.4	11.5	58.6	8.9	1.2
◇	0.0	0.0	1.2	0.8	1.8	5.6	72.3	18.3
▽	0.0	0.0	7.3	4.5	8.8	30.0	42.0	7.4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	12	0.1599	0.0155	0.0077	0.0027				
□	20	14	0.0532	0.0139	0.0097	0.0044	0.0016			
△			4.9861	0.3642	0.3205	0.2345	0.1256	0.0738	2.05	4.93
◇	21	15	0.0422	0.0118	0.0084	0.0041	0.0015			
▽			1.0131	0.1259	0.0768	0.0326	0.0072	0.0033	2.56	38.17

Material Description	USCS	AASHTO
○ Silty clay till, sandy, trace gravel	CL	A-4(3)
□ Clayey silt, trace sand, trace gravel	CL-ML	A-4(2)
△ Sand, trace silt, trace clay, some gravel		
◇ Clayey silt till, trace sand, trace gravel	CL-ML	A-4(3)
▽ Silty sand till, trace clay, trace gravel		

Project No. 19-043-103 Client: Times Group Corporation

Project: Geotechnical Investigation, 5061 Stouffville Rd., Whitchurch-Stouffville, ON

○Location: BH24-4 SS6 Sample Number: VM-6181

□Location: BH24-5 SS8 Sample Number: VM-6181

△Location: BH24-7 SS15 Sample Number: VM-6181

◇Location: BH24-8 SS9 Sample Number: VM-6181

▽Location: BH24-8 SS16 Sample Number: VM-6181

Remarks:

○F.M.=0.38

□F.M.=0.30

△F.M.=2.27

◇F.M.=0.21

▽F.M.=1.16

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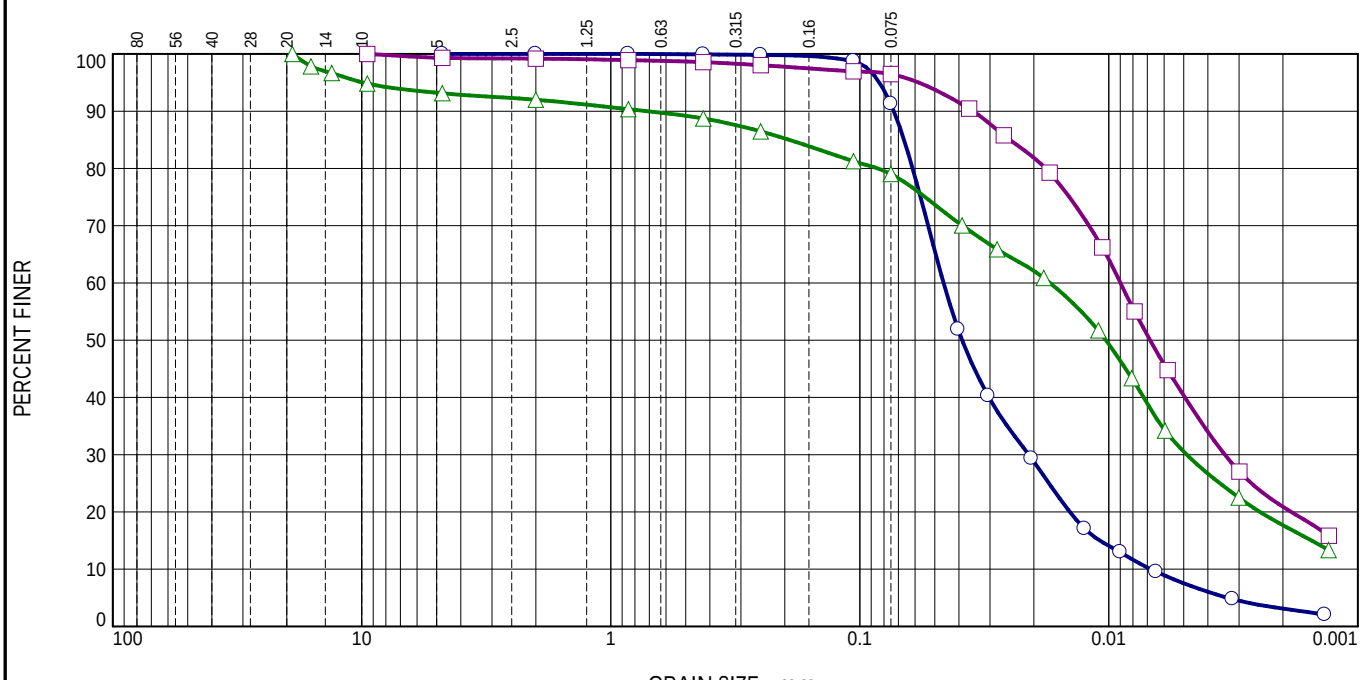
Figure **19**

Tested By: Helen/Disha Checked By: Kirupa

Particle Size Distribution Report

ASTM D422



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.0	0.1	8.6	88.2	3.1
□	0.0	0.0	0.7	0.1	0.6	2.1	75.6	20.9
△	0.0	0.0	6.9	1.1	3.3	9.7	61.3	17.7

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.0664	0.0461	0.0388	0.0210	0.0109	0.0068	1.41	6.79
□	22	16	0.0250	0.0090	0.0068	0.0034				
△	19	14	0.1923	0.0172	0.0103	0.0049	0.0015			

Material Description	USCS	AASHTO
○ Silt, trace clay, trace sand		
□ Clayey silt, trace sand, trace gravel	CL-ML	A-4(3)
△ Clayey silt till, some sand, trace gravel	CL-ML	A-4(1)

Project No. 19-043-103 Client: Times Group Corporation

Project: Geotechnical Investigation, 5061 Stouffville Rd., Whitchurch-Stouffville, ON

○Location: BH24-9 SS4B Sample Number: VM-6181

□Location: BH24-10 SS11 Sample Number: VM-6181

△Location: BH24-11 SS12 Sample Number: VM-6181

Remarks:

○F.M.=0.01

□F.M.=0.08

△F.M.=0.68

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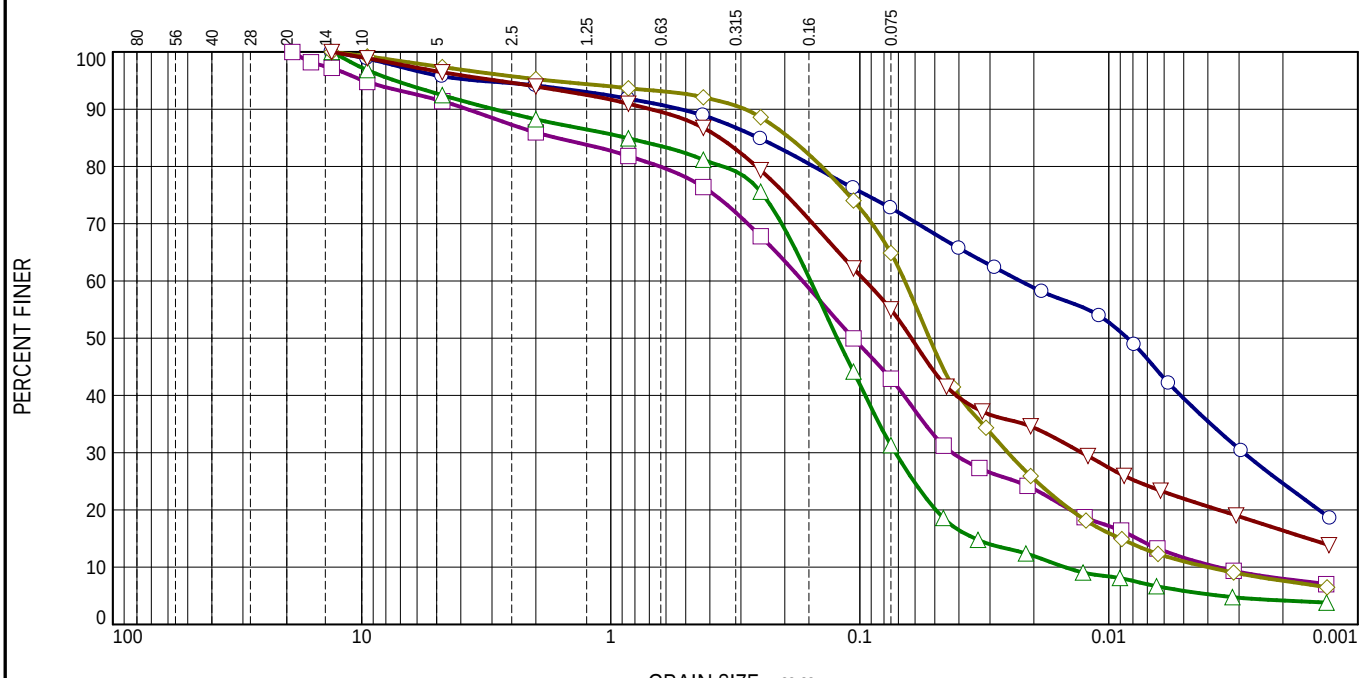
Figure **20**

Tested By: Helen/Disha Checked By: Kirupa

Particle Size Distribution Report

ASTM D422



	% +75mm	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	4.3	1.6	5.2	16.2	48.1	24.6
□	0.0	0.0	8.6	5.5	9.5	33.5	34.9	8.0
△	0.0	0.0	7.5	4.3	7.0	49.9	27.1	4.2
◇	0.0	0.0	2.6	2.1	3.2	27.2	57.3	7.6
▽	0.0	0.0	3.6	2.4	7.3	31.7	38.6	16.4

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	12	0.2550	0.0227	0.0084	0.0029				
□			1.6562	0.1698	0.1062	0.0426	0.0077	0.0036	2.93	46.57
△			0.8661	0.1575	0.1232	0.0719	0.0344	0.0150	2.19	10.49
◇			0.1915	0.0659	0.0525	0.0254	0.0090	0.0040	2.45	16.52
▽	14	9	0.3646	0.0950	0.0621	0.0128	0.0016			

Material Description	USCS	AASHTO
○ Silty clay till, sandy, trace gravel	CL	A-4(3)
□ Silty sand till, trace clay, trace gravel		
△ Silty sand, trace clay, trace gravel		
◇ Sandy silt till, trace clay, trace gravel		
▽ Clayey silt till, sandy, trace gravel	CL-ML	A-4(0)

Project No. 19-043-103 Client: Times Group Corporation

Project: Geotechnical Investigation, 5061 Stouffville Rd., Whitchurch-Stouffville, ON

○Location: BH25-1 SS9 Sample Number: VM-6415

□Location: BH25-1 SS12 Sample Number: VM-6415

△Location: BH25-1 SS14 Sample Number: VM-6415

◇Location: BH25-1 SS16 Sample Number: VM-6415

▽Location: BH25-1 SS26 Sample Number: VM-6415

Remarks:

○F.M.=0.61

□F.M.=1.35

△F.M.=1.16

◇F.M.=0.49

▽F.M.=0.77

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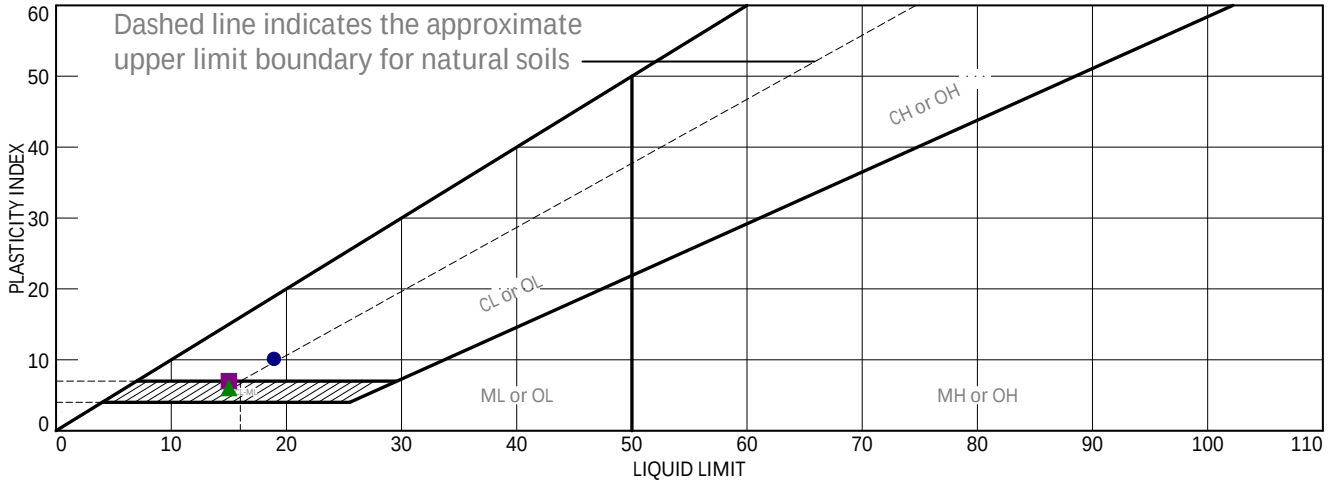
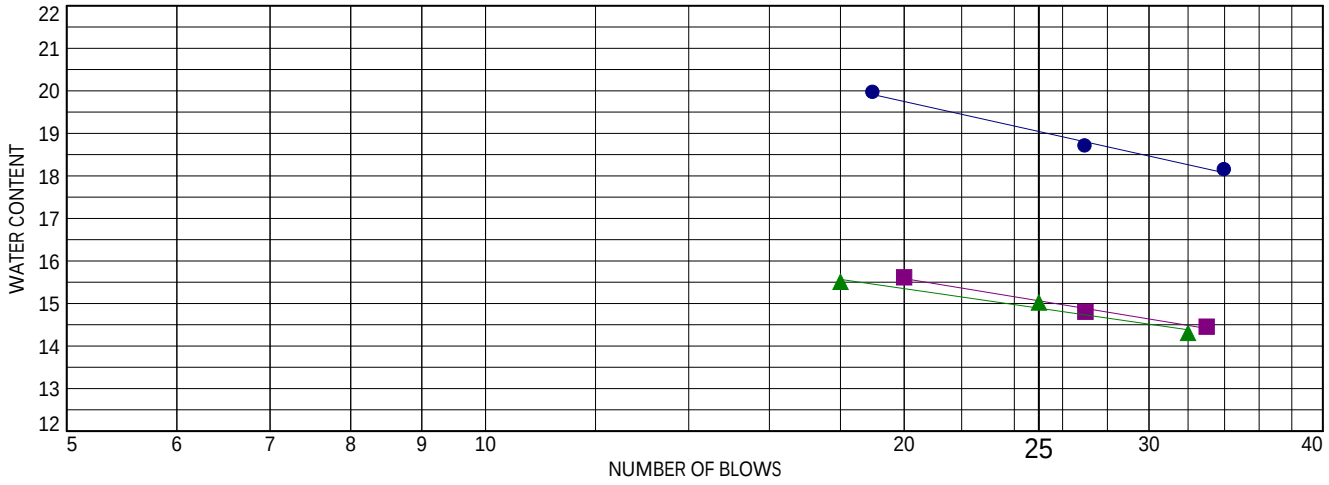
Figure 21

Tested By: Helen/Disha Checked By: Kirupa

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty clay till, sandy, trace gravel	19	9	10	87.3	66.2	CL
■	Clayey silt till, sandy, trace gravel	15	8	7	84.5	54.8	CL-ML
▲	Clayey silt till, sandy, trace gravel	15	9	6	80.3	50.4	CL-ML

Project No. 19-043-103 Client: Times Group Corporation

Project: Geotechnical Investigation, 5061 Stouffville Rd., Whitchurch-Stouffville, ON

●Location: BH24-1 SS7 Sample Number: VM-6132

■Location: BH24-3 SS18 Sample Number: VM-6132

▲Location: BH24-12 SS15 Sample Number: VM-6132

Remarks:

●Sampled on October 24, 2024

■Sampled on October 26, 2024

▲Sampled on October 23, 2024

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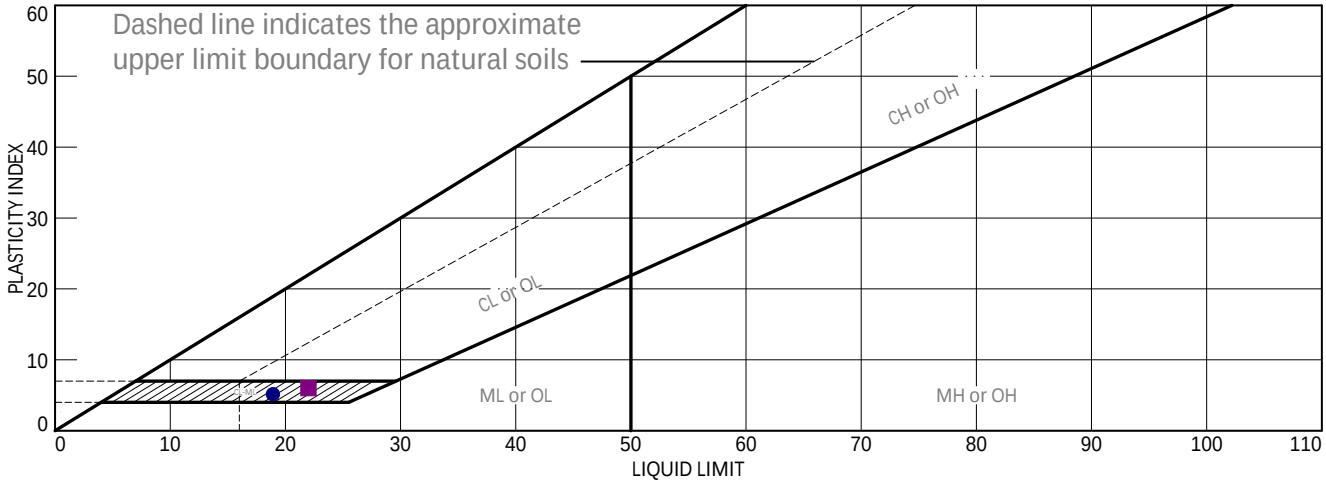
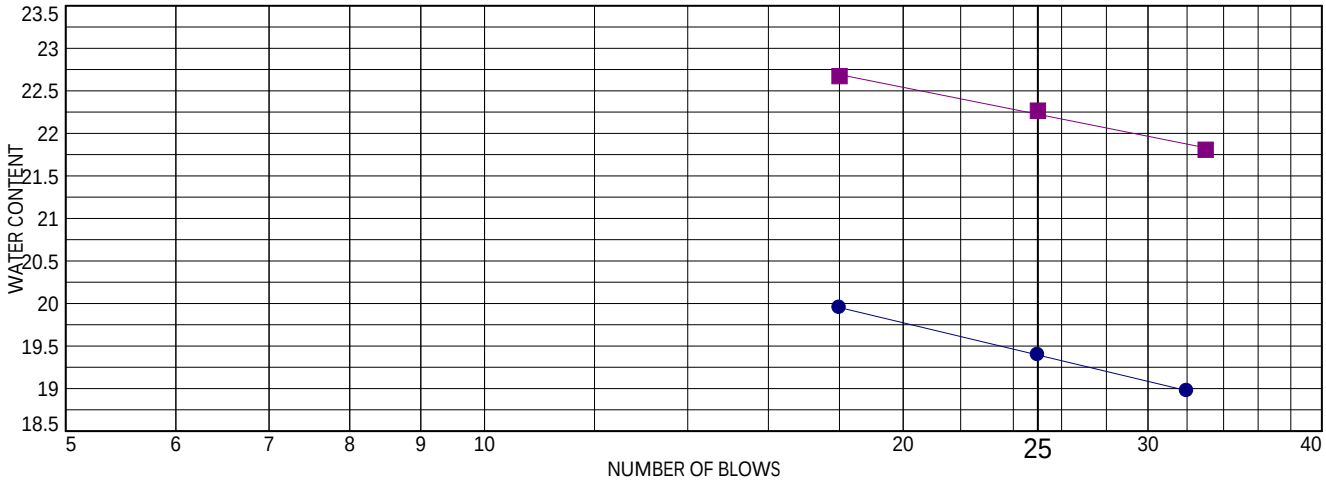
Figure 22

Tested By: Nisha Checked By: Kirupa

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Clayey silt till, some sand, trace gravel	19	14	5	88.7	79.0	CL-ML
■	Clayey silt, trace sand, trace gravel	22	16	6	98.6	96.5	CL-ML

Project No. 19-043-103 Client: Times Group Corporation

Project: Geotechnical Investigation, 5061 Stouffville Rd., Whitchurch-Stouffville, ON

●Location: BH24-11 SS12 Sample Number: VM-6181

■Location: BH24-10 SS11 Sample Number: VM-6181

Remarks:

●Sampled on November 04,2024

■Sampled on November 04,2024

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Geotechnical ❖ Environmental ❖ Materials ❖ Hydrogeology

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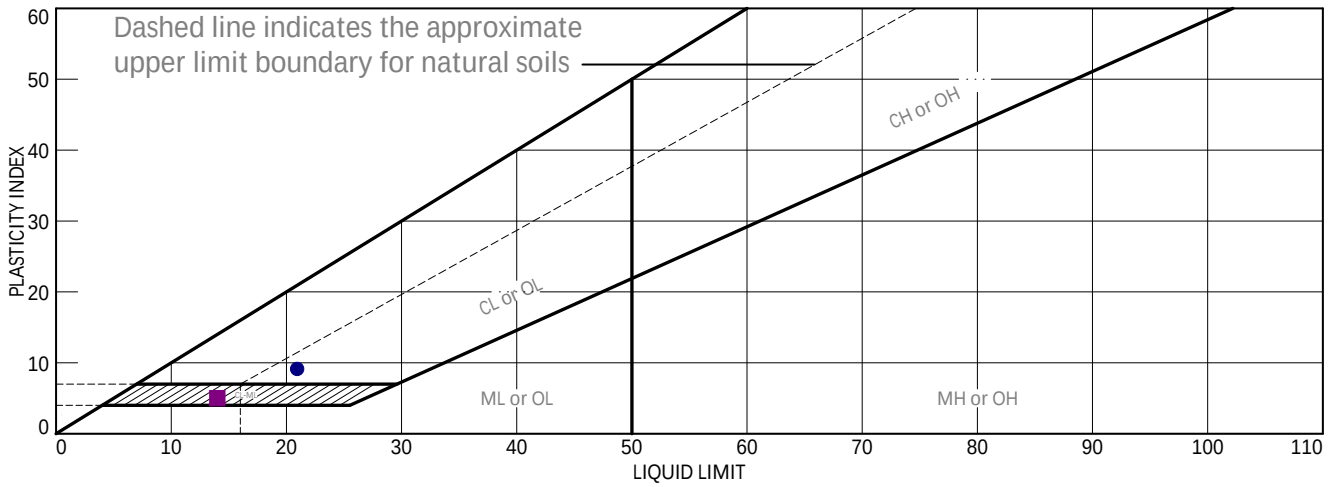
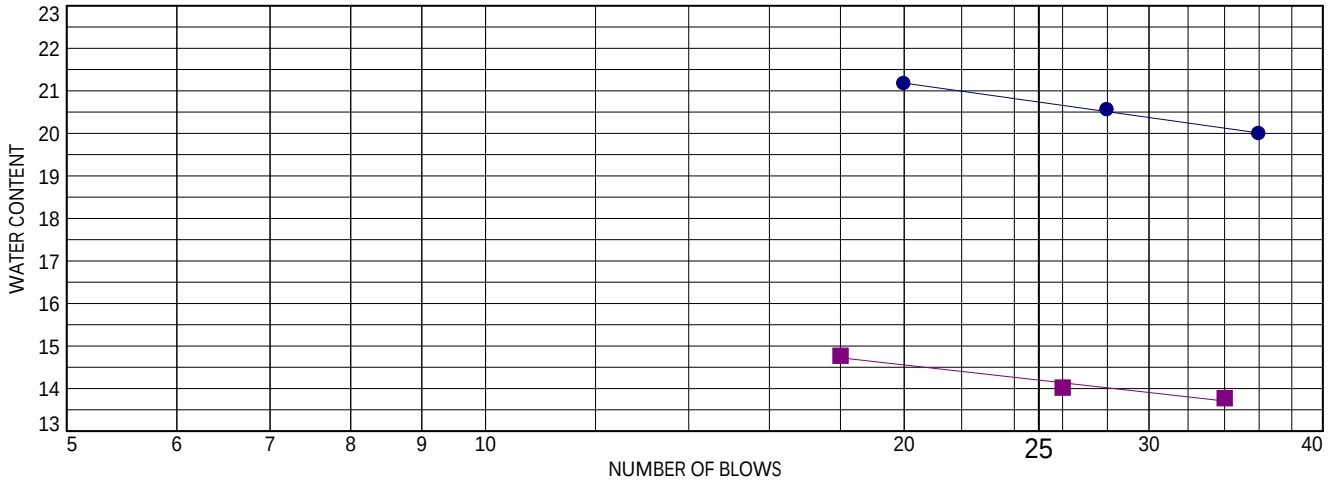
Figure 23

Tested By: Disha Checked By: Kirupa

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silty clay till, sandy, trace gravel	21	12	9	88.9	72.7	CL
■	Clayey silt till, sandy, trace gravel	14	9	5	86.7	55.0	CL-ML

Project No. 19-043-103 Client: Times Group Corporation

Project: Geotechnical Investigation, 5061 Stouffville Rd., Whitchurch-Stouffville, ON

●Location: BH25-1 SS9 Sample Number: VM-6415

■Location: BH25-1 SS26 Sample Number: VM-6415

Remarks:

●Sampled on February 26, 2025

■Sampled on February 27, 2025

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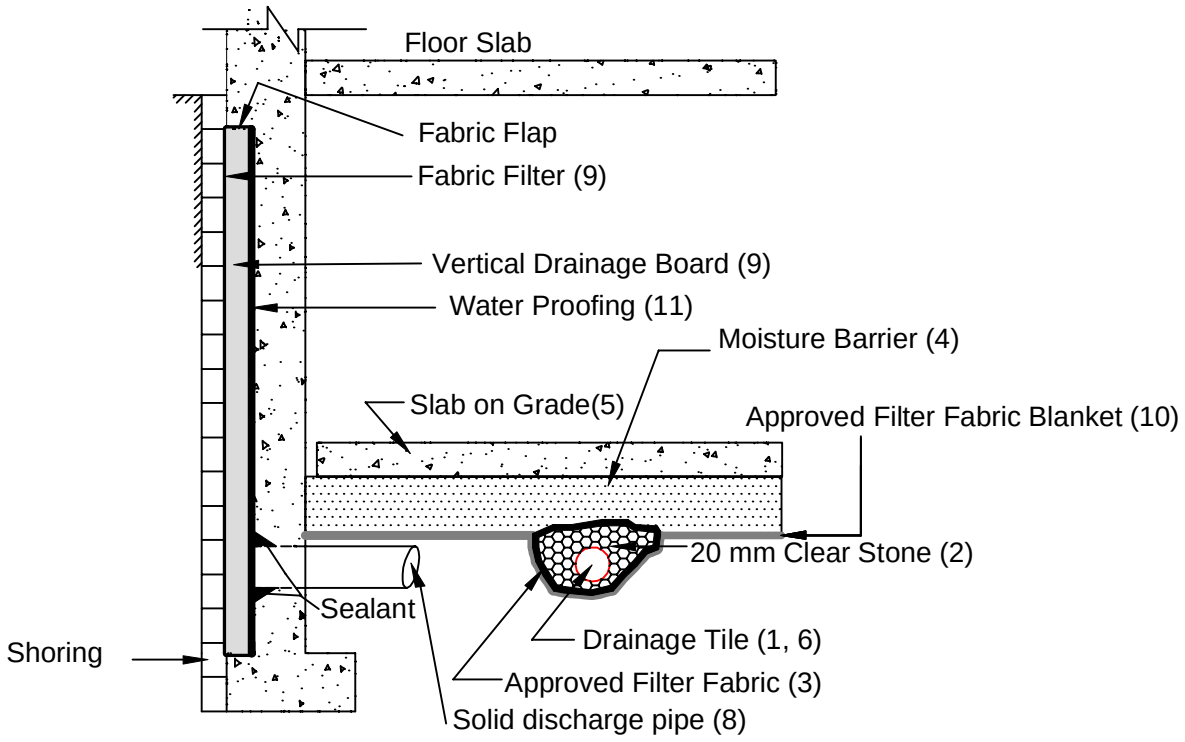
Geotechnical ❖ Environmental ❖ Materials ❖ Hydrogeology

Figure 24

Tested By: Disha Checked By: Kirupa

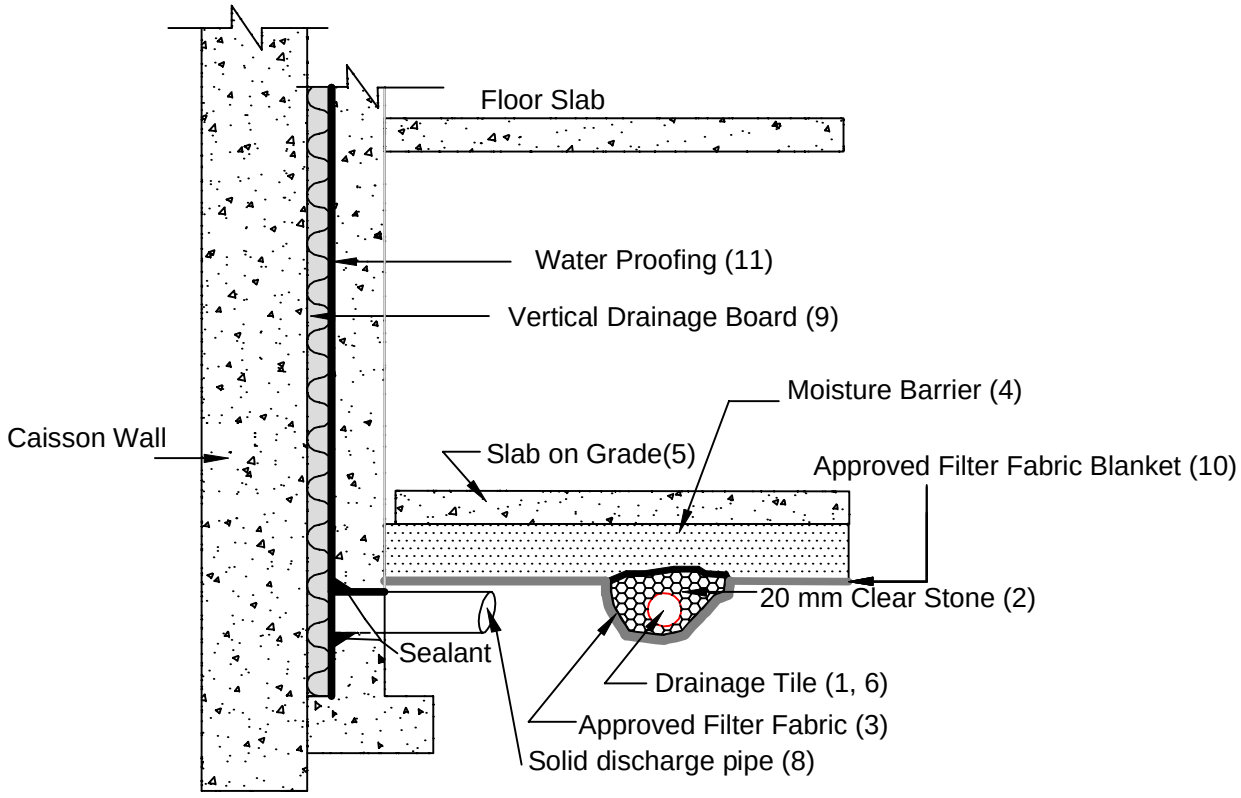


EXTERIOR FOOTING

Notes

1. Drainage tile to consist of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet, spaced between columns.
2. 20 mm (3/4") clear stone - 150 mm (6") top and side of drain. If drain is not on footing, place100 mm (4 inches) of stone below drain .
3. Wrap the clear stone with an approved filter membrane (Terrafix 270R or equivalent).
4. Moisture barrier to be at least 200 mm (8") of compacted clear 20 mm (3/4") stone or equivalent free draining material. A vapour barrier may be required for specialty floors.
5. Slab on grade should not be structurally connected to the wall or footing.
6. Underfloor drain invert to be at least 300 mm (12") below underside of floor slab. Drainage tile placed in parallel rows 6 to 8 m (20 to 25') centers one way. Place drain on 100 mm (4") clear stone with 150 mm (6") of clear stone on top and sides. Enclose stone with filter fabric as noted in (3).
7. Do not connect the underfloor drains to perimeter drains.
8. Solid discharge pipe located at the middle of each bay between the solider piles, approximate spacing 2.5 m, outletting into a solid pipe leading to a sump.
9. Vertical drainage board with filter cloth should be kept a minium of 1.2 m below exterior finished grade.
10. The entire subgrade to be sealed with approved filter fabric (Terrafix 270R or equivalent) if non-cohesive (sandy) soils below ground water table encountered.
11. The basement walls should be water proofed using bentonite or equivalent water-proofing system.
12. Review the geotechnical report for specific details. Final detail must be approved before system is considered acceptable.

DRAINAGE RECOMMENDATIONS
Shored Basement wall with Underfloor Drainage System
(not to scale)

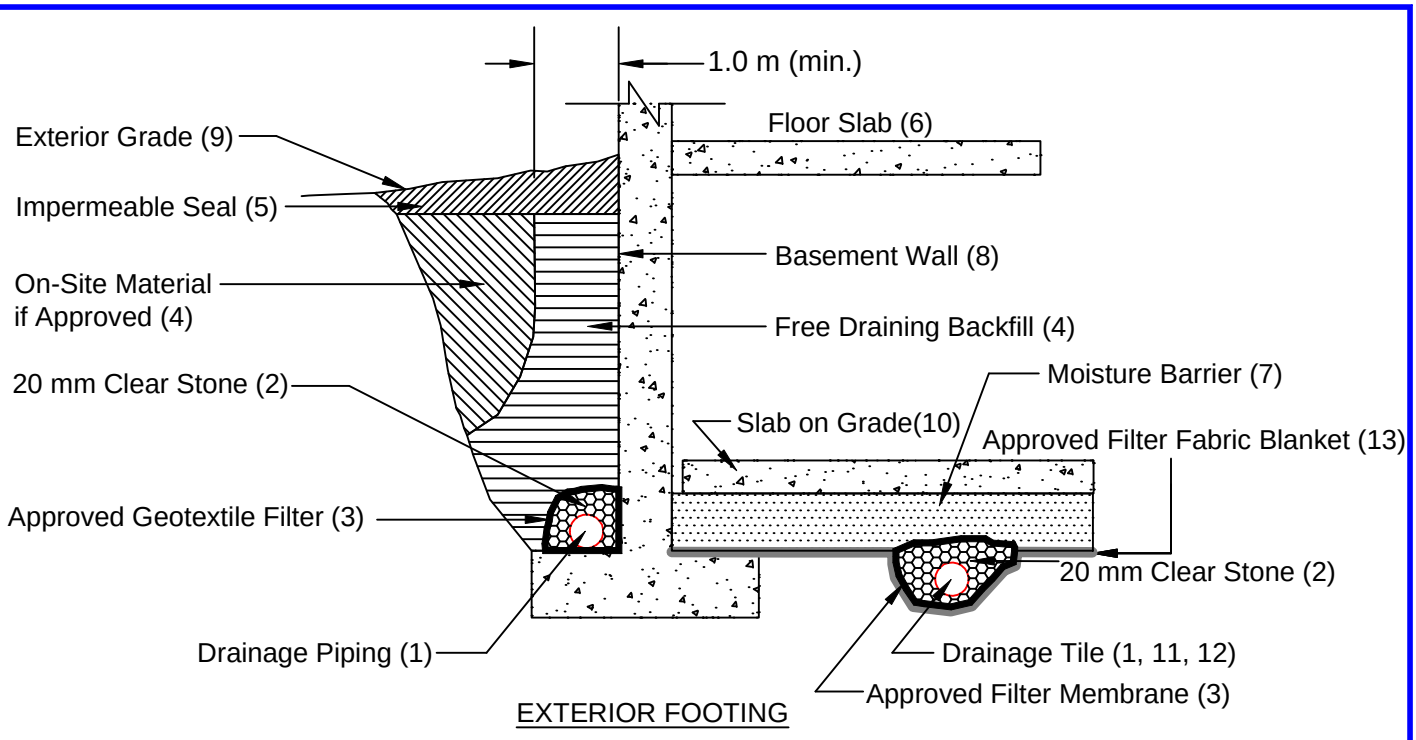


EXTERIOR FOOTING

Notes

1. Drainage tile to consist of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet, spaced between columns.
2. 20 mm (3/4") clear stone - 150 mm (6") top and side of drain. If drain is not on footing, place100 mm (4 inches) of stone below drain .
3. Wrap the clear stone with an approved filter membrane (Terrafix 270R or equivalent).
4. Moisture barrier to be at least 200 mm (8") of compacted clear 20 mm (3/4") stone or equivalent free draining material. A vapour barrier may be required for specialty floors.
5. Slab on grade should not be structurally connected to the wall or footing.
6. Underfloor drain invert to be at least 300 mm (12") below underside of floor slab. Drainage tile placed in parallel rows 6 to 8 m (20 to 25') centers one way. Place drain on 100 mm (4") clear stone with 150 mm (6") of clear stone on top and sides. Enclose stone with filter fabric as noted in (3).
7. Do not connect the underfloor drains to perimeter drains.
8. Solid discharge pipe located at the middle of each bay between the solider piles, approximate spacing 2.5 m, outletting into a solid pipe leading to a sump.
9. Vertical drainage board mira-drain 6000 or eqivalent with filter cloth should be continous from bottom to 1.2 m below exterior finished grade.
10. The entire subgrade to be sealed with approved filter fabric (Terrafix 270R or equivalent) if non-cohesive (sandy) soils below ground water table encountered.
11. The basement walls must be water proofed using bentonite or equivalent water-proofing system.
12. Review the geotechnical report for specific details. Final detail must be approved before system is considered acceptable.

DRAINAGE RECOMMENDATIONS
Shored Basement wall with Underfloor Drainage System
(not to scale)



EXTERIOR FOOTING

Notes

1. Drainage piping to consist of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet.
2. 20 mm (3/4") clear stone - 150 mm (6") top and side of drain. If drain is not on footing, place100 mm (4 inches) of stone below drain .
3. Wrap the clear stone with an approved geotextile filter fabrics (Terrafix 270R or equivalent).
4. Free Draining backfill - OPSS Granular B or equivalent compacted to the specified density. Do not use heavy compaction equipment within 450 mm (18") of the wall. Use hand controlled light compaction equipment within 1.8 m (6') of wall. The minimum width of the Granular 'B' backfill must be 1.0 m.
5. Impermeable backfill seal - compacted clay, clayey silt or equivalent. If original soil is free-draining, seal may be omitted. Maximum thickness of seal to be 0.5 m.
6. Do not backfill until wall is supported by basement floor slabs or adequate bracing.
7. Moisture barrier to be at least 200 mm (8") of compacted clear 20 mm (3/4") stone or equivalent free draining material. A vapour barrier may be required for specialty floors.
8. Basement wall to be damp proofed /water proofed as per OBC requirements.
9. Exterior grade to slope away from building min 2%.
10. Slab on grade should not be structurally connected to the wall or footing. Waterproof the slab and the slab-to-wall joint.
11. Underfloor drain invert to be at least 300 mm (12") below underside of floor slab.
12. Drainage piping placed in parallel rows 6 to 8 m (20 to 25') centers one way. Place drain on 100 mm (4") clear stone with 150 mm (6") of clear stone on top and sides. Enclose stone with filter fabric as noted in (3).
13. The entire subgrade to be covered with approved filter fabric (Terrafix 270R or equivalent) if non-cohesive (sandy) soils below ground water table encountered.
14. Do not connect the underfloor drains to perimeter drains.
15. Review the geotechnical report for specific details.

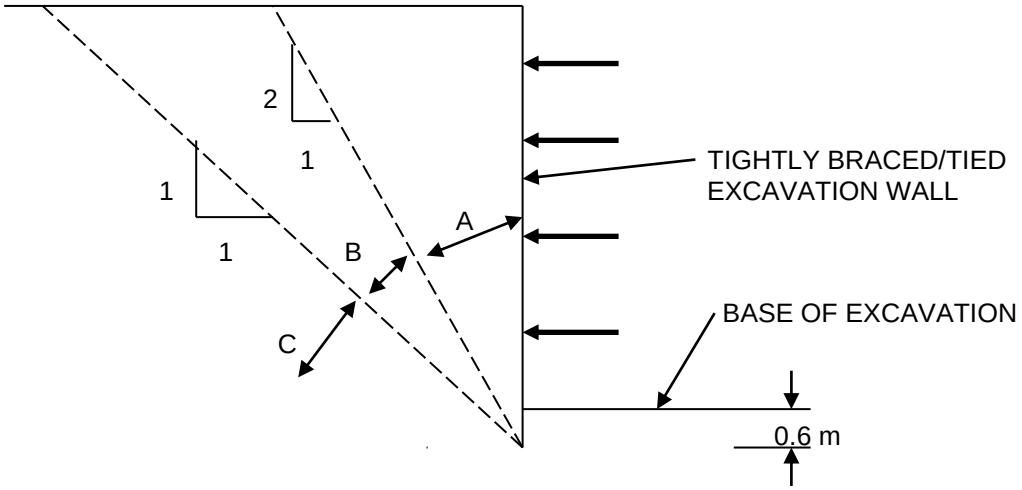
DRAINAGE AND BACKFILL RECOMMENDATIONS
Basement with Underfloor Drainage

(not to scale)

Project: 19-043-103 **Drawing 28**

Guidelines for Underpinning in Soil and Excavation Support

Existing foundations located within Zone A normally require underpinning, especially for heavy structures. For some foundations in Zone A, it may be possible to eliminate underpinning and control foundation movement by tightly braced excavation walls, such as caisson walls.



Zone A Foundations located within this zone normally require underpinning. Horizontal and vertical pressures on the excavation wall of non underpinned foundations must be considered

Zone B Foundations located within this zone normally do not require underpinning. Horizontal and vertical pressures on the excavation wall of non underpinned foundations must be considered

Zone C Underpinning to structures is normally founded in this zone. Lateral pressure from underpinning is not normally considered

(Reference: Figure 26.27 from Canadian Foundation Engineering Manual, 4th Edition)

APPENDIX A

LOCATION PLAN AND LOGS OF BOREHOLES (BH21-1 TO BH21-5 AND BH19-5)

J:\-GIS\19-043-100 4721 and 5061 Stouffville Road_Times Group\1-QGIS\HydroG-101\Figure 3 – Borehole and Monitoring Well Locations_MM_Jun2021.qgz

Legend

- Approx Site Boundary
- Borehole
- Monitoring Well

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: HYDROGEOLOGICAL INVESTIGATION
5061-4721 Stouffville Road, Whitchurch-Stouffville, ON

Title: **Geotechnical Investigation High-Rise Building**

N

Client: TIMES GROUP

Size:	Approved By:	Drawn By:	Date:
8.5 x 11	D.G	S.Y	March 2021
Rev: 0	Scale: As Shown	Project No.: 19-043-101	Drawing No.: 1

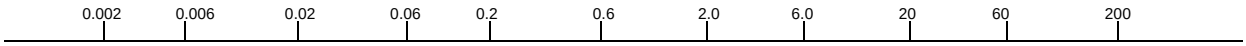
Image/Map Source: *Google Satellite Image*

Drawing 1A: Notes On Sample Descriptions

1. All sample descriptions included in this report generally follow the Unified Soil Classification. Laboratory grain size analyses provided by DS also follow the same system. Different classification systems may be used by others, such as the system by the International Society for Soil Mechanics and Foundation Engineering (ISSMFE). Please note that, with the exception of those samples where a grain size analysis and/or Atterberg Limits testing have been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

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

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

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LOG OF BOREHOLE BH19-5

PROJECT: Geotechnical Investigation
CLIENT: Times Group Corp
PROJECT LOCATION: 4721 to 5061 Stouffville Road, Whitchurch-Stouffvill, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4869147.9 E 637851

DRILLING DATA
Method: Solid Stem Auger
Diameter: 150mm
Date: May/01/2019

REF. NO.: 19-043-100
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS
254.3					W. L. 254.6 m May 23, 2019 Apr 13, 2021
254.2 0.1	**TOPSOIL:** 125mm	1	SS	5	
253.5 0.8	**FILL:** silty clay, trace sand, brown, moist, firm	2	SS	10	
	SANDY SILT TILL: trace to some clay, some gravel, occasional cobble/boulder, brown, wet, compact to very dense	3	SS	14	
		4	SS	78	
	some clay, grey, moist below 3.1m	5	SS	94	
		6	SS	86	
248.2 6.1	**CLAYEY SILT TILL:** sandy, trace gravel, grey, moist, hard	7	SS	40	
246.7 7.6	**SILT TO SANDY SILT:** some clay, grey, moist, dense	8	SS	46	
245.2 9.1	**CLAYEY SILT TILL:** sandy, trace gravel/ cobble, grey, moist, hard	9	SS	36	
		10	SS	47	
242.1 12.2	**SILTY SAND TO SANDY SILT TILL:** trace to some clay, trace cobbles, grey, moist, very dense	11	SS	86	
241.0 13.3	**SAND AND GRAVEL:** trace silt, grey, wet, dense	12	SS	39	
239.1 15.2	**END OF BOREHOLE**				

Notes:
1) 50mm dia. monitoring well installed at 15.2 mbgl upon completion.
2) Water level readings:

Date:	W.L. Depth (m):
Apr 13, 2021	-0.01 (above ground surface)
May 23, 2019	-0.30 (above ground surface)

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
(40 60 80 100)

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

METHANE AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
19	33	38	10

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG 19-043-100, 4271 STOUFFVILLE.GPJ DS.GDT 4/15/21

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LOG OF BOREHOLE BH21-1

PROJECT: Geotechnical Investigation - Additional Work
CLIENT: Times Group
PROJECT LOCATION: 4721 and 5061 Stouffville Rd, Whitchurch-Stouffvill, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4869159.459 E 637854.913

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Feb-11-2021

REF. NO.: 19-043-101
ENCL NO.: 3

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m
254.5 / 0.0	**TOPSOIL:** 300mm	1	SS	7
253.7 / 0.8	**CLAYEY SILT:** some sand, trace gravel, brown, moist, firm (weathered)			
253.5 / 1.0	**SILTY SAND:** trace clay, trace gravel, brown, wet, compact	2	SS	17
	SANDY SILT TILL: trace clay, trace gravel, brown, moist, compact to dense	3	SS	17
		4	SS	20
		5	SS	36
	grey below 4.5m	6	SS	31
248.5 / 6.0	**CLAYEY SILT TILL:** some sand, trace gravel, grey, moist, very stiff	7	SS	25
		8	SS	19
		9	SS	17
		10	SS	22
242.3 / 12.2	**SAND AND GRAVEL:** silty, trace cobble, trace clay, grey, saturated, compact	11	SS	29
240.8 / 13.7	**SILTY SAND TILL:** trace clay, trace gravel, brown, wet, compact to very dense	12	SS	21
		13	SS	52
238.7 / 15.8	**END OF BOREHOLE**			

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water level readings:

Date:	W.L. Depth (m):
April 13, 2021	1.37
Feb. 25, 2021	0.4

GROUND WATER CONDITIONS: W. L. 254.1 m Feb 21, 2025; W. L. 253.1 m Apr 13, 2021

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

METHANE AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
2	17	54	27

DS SOIL LOG 19-043-101 4721 AND 5061 STOUFFVILLE RD ADDITIONAL WORK_TIMES GROUP.GPJ DS.GDT 21-5-3

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH21-2

PROJECT: Geotechnical Investigation - Additional Work
CLIENT: Times Group
PROJECT LOCATION: 4721 and 5061 Stouffville Rd, Whitchurch-Stouffvill, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4869127.615 E 637803.503

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Feb-11-2021

REF. NO.: 19-043-101
ENCL NO.: 4

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
255.2												
254.9 0.0	**TOPSOIL:** 300mm											
0.3 254.4	**SANDY SILT:** trace clay, trace gravel, trace organics, brown, moist, compact (weathered)		1	SS	13		W. L. 255.2 m Feb 21, 2025					
1 0.8	**CLAYEY SILT TILL:** sandy, trace gravel/ cobble, grey, moist, stiff to hard		2	SS	14		W. L. 254.1 m Apr 13, 2021					
2			3	SS	24		253					
	No recovery at 2.3m		4	SS	60							
252.2 3 3.0	**SANDY SILT TILL:** clay seams, trace gravel/ cobble, grey, moist, dense to very dense		5	SS	37		252					9 30 46 15
4	some clay below 4.5m		6	SS	33		251					
5							250					
6			7	SS	58		249					
247.7 7 7.5	**CLAYEY SILT TILL:** some sand to sandy, trace gravel/ cobble, grey, moist, very stiff to hard		8	SS	25		248					
8							247					
9			9	SS	30		246					0 2 62 36
244.5 10 10.7	**SANDY SILT TILL:** some clay, trace gravel/ cobble, grey, wet, compact		10	SS	15		245					
11							244					
243.0 12 12.2	**SAND:** trace clay, trace gravel, grey, saturated		11	SS	disturbed		243					
13							242					
241.5 14 13.7	**SANDY SILT TILL:** trace clay, trace gravel/ cobble, grey, moist, very dense		12	SS	50/ 125mm		241					
15												
239.7			13	SS	50/ 100mm		240					
15.5	**END OF BOREHOLE**											

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water level readings:

Date:	W.L. Depth (m):
April 13, 2021	1.18
Feb. 25, 2021	- 0.02 (above ground)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG 19-043-101 4721 AND 5061 STOUFFVILLE RD ADDITIONAL WORK_TIMES GROUP.GPJ DS.GDT 21-5-3

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LOG OF BOREHOLE BH21-3

PROJECT: Geotechnical Investigation - Additional Work
CLIENT: Times Group
PROJECT LOCATION: 4721 and 5061 Stouffville Rd, Whitchurch-Stouffvill, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4869091.791 E 637696.023

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Feb-16-2021

REF. NO.: 19-043-101
ENCL NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	METHANE AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
256.6								
0.0 / 256.2	**TOPSOIL:** 380mm		1	SS	21		256	
0.4 / 255.5	**CLAYEY SILT:** trace clay, trace gravel, trace topsoil, dark brown, moist, stiff to very stiff (weathered)		2	SS	11			
1.1 / 254.3	**CLAYEY SILT TILL:** sandy, trace gravel, sand seams, brown, moist, stiff		3	SS	11		255	
2.3 / 252.1	**SANDY SILT TILL:** some clay, trace gravel/ cobbles, brown, moist, compact to dense		4	SS	22		254	
			5	SS	36	W. L. 253.3 m W. L. 253.1 m Feb 21, 2025		4 30 55 11
4.5 / 250.6	**SAND:** some silt, trace clay, brown, saturated		6	SS	disturbed		252	
6.0	**CLAYEY SILT TILL:** sandy, trace gravel, sand seams, grey, moist, very stiff to hard		7	SS	86/ 230mm		251	
			8	SS	86/ 280mm		250	
	trace sand below 9m		9	SS	24		249	
245.9							248	
10.7	**SANDY SILT TO SILTY SAND TILL:** trace clay, trace gravel, grey, wet, dense to very dense		10	SS	50/ 125mm		247	7 47 37 9
			11	SS	40		246	
	moist below 13.7m		12	SS	50/ 125mm		245	
241.3							244	
15.3	**END OF BOREHOLE**		13	SS	50/ 125mm		243	
	Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water level readings: Date: W.L. Depth (m): April 13, 2021 3.3 Feb. 25, 2021 3.5						242	

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG 19-043-101 4721 AND 5061 STOUFFVILLE RD ADDITIONAL WORK_TIMES GROUP.GPJ DS.GDT 21-5-3

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LOG OF BOREHOLE BH21-4

PROJECT: Geotechnical Investigation - Additional Work
CLIENT: Times Group
PROJECT LOCATION: 4721 and 5061 Stouffville Rd, Whitchurch-Stouffvill, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4869153.844 E 637681.724

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Feb-12-2021

REF. NO.: 19-043-101
ENCL NO.: 6

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS "N" 0.3 m	ELEVATION
256.7 / 0.0	**TOPSOILAND SILT:** 330mm				
256.4 / 0.3	**CLAYEY SILT:** trace gravel, trace topsoil, brown, moist, very stiff (weathered)	1	SS	16	
255.9 / 0.8	**CLAYEY SILT TILL:** sandy, trace gravel, brown, moist, very stiff	2	SS	15	
255.2 / 1.5	**SANDY SILT TILL:** trace clay, trace gravel/ cobble, brown, very moist, compact	3	SS	18	
		4	SS	22	
253.7 / 3.0	**SANDY SILT:** trace clay, brown, wet, dense	5	SS	36	
252.2 / 4.5	**CLAYEY SILT TILL:** some sand, trace gravel, grey, moist, very stiff to hard	6	SS	20	
		7	SS	34	
		8	SS	45	
		9	SS	47	
246.0 / 10.7	**SANDY SILT TILL:** some clay, trace gravel/ cobble, grey, very moist, very dense	10	SS	50/ 125mm	
244.4 / 12.3	**END OF BOREHOLE**	11	SS	50/ 125mm	

Notes:
1) 50mm dia. monitoring well installed upon completion.
2) Water level readings:

Date:	W.L. Depth (m):
April 13, 2021	0.28
Feb. 25, 2021	1.9

W. L. 256.4 m Apr 13, 2021
W. L. 254.8 m Feb 21, 2025

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

METHANE AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
3	16	54	27

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG 19-043-101 4721 AND 5061 STOUFFVILLE RD ADDITIONAL WORK_TIMES GROUP.GPJ DS.GDT 21-5-3

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LOG OF BOREHOLE BH21-5

PROJECT: Geotechnical Investigation - Additional Work
CLIENT: Times Group
PROJECT LOCATION: 4721 and 5061 Stouffville Rd, Whitchurch-Stouffvill, ON
DATUM: Geodetic
BOREHOLE LOCATION: See Drawing 1 N 4869178.503 E 637758.266

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Feb-12-2021

REF. NO.: 19-043-101
ENCL NO.: 7

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
255.6 / 0.0	**TOPSOIL:** 330mm				
0.3 / 254.5	**CLAYEY SILT:** trace sand, trace topsoil, brown, moist, stiff (weathered)	1	SS	9	
1.1	**CLAYEY SILT TILL:** sandy, trace gravel/ cobble, grey, moist, very stiff to hard	2	SS	16	254
		3	SS	15	
	grey below 2.7m	4	SS	43	253
		5	SS	21	252
	sand seams below 4.5m	6	SS	26	251
		7	SS	25	250
		8	SS	20	249
246.6 / 9.0	**SANDY SILT TILL:** some clay, trace gravel/ cobble, grey, moist, very dense	9	SS	50/ 50mm	248
244.9 / 10.7	**SAND:** some silt, trace clay, trace gravel, brown, wet, very dense	10	SS	94/ 280mm	247
10.9	**SANDY SILT TILL:** trace clay, trace gravel, grey, moist, very dense				246
243.1 / 12.5	**END OF BOREHOLE**	11	SS	50/ 25mm	245
	Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water level readings:				244
	Date: April 13, 2021 — W.L. Depth (m): 0.30				
	Feb. 25, 2021 — - 0.02 (above ground)				

W. L. 255.6 m
Feb 21, 2025
Apr 13, 2021

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

METHANE AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

DS SOIL LOG 19-043-101 4721 AND 5061 STOUFFVILLE RD ADDITIONAL WORK_TIMES GROUP.GPJ DS.GDT 21-5-3