PRELIMINARY GEOTECHNICAL INVESTIGATION
PROPOSED REDEVELOPMENT
154 FRONT STREET EAST
TORONTO, ONTARIO

Submitted to:

Build Toronto Inc.
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EXECUTIVE SUMMARY

This report presents the subsoil conditions and provides recommendations on the geotechnical aspects of the redevelopment of the property at 154 Front Street East to be a 7-storey building with two levels of underground parking. The report is prepared based on the findings of subsoil conditions encountered in the boreholes advanced at the site as part of the project geotechnical and environmental investigation program.

A total of 9 boreholes were advanced at the site between 26 February and 3 March 2010 extending to depths ranging from 4.4 m to 8.1 m below the existing ground surface. Based on the investigation results, the soil profile consisted of surficial asphaltic concrete overlying gravelly sand / sand and gravel fill and / or fill soils (silty clay / clayey silt or sandy silt) underlain by various native soils consisting of sand or silt or sandy silt and / or silty clay / clayey silt to the depths of termination of the majority of the boreholes. Four boreholes were terminated in the glacial till (clayey silt till / sandy silt till). Groundwater was measured at different depths ranging from 1.5 m to 6.1 m at the site. Three boreholes were found dry.

Based on the results of the investigation, conventional strip / spread footings, and/or mat foundations may be considered for support of the proposed 7-storey building. However, the native soils (sand or silt / sandy silt and /or silty clay / clayey silt) are incapable of supporting the proposed building loads. Therefore, consideration could be given for construction of all footings and lower floor slab of underground parking on the underlying competent till. For design purpose, geotechnical reactions of 250 kPa (SLS) and geotechnical resistances of 375 kPa (factored ULS) may be used for footings placed on till at depths of about 6 m to 7 m below the existing grade. Based on the groundwater measurements, excavation below 1.5 m depth will likely require significant dewatering effort. The groundwater table must be lowered to at least 1.0 m below the deepest excavation base. If shallow foundations are found insufficient to provide support for the proposed building, deep foundations (driven piles or cast-in-place caissons) could be considered. However, the boreholes advanced at the site were not deep enough to provide recommendations for deep foundation.

A permanent dewatering system will be required to prevent groundwater seepage through the underground floor slab and basement walls. Water-proofing basement walls and water / damp-roofing underground floor slab will be required.

Considering that the investigation may not cover entirely the footprints of the proposed building and / or insufficient depth of investigation for foundation design, an additional geotechnical investigation would likely be needed for detail design.

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1.0 INTRODUCTION

AMEC Earth & Environmental, a division of AMEC Americas Limited (AMEC), Consulting Geotechnical, Construction Quality Control and Environmental Engineers, was retained by Build Toronto Inc. to conduct a geotechnical investigation for the proposed redevelopment of the property at 154 Front Street East, Toronto, Ontario.

The purpose of this geotechnical investigation was to assess the subsurface soil and groundwater conditions at the site, and to provide recommendations on the geotechnical aspects of the proposed redevelopment.

Concurrent with this geotechnical investigation, an environmental investigation program involving the drilling of 4 boreholes with Standard Penetration Test (SPT) and soil sampling was also implemented at the site. The subsoil conditions for this report were assessed based on all boreholes (geotechnical and environmental) advanced at the site. Given that the current investigation may not have entirely covered the proposed development footprint (no borehole was advanced at the interior of the existing building), this geotechnical report should be considered as preliminary in nature and additional geotechnical investigation may be required for design.

Authorization to proceed with this investigation was received from Ms. Tracey Smith on 5 February 2010. The work carried out for this investigation was completed in accordance with AMEC's Proposal 1002 dated 19 January 2010 and Build Toronto Inc. Purchase Order No. B061 dated 5 February 2010.

This report contains the findings of geotechnical investigation, together with recommendations and comments. These recommendations and comments are based on factual information and are intended only for use by design engineers. The number of boreholes may not be sufficient to determine all the factors that may affect construction methods and costs. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The anticipated construction conditions are also discussed, but only to the extent that they may influence design decisions. Construction methods discussed, however, express AMEC's opinion only and are not intended to direct the contractors on how to carry out the construction. Contractors should also be aware that the data and their interpretation presented in this report may not be sufficient to assess all the factors that may have an effect upon the construction.

The report was prepared with the condition that the design would be in accordance with all applicable standards and codes, regulations of authorities having jurisdiction, and good engineering practice. Further, the recommendations and opinions in this report are applicable only to the proposed project as described above.

On-going liaison with AMEC during the final design and construction phase of the project is recommended to confirm that the recommendations in this report are applicable and/or correctly interpreted and implemented. Also, any queries concerning the geotechnical aspects of the proposed project should be directed to AMEC for further elaboration and/or clarification.

2.0 SITE AND PROJECT DESCRIPTION

The site is located at the northwest corner of Sherbourne Street and Front Street East in the City of Toronto, Ontario. The site is roughly rectangular in shape and encompasses a plan area of approximately 0.31 ha. The site currently includes a 2-storey commercial building and associated parking areas. Based on the information available to AMEC, the site was historically occupied by a Toronto Railway Co. facility, and then over the years, by carriage maker, blacksmith, battery company, tire company, feed mill yard, wrecking yard, and service station.

The subject site is located in a developed commercial/residential setting. To the north of the site is the TTC right of way, machinery works and a residential and commercial community; to the west and southwest is a former TTC warehouse, machinery shop, boiler works and currently a high density residential / commercial area; and to the east and southeast is commercial / industrial business, gas station and parking lot. A general site location plan is shown in Figure No. 1.

Based on the information available in the Request For Proposal (RFP), the existing building will be demolished and the site would be redeveloped for residential or mixed use purposes. The proposed redevelopment could consist of a 7-storey building with two levels of underground parking.

3.0 INVESTIGATION PROCEDURES

The field work for the geotechnical and environmental investigation was carried out concurrently between 26 February and 3 March 2010 and comprised drilling a total of 9 boreholes at the site. The boreholes were extended to 4.4 m to 8.1 m below the existing grade. The approximate borehole locations are shown in Figure No. 2.

Prior to the commencement of the drilling work, an approval was obtained from Build Toronto Inc. on the submitted draft borehole location plan. The borehole locations were then established in the field by AMEC personnel and cleared of existing underground services by the appropriate agencies.

All boreholes were advanced using a track-mounted drill rig with solid / hollow stem augers equipped with Standard Penetration Test (SPT) tools. The SPT and soil sampling were performed in all boreholes under the full-time supervision of experienced personnel from AMEC. Soil samples were generally obtained at 0.76 m interval for the initial 3 m of the borehole and 1.5 m thereafter, while performing the Standard Penetration Test SPT) in accordance with ASTM D1586. The SPT consisted of freely dropping a 63.5 kg (140 lbs.) hammer a vertical distance of 0.76 m (30 inches) to drive a 51 mm (2 inches) diameter O.D. split-barrel (split spoon) sampler into the ground. The number of blows of the hammer required to drive the sampler into the relatively undisturbed ground by a vertical distance of 0.30 m (12 inches) was recorded as SPT 'N' value of the soil which indicated the consistency of cohesive soils or compactness of non-cohesive soils. In addition to SPT, field vane tests (VT) were carried out in the clayey soils in 3 boreholes (BH 6, BH 7 and BH 8) at depths where SPT 'N' values of less than 10 blows per 0.3 m were encountered.

Groundwater levels were measured in Boreholes BH 1, BH 2, BH 3, BH 6 to BH 9 during and on completion of drilling work. Monitoring wells were installed in three boreholes (BH 1, BH 2 and BH 5) and groundwater level was measured on 10 March 2010.

AMEC personnel surveyed the ground surface elevations at the borehole locations using the top of fire hydrant (about 0.7 m above ground) located between the existing building and Front Street East as a temporary benchmark (TBM). The TBM was assigned an arbitrary elevation of 100 m.

Upon completion of drilling, the boreholes were backfilled with bentonite and the soil samples were transported to AMEC's Advanced Soil Laboratory in Scarborough (Toronto), Ontario for further examination (i.e., water content determination, grain size analysis and Atterberg Limit determination). The results of the in-situ and laboratory tests are presented on the corresponding Record of Boreholes. The results of the grain size distribution analysis and Atterberg Limit tests are presented in Appendix A.

4.0 SUB-SURFACE CONDITIONS

Based on the soil conditions encountered in the boreholes, the soil profile generally consisted of surficial asphaltic concrete overlying gravelly sand / sand and gravel fill and / or fill soils (silty clay / clayey silt or sandy silt) underlain by native soils (sand or silt or sandy silt and / or silty clay / clayey silt) to the depths of termination of the majority of boreholes. In four deeper boreholes, glacial till (clayey silt till / sandy silt till) was encountered below the silty clay / clayey silt.

The stratigraphic units and groundwater conditions are discussed in the following sections. The Records of Boreholes are attached for detailed information.

Please note that the following summary is to assist the designers of the project with an understanding of the anticipated soil conditions across the site. However, it should be noted that the soil and groundwater conditions may vary between and beyond these locations.

4.1 Asphaltic Concrete

Asphaltic concrete was penetrated at the existing grade in all boreholes. The thickness ranged from about 55 mm to 125 mm.

4.2 Gravelly Sand / Sand and Gravel Fill

Gravelly sand / sand gravel fill was encountered underneath the asphaltic concrete in Boreholes BH 1, BH 3, BH 4, BH 5, BH 6, BH 7, BH 8 and BH 9; and below the silty clay / clayey silt fill in BH 2. The gravelly sand / sand and gravel fill extended to depths varying from about 0.1 m to 2.1 m below the existing ground surface.

The gravelly sand / sand and gravel fill was brown in colour, and contained some silt. In Boreholes BH 2, BH 3 and BH 9, a trace of asphaltic concrete / brick debris was noted. The SPT ‘N’ values of the gravelly sand / sand and gravel fill ranged widely from 3 to 44 blows per 0.3 m. The water contents measured in the gravelly sand / sand and gravel fill ranged from 3 % to 19 %.

It should be noted that the thickness and the conditions of the gravelly sand / sand and gravel fill could vary significantly between and beyond the borehole locations.

4.3 Fill Soils (Silty Clay / Clayey silt / Sandy Silt)

Silty clay / clayey silt fill was encountered in Borehole BH 2 underneath the asphaltic concrete; and below the gravelly sand / sand and gravel fill in Borehole BH 5. Sandy silt fill was encountered underneath the gravelly sand / sand and gravel fill in Borehole BH 4. The silty clay / clayey silt and / or sandy silt fill extended to the depths ranging from about 0.6 m to 2.1 m below the existing ground surface.

The silty clay / clayey silt and / or sandy silt fill was dark brown / brown-grey in colour, and contained traces of sand, brick debris and asphaltic concrete. The SPT 'N' values for the silty clay / clayey silt and / or sandy silt fill varied widely from 4 blows to 15 blows per 0.3 m.

It should be noted that the thickness and the conditions of the silty clay / clayey silt and / or sandy silt fill could vary significantly between and beyond the borehole locations.

4.4 Sand / Silt / Sandy Silt

Native sand / silt / sandy silt was encountered underneath the gravelly sand / sand and gravel fill in Boreholes BH 1, BH 6, BH 7 and BH 8; and below clayey silt / silty clay fill in Borehole BH 5. The sand / silt / sandy silt extended to depths ranging from about 2.0 m to 2.7 m below the existing grade. The sand / silt / sandy silt was brown-grey in colour and contained a trace of clay. The SPT 'N' values measured in the sand / silt / sandy silt ranged widely from 1 blow to 28 blows per 0.3 m indicating very loose to compact compactness. One exceptionally high SPT 'N' value of 42 blows per 0.3 m was recorded in Borehole BH 5 which was likely due to gravel.

Grain size analyses were completed on two samples of sand / silt, and the results of laboratory tests conducted on the soil samples are presented in the following Table 4.1.

Table 4.1: Grain Size Distribution Analysis Results

Borehole No.		Depth (m)	Grain Size Distribution			
			Gravel (%)	Sand (%)	Fines (%)	
					Silt	Clay
BH 1	SS 2	0.8 - 1.4	0	94	5	1
BH 8	SS 2	0.8 - 1.4	0	8	85	7

The grain size distribution curves are presented in Figure No. A1.

4.5 Silty Clay / Clayey Silt

Silty clay / clayey silt was encountered in all boreholes, underneath the silty clay / clayey silt fill in Borehole BH 2; below gravelly sand / sand and gravel fill in Boreholes BH 3 and BH 9; below sandy silt fill in Borehole BH 4; and below sand / sandy silt in Boreholes BH 1, BH 5, BH 6 and BH 7. The silty clay / clayey silt was brown in colour but changed to grey over depth, and contained a trace of sand. Trace gravel was noted within the silty clay / clayey silt deposit. The SPT 'N' values measured in the silty clay / clayey silt ranged widely from 1 to 18 blows per 0.3 m indicating very soft to very stiff consistency. Results of three field vane tests completed in Boreholes BH 6, BH 7 and BH 8 indicated that the undrained shear strength of the clayey silt

ranged between 10 and 36 kPa. Laboratory testing conducted on silty clay / clayey silt samples revealed moisture contents ranging from 11 % to 22 %.

Grain size analyses were completed on two samples of silty clay / clayey silt, and the results of laboratory tests conducted on the soil samples are presented in the following Table 4.2.

Table 4.2: Grain Size Distribution Analysis Results

Borehole No.	Sample No.	Depth (m)	Grain Size Distribution				Atterberg Limits			USCS Modified Group Symbol
			Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
BH 4	SS 3	1.5 - 2.1	0	3	79	18	25	15	10	CL
BH 6	SS 4	2.3 - 2.7	1	1	75	23	ND	ND	ND	ND

ND: Not determined

The grain size distribution curves are presented in Figure No. A1.

4.6 Glacial Till (Clayey Silt Till / Sandy Silt Till)

A glacial till deposit was encountered below the silty clay / clayey silt in Boreholes BH 4, BH 7, BH 8 and BH 9. All 4 boreholes were terminated after exploring the glacial till for about 1.0 to 1.5 m.

The glacial till predominantly consisted of silt matrix with varying proportions of clay, sand and gravel sized particles. The till, in general, can be characterized as clayey silt / sandy silt with a trace of gravel. Based on visual and tactile examination of the soil, the till (clayey silt till / sandy silt till) was grey in colour.

Four SPT ‘N’ values (one per borehole) measured in the till (clayey silt till / sandy silt till) varied from 18 to 30 blows per 0.3 m, indicating a very stiff to hard consistency or compact to dense compactness.

The moisture contents measured in the till (clayey silt till / sandy silt till) ranged from 11% to 14%.

4.7 Groundwater Conditions

Groundwater levels were measured in Boreholes BH 1, BH 2, BH 3, BH 6 to BH 9 during and on completion of drilling work. Monitoring wells were installed in three boreholes (BH 1, BH 2 and BH 5) and groundwater levels were measured on 10 March 2010.

The results of the measurements are shown on the individual Record of Boreholes, and summarized in Table 4.3 below:

Table 4.3: Groundwater Levels

Borehole No.	Groundwater Level	
	Date of Measurement	Depth of Groundwater below Existing Grade (m)
BH 1	26 February 2010 10 March 2010	1.5[(1)] 1.5[(2)]
BH 2	2 March 2010 10 March 2010	3.4[(1)] 1.9[(2)]
BH 3	26 February 2010	1.5[(1)]
BH 4	2 March 2010	Not measured
BH 5	2 March 2010	Not measured
BH 6	3 March 2010	dry[(1)]
BH 7	3 March 2010	4.0[(1)]
BH 8	3 March 2010	dry[(1)]
BH 9	26 February 2010	6.1[(1)]

Notes: [(1)] In open borehole during or on completion of drilling [(2)] In monitoring wells

It should be pointed out, however, that the groundwater at the site would fluctuate seasonally and can be expected to be somewhat higher during the spring months and in response to major weather events.

5.0 DISCUSSION AND RECOMMENDATIONS

As per the information provided to AMEC, the site would be redeveloped as a 7-storey building with two levels of underground parking. The existing structure on the property would be demolished for the proposed redevelopment. The site grading plan was not available at the time of writing this report. It is likely that the existing grading will be maintained.

Based on the soil conditions encountered in the boreholes, the soil profile consisted of surficial asphaltic concrete overlying gravelly sand / sand and gravel fill and / or fill soils (silty clay / clayey silt or sandy silt) underlain by native soils (sand or silt or sandy silt and / or silty clay / clayey silt) to the depths of termination of the majority of the boreholes. Four boreholes were terminated in the glacial till (clayey silt till / sandy silt till).

The investigation indicated that conventional strip / spread footings, and/or mat foundations are feasible for providing support of the proposed 7-storey building. However, the native soils (sand or silt or sandy silt and / or silty clay / clayey silt) are incapable of supporting the proposed building loads. Therefore, conventional strip / spread / mat footings should be extended to the competent till deposit. Geotechnical reactions of 250 kPa (SLS) and geotechnical resistances of 375 kPa (factored ULS) may be used for design for footings placed at depths of about 6 to 7 m below the existing grade. Alternatively, deep foundations (driven piles or cast-in-place caissons) may be considered, which will require additional deeper boreholes for design. Based on the groundwater measurements, excavation for shallow foundations is likely to extend below groundwater table. The groundwater table must be lowered to at least 1.0 m below the deepest excavation base. The basement wall and floor will have to be designed for the high groundwater level, together with an appropriate method for dewatering during construction.

Details for design and construction are provided in the following sections. It should be noted that the boreholes used in this report may not cover the proposed building footprint (unknown at the time of preparing this report). Therefore, an additional detailed geotechnical investigation may be required.

5.1 Site Grading

5.1.1 General

Based on the information provided in the RFP, the site use in the past included as a service station with recorded underground storage tanks (UST). It is possible that the remnants of the former buildings including foundations (if any), and UST might still be found buried below the ground surface. The site development would, therefore, require the complete removal of the buried UST structure / remnants of the previously existing building (if any) and backfilling of the void (where necessary), and stripping of existing fill, topsoil, organic matter, deleterious materials and soft/loose spots, if and where encountered. The exposed subgrade should be proof-rolled to identify weak areas. Any weak or excessively wet zones identified during proof-rolling should be sub-excavated and replaced with engineering fill (or similar).

All grade raise (if required), replacement of existing fill, soft surficial soils at the site and backfilling of void due to removal of remnants of the old foundations should be achieved by placing engineered fill (or equivalent) as detailed Section 5.1.3. Prior to placement of engineered fill, the subgrade should be inspected and approved by a geotechnical engineer.

5.1.2 Suitability of Existing Soils for Use as Engineered Fill

Fill soils below the asphaltic concrete containing construction debris (or similar) and organic matter inclusion should not be reused as backfill.

The excavated native soils and clean fill soils are considered suitable for backfill provided the water content of these soils are within 2 percent of the optimum moisture content. It should be noted that there may be zones within the clayey silt soils which could be too wet to compact and, therefore, additional processing (e.g., drying) may be required.

The existing fill soils / native soils would require selection and sorting prior to reuse as backfill. The selection and sorting must be conducted under the supervision of a geotechnical engineer. Alternatively, clean inorganic imported soil should be used for engineered fill.

5.1.3 Engineered Fill

The following engineering fill placement procedure is recommended.

(i) The aerial extent of engineered fill should be controlled by proper surveying techniques to ensure that the top of the engineered fill extends a minimum of 2.5 m beyond the perimeter of any proposed roads, driveways, parking areas or settlement-sensitive structures to be supported. Where the depth of engineered fill exceeds 1.5 m, this horizontal distance of 2.5 m beyond the above noted perimeters should be increased by at least 1.0 m for each 1.0 m depth of fill.

(ii) The area to receive the engineered fill should be stripped of any topsoil, organic matter, and other compressible, weak and deleterious materials. After stripping, the entire area should be inspected and approved by the geotechnical engineer. Spongy, wet or soft / loose spots should be sub-excavated to stable subgrade and replaced with compactable approved soil, compatible with subgrade conditions, as directed by the geotechnical engineer.

(iii) The fill material should be placed in thin layers not exceeding approximately 200 mm when loose. Oversize particles (cobbles and boulders) larger than 120 mm should be discarded, and each fill layer should be uniformly compacted with heavy compactors, suitable for the type of fill used, to at least 95% of its Standard Proctor Maximum Dry Density (SMPDD) in general and to at least 98% for the top 600 mm below paved areas and 100% SMPDD below proposed footings.

(iv) Full-time geotechnical inspection and quality control (by means of frequent field density and laboratory testing) are necessary for the construction of a certifiable engineered fill and compaction procedure and efficiency should be controlled by the geotechnical engineer.

(v) The engineered fill should not be frozen and should be placed at moisture contents within 2 % of the optimum value for compaction. The engineered fill should not be performed during winter months when freezing ambient temperatures occur persistently or intermittently.

Geotechnical reactions of 150 kPa (SLS) and geotechnical resistances 225 kPa (factored ULS) for spread / strip footings supported by at least 1.0 m of engineered fill constructed in accordance with the above recommendations may be considered. It is recommended that the footing subgrade be evaluated by the geotechnical engineer prior to placing the formwork. All footings should have at least 1.2 m of earth cover or equivalent artificial insulation for frost protection.

5.2 Foundations

As stated in Section 5.0, a 7-storey building would be constructed at the site after demolishing the existing building. The proposed development would likely include two levels of underground parking. Assuming that the development will not require any significant regrading, and the final design grades will be generally similar to that of the existing site grade; the design foundation levels of the proposed buildings will be set at about 5 to 6 m below the existing grade for two levels of underground parking scheme.

Based on the soil conditions encountered in the boreholes, shallow foundations (strip / spread footings) and / or mat foundations are feasible at the site. The existing fill and underlying native soils (sand / silt / sandy silt and / or silty clay / clayey silt) are not competent for supporting the proposed building loads. Therefore, footings should be extended to the underlying competent till deposit. If shallow foundations are found insufficient to provide support for the proposed building, deep foundations (driven piles or caissons) may be used. Additional deeper boreholes will be required for detail design of deep foundations.

5.2.1 Strip / Spread Footings

Based on the investigation results, the recommended footing depths, Geotechnical Reaction at Serviceability Limit State (SLS) and Geotechnical Resistance at Ultimate Limit State (ULS) for strip / spread footings at the borehole locations are given in Table 5.1.

Table 5.1: SLS and ULS Values for Strip / Spread Footings

Borehole		Depth below existing ground surface (m)	Founding Subsoil	Geotechnical Pressure Reaction at SLS (kPa)	Factored Geotechnical Pressure Resistance at ULS[(1)] (kPa)
No.	Termination Depth, m				
BH 1	5.2	1.5 m (±) - 2.7 m below 2.7 m (±)	Very loose to loose sand stiff to very soft silty clay / clayey silt	Not recommended* Not recommended*	Not recommended* Not recommended*
BH 2	4.4	2.0 m (±) and below	Very stiff to firm silty clay / clayey silt	Not recommended*	Not recommended*
BH 3	5.2	2.0 m (±) and below	Firm to soft silty clay / clayey silt	Not recommended*	Not recommended*
BH 4	8.2	1.5 m - 7.0 m(±) below 7.0 m (±)	Stiff silty clay / clayey silt Very stiff clayey silt till	100 250**	150 375**
BH 5	5.2	1.5 m - 2.1 m(±) below 2.0 m (±)	Compact sandy silt Stiff silty clay / clayey silt	Not recommended* Not recommended*	Not recommended* Not recommended*
BH 6	6.6	1.5 m - 2.0 m (±) 2.0 m - 6.0 m (±) below 6.0 m (±)	Compact sandy silt Stiff to firm silty clay / clayey silt Very stiff silty clay / clayey silt	Not recommended* Not recommended* 150**	Not recommended* Not recommended* 225**
BH 7	6.6	1.5 m - 2.7 m (±) 2.7 m - 6.0 m (±) below 6.0 m (±)	Compact to loose sandy silt Firm to very soft silty clay / clayey silt Compact sandy silt till	Not recommended* Not recommended* 250**	Not recommended* Not recommended* 375**
BH 8	8.1	1.5 m - 4.0 m (±) 4.0 m - 6.5 m (±) below 6.5 m (±)	Very stiff to firm Silty clay /clayey silt Firm to very soft silty clay / clayey silt Very stiff clayey silt till	Not recommended* Not recommended* 250**	Not recommended* Not recommended* 375**
BH 9	8.1	1.5 m - 7.0 m(±) below 7.0 m (±)	Stiff to firm silty clay / clayey silt Very stiff clayey silt till	Not recommended* 300**	Not recommended* 450**

Notes: * "Not recommended" for supporting shallow foundation; ** Deeper boreholes are required for confirmation
A resistance factor of Φ = 0.5 has been applied to the values provided.

Both SLS and ULS values shown on Table 5.1 are applicable for a concentrically loaded spread foundation founded on the soil type indicated. These values must be verified by deeper boreholes and detail analysis.

The geotechnical horizontal resistance (against sliding) for spread footings should be designed using a coefficient of friction between concrete and subgrade of 0.35 which includes a resistance factor of 0.8.

The design frost penetration for Toronto area is 1.2 m. Therefore, a permanent soil cover of at least 1.2 m or its thermal equivalent is required for frost protection of foundations. All exterior footings and footings beneath unheated areas should have at least 1.2 m of earth cover or equivalent synthetic insulation for frost protection.

Where necessary, the stepping of the footings at different elevations should be carried out at an angle no steeper than 2 horizontal (clear horizontal distance between footings) to 1 vertical (difference in elevation) and no individual footing step should be greater than 0.6 m and may have to be as low as 0.3 m if weaker soils are encountered.

The minimum footing sizes, footing thickness, excavations and other footing requirements should be designed in accordance with the latest edition of the Ontario Building Code. For footings designed and constructed as recommended in this report and in accordance with good construction practice, the above SLS values provided should correspond to total and differential settlements of not more than 25 mm and 20 mm, respectively, subject to confirmation by detailed analysis, if accurate values are required.

The excavations and dewatering for the construction of the footings should follow the procedures provided in Section 5.5 (Excavation and Dewatering). Significant effort in dewatering groundwater from the excavations will likely be required, particularly if excavation is below about 1.5 m depth. It should be noted that during construction, the groundwater level should be lowered by a minimum of 1 m below the footing founding level.

In order to achieve the resistance / reaction as indicated in Table 5.1, the exposed subgrade should be free of loose / soft, disturbed wet or otherwise deleterious materials. The footing subgrade should be inspected and evaluated by a geotechnical engineer prior to concreting to confirm that the footings are founded on competent subgrade capable of supporting the recommended design pressure.

5.2.2 Mat Foundation

Mat foundation may also be used to support the proposed 7-storey structure. Mat foundation should be founded on competent till below the native soils (sand / silt / sandy silt and / or silty clay / clayey silt). The SLS and ULS values given in Table 5.1 may be used for design. The following values of the modulus of subgrade reaction (k_s) may be used to determine the soil spring stiffness for design purposes:

Soil	Modulus of Subgrade Reaction (MPa/m)
Very stiff clayey silt till or compact sandy silt till	25

The subgrade should be proof-rolled and compacted to a uniform high density and should be inspected and approved by the geotechnical engineer prior to placing concrete.

The mat foundation should be placed on a minimum 200 mm thick layer of Granular 'A' material, compacted to 100 % Standard Proctor Maximum Dry Density (or equivalent) overlying approved native soil subgrade.

The design frost penetration for the general area is 1.2 m. Therefore, a permanent soil cover of 1.2 m or its thermal equivalent is required for frost protection of foundations.

5.3 Deep Foundations

If shallow foundations (i.e., strip / spread footings and/or mat foundations) are not sufficient to support the proposed 7-storey building, deep foundations (augered caisson or driven piles) could be considered. Current boreholes penetrated only about 1.0 to 1.5 m into competent till deposit. Additional borehole investigation will be needed for detailed design of foundation.

5.4 Lateral Earth pressure

The following unfactored coefficients (Table 5.2) should be used to calculate the lateral earth pressures against the walls of the underground parking garage.

Table 5.2: Lateral Earth Pressure Coefficients (Unfactored)

Stratum / Parameter	Bulk unit weight of soil, γ (kN/m^3)	Active earth pressure coefficient, K_a	At-rest earth pressure coefficient, K_o	Passive earth pressure coefficient, K_p
Very Loose to Loose Sand / Sandy Silt or Very Soft to firm Silty Clay / Clayey Silt	17.0	0.45	0.55	1.2
Compact Sand / Sandy Silt or Stiff to Very Stiff Silty Clay / Clayey Silt	19.0	0.35	0.50	1.8
Compact to Dense Sandy Silt Till or Very stiff Clayey Silt Till	21.0	0.30	0.45	2.3

Stratum / Parameter	Bulk unit weight of soil, γ (kN/m^3)	Active earth pressure coefficient, K_a	At-rest earth pressure coefficient, K_o	Passive earth pressure coefficient, K_p
Granular A (*) (OPSS 1010)	22.0	0.27	0.45	2.7
Granular B Type I (*) (OPSS 1010)	21.0	0.31	0.50	2.2
Existing Fill (gravelly sand / sand and gravel)	19.0	0.38	0.48	1.8
Existing Fill (silty clay / clayey silt or sandy silt)	18.0	0.42	0.50	1.7

(*) All granular soils compacted to minimum 95% Standard Proctor Maximum Dry Density (SPMDD)

The K_p (passive condition) values are reduced in order to limit the lateral soil movement that requires to mobilize the passive resistance.

5.5 Excavation and Dewatering

The borehole data indicated that existing fill soils, and native sand / sandy silt / silt / silty clay / clayey silt would be encountered in the excavations. All excavations should be carried out in accordance with the Ontario Health and Safety Regulations. The excavated soils can be classified as follows:

Existing Fill (gravelly sand / sand and gravel)	Type 3
Existing Fill (silty clay / clayey silt or sandy silt)	Type 3
Very loose to loose sand / sandy silt	Type 4
Very soft to firm silty clay / clayey silt	Type 4
Compact sand / sandy silt	Type 3
Stiff silty clay / clayey silt	Type 3
Very stiff clayey silt till	Type 3
Compact to dense sandy silt till	Type 3

Accordingly, for Type 3 soils, a bank slope of 1H:1V is required for excavations in accordance with the Ontario Health and Safety Regulations. However, for excavations within the sandy soils located under groundwater table, flatter slopes (e.g. 3H:1V) may be required. For Type 4 soils, a bank slope of 3H:1V is required. If the required excavation side slope can not be provided due to space limitations, the side of excavation should be supported or shored as designed by an engineer.

Stockpiles of excavated materials should be kept at least 3.0 m from the edge of the excavation to avoid slope instability, subject to confirmation by the geotechnical engineer. Care should also be taken to avoid overloading of any underground services/structures by stockpiles.

Attention is called to the possible presence of cobbles and/or boulders that may be encountered during excavation in the native soil till deposits. Concrete rubbles or left over footings from previous buildings are also likely to be present at the site.

Normal excavation equipment will be suitable for excavation. The terms describing the compactness (loose, compact, dense, very dense) or consistency (stiff, very stiff, hard) of soil strata give an indication of the effort needed for excavation. Additional excavation efforts (e.g., impact hammering) may be required for excavating the very dense sandy soils. Such a possibility should be considered by the contractor and construction contract.

Based on the soil and groundwater conditions at the borehole locations, dewatering would likely be needed if excavation is below a depth of about 1.5 m below the current grade. Significant dewatering will likely be required (e.g., well points, a series of filtered sumps and pumps) when excavating through the sandy soils located within 3 m to 4 m depth below the existing grade. Dewatering through the silty / clayey soils below 3 m to 4 m depth will likely require a series of filtered sumps and pumps or similar. At some localized depths (e.g., sandy silt till in Borehole BH 7 at about 6 m depth, significant dewatering effort may be required. The groundwater table must be lowered to at least 1.0 m below the deepest excavation base. A contractor specializing in dewatering should be retained to design, install and operate the dewatering system. Test pits should be excavated prior to construction in order to determine the effective dewatering method, if practical.

5.6 Underground Parking Floor Slab

The bottom floor slab for the underground parking is likely to at about 5 to 6 m below the existing grade. Concrete floor slab may be built on properly graded natural subgrade. The thickness of the concrete slab-on-grade should be designed by a structural engineer.

A base layer of free draining granular material such as Granular A (OPSS 1010) of at least 200 mm in thickness should be placed immediately beneath the floor slab for levelling and drainage purposes. The base material should be compacted to at least 100% Standard Proctor Maximum Dry Density. The Granular A should be separated from the subgrade by an approved filter fabric properly designed to prevent subgrade soil erosion.

It should be noted that the bottom basement floor slab will likely be below the groundwater level. A permanent underfloor drainage system together with a perimeter drainage system for foundation should be properly designed and installed to prevent groundwater seepage through the underground bottom floor slab. The permanent underfloor drainage system and the perimeter drainage system must be designed and constructed with a proper filter system to prevent any migration of fine-grained soil (silt and clay sized particles) from the founding soil into the drainage systems. The floor slab should be damp-proofed or water-proofed according to Ontario Building Code. Alternatively, the underground floor slab should be completely waterproofed and designed against buoyancy.

The floor slab may be designed using a soil modulus of subgrade reaction, k_s, provided in Section 5.2.2. The slab-on-grade should not be connected monolithically to all load-bearing walls and columns unless it is designed accordingly.

Where construction is undertaken during winter months, floor slab subgrades should be protected from freezing. Alternatively, the floor slab subgrade should be completely thawed, inspected and proof rolled prior to placing concrete.

5.7 Backfill, Perimeter Drainage and Underfloor Drainage

The underground parking floor walls of the proposed building should be backfilled with granular material placed in 125 mm thick loose lifts that can be compacted with light equipment to avoid damaging the basement walls. Heavy compaction equipment should not be operated along basement walls especially when the walls are unsupported at their top. The backfill should not be over-compacted to avoid damage to basement walls. Due to its high permeability, the granular material will permit quick drainage of water to perimeter drains, but in order to reduce the quantity of water percolating into the backfill, the uppermost 0.5 m of the backfill should consist of clayey soils.

Due to their rigidity and unyielding character, basement walls should be designed for the at-rest earth pressure condition calculated in accordance with the Canadian Foundation Engineering Manual, 4th Edition and parameters provided in Table 5.2.

It is recommended that a permanent drainage system consisting of weeping tile, damp/water-proofing and an underfloor granular drainage layer as indicated in Section 5.6 be installed. Vertical drainage systems would relieve water pressure against the basement walls, and should be placed over the entire exterior basement wall surface. Weeping tile should be installed along the perimeter of the building to prevent accumulation of water in the backfill and the underfloor drainage layer with the objective to reduce possible dampness of floor slabs / uplift forces on the slab-on-grade. The weeping tile system should be installed to provide a positive discharge to a non-frost susceptible filtered sump or outlet. The weeping tile should be surrounded by a designed graded granular filter or wrapped with an approved geotextile to prevent migration of fines into the system.

The site should be graded for drainage away from foundations (if possible). A minimum cross fall of three percent immediately adjacent to foundations is recommended to allow for some settlement for the backfill and promote good surface drainage.

The underground parking walls should be waterproofed to prevent groundwater seepage and dampness.

5.8 Shoring Design Considerations

Deep excavations on this site, in close proximity to the site boundaries, may need to be shored to preserve the integrity of the surrounding properties and structures. The shoring requirements for the site should be examined in detail with respect to the potential site boundary constraints, once the development details and the building footprint is finalized.

The shoring should be designed to resist the earth, surcharge and hydrostatic pressures which could occur during construction. The shoring analysis and design should be carried out by a professional engineer in accordance with the Canadian Foundation Engineering Manual, 4th Edition with the parameters provided in Table 5.2 and the requirements of the Ontario Health and Safety Regulations.

The Ontario Building Code 2006 stipulates engineering review of the subsurface conditions on a continuous basis during the installation of earth retaining structures.

5.9 Earthquake Consideration

In conformance with the criteria in Table 4.1.8.4A, Part 4, Division B of the Ontario Building Code (OBC 2006), the project site can be classified as Site Class “D-Stiff Soil” if foundations are firmly placed on the till deposits. Additional deeper boreholes will be required for confirmation.

The four values of the spectral response acceleration, $S_a(T)$, for different periods and the Peak Ground Acceleration (PGA) can be obtained from Table C-2 in Appendix C, Division B of the National Building Code (2005). The design values of F_a and F_v for the project site should be calculated in accordance with Table 4.1.8.4 B and C in OBC (2006).

5.10 Soil Corrosovity Analysis

The results of corrosivity analysis carried out by AMEC on the extracts from three selected soil samples obtained during the environmental investigation are provided in Table 5.3.

Table 5.3: Corrosivity Analysis

Soil Sample No.	pH	Resistivity (ohms-cm)	Sulphate (µg/g)	Chloride (µg/g)
BH 1 SS 1	8.1	2220	76	170
BH 5 SS 2	8.2	1720	29	252
BH G9 SS 3	8.2	1200	29	368

Based on the results of the analyses conducted, the degree of corrosivity should be considered as “Moderate to Severe” for exposed metallic structures. This is based on a comparison of the test results to literature references (J.D. Palmer, Soil Resistivity Measurement and Analysis,

Materials Performance, Volume 13, 1974). As per Table 10 “Requirements for concrete subjected to sulphate attack”, Clause 15.5.2 of CSA Standard Specification A231.94, any soil which has sulphate content below 0.1% (1000 ppm) is not considered corrosive with respect to concrete and, as such, Type GU Portland cement can be used for underground concrete. The corrosivity should be assessed by a corrosivity expert. The laboratory Certificates of Analyses are attached in Appendix B of this report.

6.0 CLOSURE

The sub-soil information and recommendations contained in this report should be used solely for the purpose of geotechnical assessment of the site. AMEC should be retained to review the recommendations provided in this report, once the details of the project are finalized and prior to the final design stage of the project. Additional boreholes may be required for detail design.

This report was prepared for the use of Build Toronto and is intended to provide information regarding the property located at 154 Front Street East, Toronto, Ontario at the time of the Site field work. AMEC shall, at its own expense, provide written confirmation to any third party identified by Build Toronto that such party may rely on any reports, documents and materials generated by AMEC during this Project. Any use which an unauthorized third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party. All third parties relying on AMEC's report, by such reliance agree to be bound by our proposal and AMEC's standard reliance letter. Should additional parties require reliance on this report, written authorization from AMEC will be required.

The attached Report Limitations, in Appendix C, are an integral part of this report.

Yours truly,
AMEC Earth & Environmental,
a division of AMEC Americas Limited

Mohammad Mollah, M.Eng., P.Eng.
Senior Geotechnical Engineer

Prapote Boonsinsuk, Ph.D., P.Eng.
Group Leader, Geotechnical Engineering

RECORD OF BOREHOLES

EXPLANATION OF BOREHOLE LOG

This form describes some of the information provided on the borehole logs, which is based primarily on examination of the recovered samples, and the results of the field and laboratory tests. Additional description of the soil/rock encountered is given in the accompanying geotechnical report.

GENERAL INFORMATION

Project details, borehole number, location coordinates and type of drilling equipment used are given at the top of the borehole log.

SOIL LITHOLOGY

Elevation and Depth

This column gives the elevation and depth of inferred geologic layers. The elevation is referred to the datum shown in the Description column.

Lithology Plot

This column presents a graphic depiction of the soil and rock stratigraphy encountered within the borehole.

Description

This column gives a description of the soil stratums, based on visual and tactile examination of the samples augmented with field and laboratory test results. Each stratum is described according to the *Modified Unified Soil Classification System.*

The compactness condition of cohesionless soils (SPT) and the consistency of cohesive soils (undrained shear strength) are defined as follows *(Ref. Canadian Foundation Engineering Manual)*:

Compactness of Cohesionless Soils	SPT N-Value*
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	> 50

Consistency of Cohesive Soils	Undrained Shear Strength kPa	Undrained Shear Strength psf
Very soft	0 to 12	0 to 250
Soft	12 to 25	250 to 500
Firm	25 to 50	500 to 1000
Stiff	50 to 100	1000 to 2000
Very stiff	100 to 200	2000 to 4000
Hard	Over 200	Over 4000

* For penetration of less than 0.3 m, N-values are indicated as the number of blows for the penetration achieved (e.g. 50/25: 50 blows for 25 centimeter penetration).

Soil Sampling

Sample types are abbreviated as follows:

SS Split Spoon	TW Thin Wall Open (Pushed)	RC Rock Core	GS Grab Sample
AS Auger Sample	TP Thin Wall Piston (Pushed)	WS Washed Sample	AR Air Return Sample

Additional information provided in this section includes sample numbering, sample recovery and numerical testing results.

Field and Laboratory Testing

Results of field testing (e.g., SPT, pocket penetrometer, and vane testing) and laboratory testing (e.g., natural moisture content, and limits) executed on the recovered samples are plotted in this section.

Instrumentation Installation

Instrumentation installations (monitoring wells, piezometers, inclinometers, etc.) are plotted in this section. Water levels, if measured during fieldwork, are also plotted. These water levels may or may not be representative of the static groundwater level depending on the nature of soil stratum where the piezometer tips are located, the time elapsed from installation to reading and other applicable factors.

Comments

This column is used to describe non-standard situations or notes of interest.

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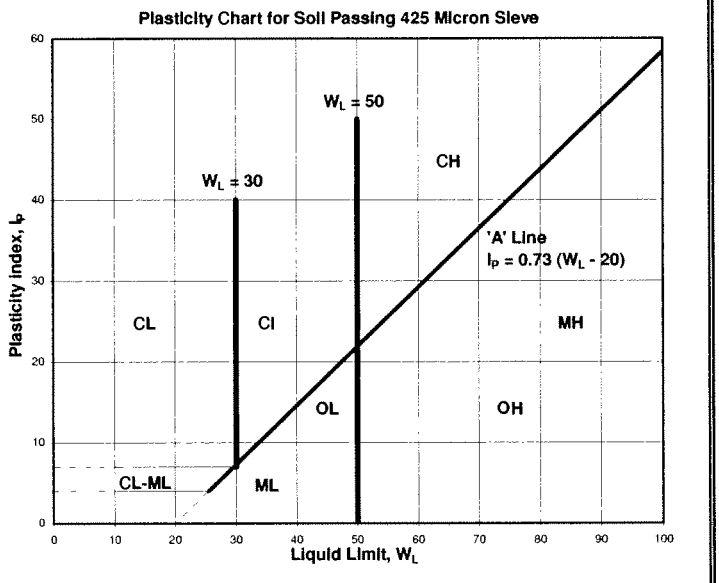
MODIFIED * UNIFIED CLASSIFICATION SYSTEM FOR SOILS

*The soil of each stratum is described using the Unified Soil Classification System (Technical Memorandum 36-357 prepared by Waterways Experiment Station, Vicksburg, Mississippi, Corps of Engineers, U.S Army. Vol. 1 March 1953.) modified slightly so that an inorganic clay of "medium plasticity" is recognized.

MAJOR DIVISION			GROUP SYMBOL	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE GRAINED SOILS (MORE THAN HALF BY WEIGHT LARGER THAN 75µm)	GRAVELS MORE THAN HALF THE COARSE FRACTION LARGER THAN 4.75mm	CLEAN GRAVELS (TRACE OR NO FINES)	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 4$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY GRAVELS (WITH SOME OR MORE FINES)	GM	SILTY GRAVELS, GRAVEL-SAND- SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 4
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 7
	SANDS MORE THAN HALF THE COARSE FRACTION SMALLER THAN 4.75mm	CLEAN SANDS (TRACE OR NO FINES)	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_U = \frac{D_{60}}{D_{10}} > 6$; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1$ to 3
			SP	POORLY GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS
		DIRTY SANDS (WITH SOME OR MORE FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 4
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES	ATTERBERG LIMITS BELOW "A" LINE OR P.I MORE THAN 7
FINE-GRAINED SOILS (MORE THAN HALF BY WEIGHT SMALLER THAN 75µm)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	W_L < 50%	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)
		W_L < 50%	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOILS	
	CLAYS ABOVE "A" LINE NEGLIGIBLE ORGANIC CONTENT	W_L < 30%	CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY OR SILTY CLAYS, LEAN CLAYS	
		30% < W_L < 50%	CI	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS	
		W_L < 50%	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
	ORGANIC SLITS & CLAYS BELOW "A" LINE	W_L < 50%	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	WHENEVER THE NATURE OF THE FINES CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER "F", E.G SF IS A MIXTURE OF SAND WITH SILT OR CLAY
		W_L < 50%	OH	ORGANIC CLAYS OF HIGH PLASTICITY	
HIGH ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE

SOIL COMPONENTS					
FRACTION	U.S STANDARD SIEVE SIZE		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS		
		PASSING	RETAINED	PERCENT	DESCRIPTOR
GRAVEL	COARSE	76 mm	19 mm	35-50	AND
				20-35	Y/EY
	FINE	19 mm	4.75 mm	10-20	SOME
				1-10	TRACE
SAND	COARSE	4.75 mm	2.00 mm		
	MEDIUM	2.00 mm	425 µm		
	FINE	425 µm	75 µm		
FINES (SILT OR CLAY BASED ON PLASTICITY)		75 µm			
OVERSIZED MATERIAL					
ROUNDED OR SUBROUNDED: COBBLES 76 mm TO 200 mm BOULDERS > 200 mm				NOT ROUNDED: ROCK FRAGMENTS > 76 mm ROCKS > 0.76 CUBIC METRE IN VOLUME	



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Note 1: Soils are classified and described according to their engineering properties and behaviour.

Note 2: The modifying adjectives used to define the actual or estimated percentage range by weight of minor components are consistent with the Canadian Foundation Engineering Manual (4th Edition, Canadian Geotechnical Society, 2006.)

RECORD OF BOREHOLE No. BH 1

Project Number:	TC101006.1000.4	Drilling Location:	BH 1	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	200 mm Hollow Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Feb 26, 10	Date Completed: Feb 26, 10	Revision No.: 0, 4/7/10

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION Local Ground Surface Elevation: 99.1 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: O SPT □ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12; △ Soil Vapour Reading parts per million (ppm) 100 200 300 400; ▲ Lower Explosive Limit (LEL) W_P W W_L Plastic Liquid 20 40 60 80	INSTRUMENTATION INSTALLATION	GR	SA	SI	CL
	about 100 mm ASPHALTTIC CONCRETE 99.0 grey Gravelly Sand / Sand and Gravel FILL some silt moist 98.5	SS	1	40	10		99							
	0.6 grey SAND trace silt, trace clay very loose to loose moist	SS	2	25	2	1	98							
	wet	SS	3	100	1	2	97							
	96.3 2.7 brown SILTY CLAY / CLAYEY SILT trace sand trace gravel firm to stiff to very soft moist	SS	4	100	5						0	94	5	1
	grey	SS	5	25	11	3	96							
		SS	6	100	8	4	95							
	93.9 5.2 End of Borehole Well Detail: 50 mm slotted PVC pipe (0.8 m - 2.9 m) with sand pack (0.5 m - 3.1 m), bentonite plug above and below sand, capped with flush-mounted casing set in concrete with J-plug.	SS	7	50	1	5	94							

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▽ Groundwater depth on completion of drilling on 2/26/2010 at a depth of: 1.5 m.

▼ Groundwater depth observed on 3/10/2010 at a depth of: 1.5 m.

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

RECORD OF BOREHOLE No. BH 2

amec

Project Number:	TC101006.1000.4	Drilling Location:	BH 2	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	200 mm Hollow Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Mar 2, 10	Date Completed: Mar 2, 10	Revision No.: 0, 4/7/10

LITHOLOGY PROFILE			SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Lithology Plot	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: O SPT □ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12; △ Soil Vapour Reading parts per million (ppm) 100 200 300 400; ▲ Lower Explosive Limit (LEL) W_p W W_L; Plastic Liquid 20 40 60 80	INSTRUMENTATION INSTALLATION	GR SA SI CL
	Local Ground Surface Elevation: 99.6 m											
	about 125 mm ASPHALTIC CONCRETE	99.6										
	brown **Silty Clay / Clayey Silt FILL** some sand, trace gravel, brick debris moist	99.0	SS	1	46	4						
	grey	0.6						99				
	Gravelly Sand / Sand and Gravel FILL some silt, trace brick debris moist		SS	2	21	6	1					
		98.2										
	brown - grey	1.4						98				
	Silty Clay / Clayey Silt FILL trace sand, asphaltic concrete, brick debris moist		SS	3	17	6	2					
		97.5										
	brown	2.1						97				
	SILTY CLAY / CLAYEY SILT trace sand trace gravel very stiff to firm moist		SS	4	92	18	3					
			SS	5	58	17	▽	96				
	grey		SS	6	92	4	4					
		95.2										
	End of Borehole	4.4										
	Well Detail: 50 mm slotted PVC pipe (0.9 m - 4.0 m) with sand pack (0.6 m - 4.3 m), bentonite plug above and below sand, capped with flush-mounted casing set in concrete with J-plug.											

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▽ Groundwater depth on completion of drilling on 3/2/2010 at a depth of: 3.4 m.

▼ Groundwater depth observed on 3/10/2010 at a depth of: 1.9 m.

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

RECORD OF BOREHOLE No. BH 3

Project Number:	TC101006.1000.4	Drilling Location:	BH 3	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	200 mm Hollow Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Feb 26, 10	Date Completed: Feb 26, 10	Revision No.: 0, 4/7/10

Local Ground Surface Elevation: 99.0 m

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)
	about 100 mm ASPHALTIC CONCRETE 99.0						
	dark brown **Gravelly Sand / Sand and Gravel FILL** some silt, trace asphaltic concrete, brick debris moist	SS	1	25	17		
		SS	2	13	3	1	98
		SS	3	0	5	2	97
	96.9						
	brown - grey 2.1 **SILTY CLAY / CLAYEY SILT** trace sand trace gravel firm to soft to firm moist	SS	4	75	5		
		SS	5	83	4	3	96
		SS	6	92	3	4	95
	grey	SS	7	92	6	5	94
	93.8						
	End of Borehole 5.2						

FIELD TESTING: Penetration Testing — ○ SPT □ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: ★ Rinse pH Values 2 4 6 8 10 12; △ Soil Vapour Reading parts per million (ppm) 100 200 300 400; ▲ Lower Explosive Limit (LEL) W_p W W_l; Plastic 20 40 60 80 Liquid

INSTRUMENTATION INSTALLATION

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

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▽ Groundwater depth on completion of drilling on 2/26/2010 at a depth of: 1.5 m.

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

RECORD OF BOREHOLE No. BH 4

Project Number:	TC101006.1000.4	Drilling Location:	BH 4	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	200 mm Hollow Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Mar 2, 10	Date Completed: Mar 2, 10	Revision No.: 0, 4/7/10

Local Ground Surface Elevation: 99.2 m

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING: Penetration Testing (SPT / PPT / DCPT), MTO Vane* (Intact / Remould), Nilcon Vane* (Intact / Remould), * Undrained Shear Strength (kPa)	LAB TESTING: Rinse pH Values, Soil Vapour Reading (parts per million (ppm)), Lower Explosive Limit (LEL), Plastic / Liquid	INSTRUMENTATION INSTALLATION	COMMENTS & GRAIN SIZE DISTRIBUTION (%) GR	SA	SI	CL
	about 70 mm ASPHALTIC CONCRETE 99.2													
	dark brown Gravelly Sand / Sand and Gravel FILL some silt moist 98.8 / 0.5	SS	1	46	7		99		14					
	dark brown Sandy Silt FILL trace gravel, trace brick debris moist	SS	2	13	7	1	98		15					
	97.8													
	brown SILTY CLAY / CLAYEY SILT trace sand trace gravel stiff moist 1.4	SS	3	42	11	2	97		17		0	3	79	18
		SS	4	79	13	3	96		18					
		SS	5	100	14				17					
	grey	SS	6	92	8	4	95		13					
		SS	7	75	13	5	94		11					
						6								
		SS	8	42	13		93		13					
	92.2					7								
	brown CLAYEY SILT TILL trace sand, trace gravel shale fragment very stiff moist 7.0	SS	9	79	25	8	92		14					
	91.0						91							
	End of Borehole 8.2													

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▽ No freestanding groundwater measured in open borehole on completion of drilling.

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

Scale: 1 : 53

RECORD OF BOREHOLE No. BH 5

Project Number:	TC101006.1000.4	Drilling Location:	BH 5	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	200 mm Hollow Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Mar 2, 10	Date Completed: Mar 2, 10	Revision No.: 0, 4/7/10

Local Ground Surface Elevation: 99.5 m

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)
	about 125 mm ASPHALTIC CONCRETE 99.4						
	brown Gravelly Sand / Sand and Gravel FILL moist 99.1	SS	1	75	18		99
	dark brown Clayey Silt / Silty Clay Fill some gravel, trace sand, brick debris moist 98.9 0.6						
	brown SANDY SILT trace clay dense to compact moist	SS	2	58	42	1	
		SS	3	83	14	2	98
	97.4 2.1						
	brown SILTY CLAY / CLAYEY SILT trace sand trace gravel stiff to very soft moist	SS	4	42	12		97
	grey	SS	5	50	4	3	
		SS	6	100	2	4	96
		SS	7	100	2	5	95
	94.3 End of Borehole 5.2						

Groundwater depth in monitoring well on 10 March 2010: dry.

Well Detail:
50 mm slotted PVC pipe (0.9 m - 4.0 m) with sand pack (0.6 m - 4.2 m), bentonite plug above and below sand, capped with flush-mounted casing set in concrete with J-plug.

FIELD TESTING: Penetration Testing — ○ SPT □ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: ★ Rinse pH Values 2 4 6 8 10 12; △ Soil Vapour Reading parts per million (ppm) 100 200 300 400; ▲ Lower Explosive Limit (LEL) W_p W W_l; Plastic Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

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

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▽ No freestanding groundwater measured in open borehole on completion of drilling.

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

RECORD OF BOREHOLE No. BH 6

Project Number:	TC101006.1000.4	Drilling Location:	BH 6	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	100 mm Solid Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Mar 3, 10	Date Completed: Mar 3, 10	Revision No.: 0, 4/7/10

Local Ground Surface Elevation: 99.5 m

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)
	about 55 mm ASPHALTIC CONCRETE 99.5						
	brown Gravelly Sand / Sand and Gravel FILL some silt moist 99.0 / 0.5	SS	1	78	44		
	brown SANDY SILT trace clay compact moist	SS	2	100	28	1	99
		SS	3	100	22		98
	grey 97.5 / 2.0 SILTY CLAY / CLAYEY SILT trace sand trace gravel firm to very stiff moist	SS	4	100	6	2	
		VT					97
		SS	5	100	11	3	
						4	96
	wet	SS	6	100	6		
		VT				5	95
						6	94
	End of Borehole 92.9 / 6.6	SS	7	72	16		93

FIELD TESTING: Penetration Testing — SPT, PPT, DCPT; MTO Vane* (Intact, Remould); Nilcon Vane* (Intact, Remould); * Undrained Shear Strength (kPa) 20 40 60 80

LAB TESTING: Rinse pH Values 2 4 6 8 10 12; Soil Vapour Reading, parts per million (ppm) 100 200 300 400; Lower Explosive Limit (LEL) W_p W W_l; Plastic / Liquid 20 40 60 80

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
1	1	75	23

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▽ No freestanding groundwater measured in open borehole on completion of drilling.

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

RECORD OF BOREHOLE No. BH 7

Project Number:	TC101006.1000.4	Drilling Location:	BH 7	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	100 mm Solid Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Mar 3, 10	Date Completed: Mar 3, 10	Revision No.: 0, 4/7/10

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)
Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: O SPT □ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12; Soil Vapour Reading △ parts per million (ppm) 100 200 300 400; ▲ Lower Explosive Limit (LEL) W_P W W_L Plastic Liquid 20 40 60 80	INSTRUMENTATION INSTALLATION	GR SA SI CL
Local Ground Surface Elevation: 99.1 m											
	about 60 mm ASPHALTIC CONCRETE 99.1						99				
	brown Sand and Gravel FILL some silt moist 98.6 0.5	SS	1	22	18						
	brown SANDY SILT trace clay compact to loose moist	SS	2	50	20	1	98				
		SS	3	100	12	2	97				
	96.3 2.7	SS	4	22	8						
	grey SILTY CLAY / CLAYEY SILT trace sand trace gravel firm to very soft moist	SS	5	100	6	3	96				
		VT				4 ▽	95	▲18 △30			
	93.3 5.8	SS	6	100	2	5	94	△36			
	grey SANDY SILT TILL trace clay, trace gravel compact moist to wet	VT				6	93				
	92.5	SS	7	22	26	■					
	End of Borehole 6.6										

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▽ Groundwater depth on completion of drilling on 3/3/2010 at a depth of: 4.0 m. ■ Cave in depth after removal of augers: 6.4 m.

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

Scale: 1 : 53

RECORD OF BOREHOLE No. BH 8

Project Number:	TC101006.1000.4	Drilling Location:	BH 8	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	100 mm Solid Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Mar 3, 10	Date Completed: Mar 3, 10	Revision No.: 0, 4/7/10

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		COMMENTS & GRAIN SIZE DISTRIBUTION (%)			
Lithology Plot	DESCRIPTION Local Ground Surface Elevation: 99.1 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: O SPT □ PPT ● DCPT; MTO Vane* △ Intact ▲ Remould; Nilcon Vane* ◇ Intact ◆ Remould; * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12; Soil Vapour Reading △ parts per million (ppm) 100 200 300 400; ▲ Lower Explosive Limit (LEL) W_p W W_L; Plastic Liquid 20 40 60 80	INSTRUMENTATION INSTALLATION	GR	SA	SI	CL
	about 85 mm ASPHALTIC CONCRETE 99.0						99							
	brown gravelly Sand / Sand and Gravel FILL some silt moist 98.5	SS	1	42	35				3					
	0.6 grey SILT trace clay, trace gravel compact moist 97.9	SS	2	33	26	1	98		16		0	8	85	7
	1.2 grey SILTY CLAY / CLAYEY SILT trace sand trace gravel very soft to very stiff moist	SS	3	100	16	2	97		17					
		SS	4	122	9				18					
		VT				3	96	▲10 △29						
		SS	5	56	5				22					
		VT				4	95	▲3 △10						
		SS	6	100	1	5	94		18					
		VT				6	93	▲7 △15						
		SS	7	56	11	7	92		17					
	91.9 7.2 grey CLAYEY SILT TILL trace sand, trace gravel very stiff moist	SS	8	106	18	8			11					
	91.0 End of Borehole 8.1													

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▽ No freestanding groundwater measured in open borehole on completion of drilling.

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

RECORD OF BOREHOLE No. BH 9

amec

Project Number:	TC101006.1000.4	Drilling Location:	BH 9	Logged by:	MM
Project Client:	Build Toronto Inc.	Drilling Method:	100 mm Solid Stem Augering	Compiled by:	MM
Project Name:	Proposed Redevelopment	Drilling Machine:	Track Mounted Drill	Reviewed by:	MM
Project Location:	154 Front Street East	Date Started:	Feb 26, 10	Date Completed: Mar 3, 10	Revision No.: 0, 4/7/10

Local Ground Surface Elevation: 99.0 m

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)
	about 100 mm ASPHALTIC CONCRETE 99.0						
	dark brown **Gravelly Sand / Sand and Gravel FILL** some silt, trace asphaltic concrete moist 98.4	SS	1	42	9		
	0.6 grey **SILTY CLAY / CLAYEY SILT** trace sand trace gravel very stiff to firm moist	SS	2	79	8	1	98
		SS	3	92	7	2	97
		SS	4	0	11	3	96
		SS	5	100	16		
		SS	6	83	6	4	95
		SS	7	92	6	5	94
						6 ▽	93
		SS	8	72	10		
	92.1 6.9 grey **CLAYEY SILT TILL** trace sand, trace gravel very stiff moist					7	92
		SS	9	11	30	■	
	90.9 **End of Borehole** 8.1					8	91

FIELD TESTING

Penetration Testing: ○ SPT □ PPT ● DCPT

MTO Vane*: △ Intact ▲ Remould

Nilcon Vane*: ◇ Intact ◆ Remould

* Undrained Shear Strength (kPa): 20 40 60 80

LAB TESTING

★ Rinse pH Values: 2 4 6 8 10 12

△ Soil Vapour Reading, parts per million (ppm): 100 200 300 400

▲ Lower Explosive Limit (LEL): W_p W W_l

Plastic Liquid: 20 40 60 80

Depth (m)	Rinse pH	Soil Vapour (ppm)	LEL
0			19
1			18
2			21
3			16
4			16
5			16
6			17
7			22
8			13

INSTRUMENTATION INSTALLATION

COMMENTS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

This borehole depth was planned to be 7 m. On 26 February 2010, the borehole was advanced with SPT and sampling to about 5.2 m and was backfilled by mistake. On 3 March 2010, a 2nd borehole, at about 0.5 m to the south of original borehole, was augered without SPT and sampling to 6.1 m and then continued with SPT and sampling to 8.1 m. The SPT and sampling data from both boreholes have been combined.

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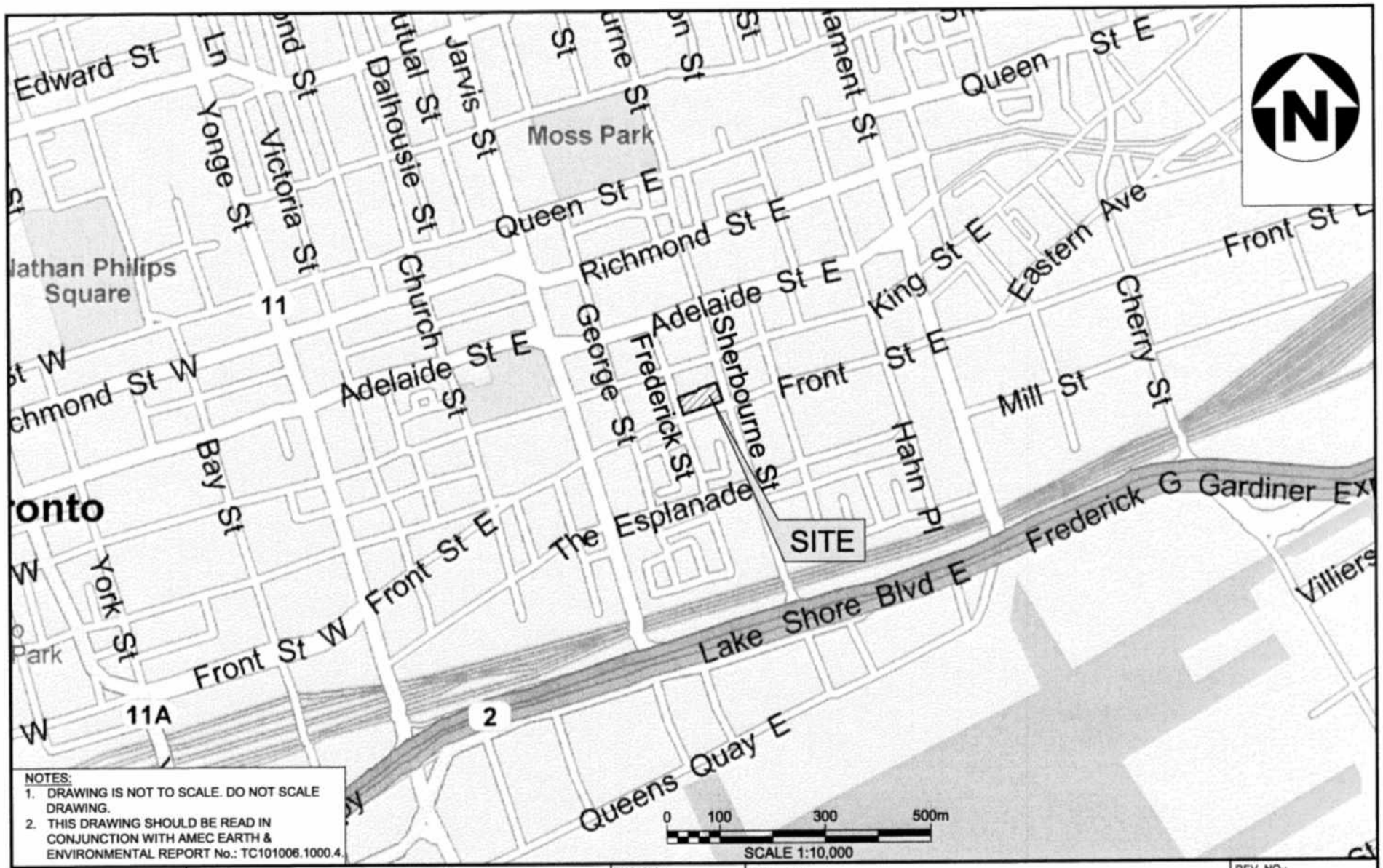
▽ Groundwater depth on completion of drilling on 3/3/2010 at a depth of: 6.1 m. ■ Cave in depth after removal of augers: 7.8 m.

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

Scale: 1 : 53

FIGURES



NOTES:
1. DRAWING IS NOT TO SCALE. DO NOT SCALE DRAWING.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH AMEC EARTH & ENVIRONMENTAL REPORT No.: TC101006.1000.4.

BUILD TORONTO

CLIENT: BUILD TORONTO INC.

DWN BY: ZF
CHK'D BY: AM
SCALE: AS SHOWN

PROJECT: BUILD TORONTO 2010 PRELIMINARY GEOTECHNICAL INVESTIGATION

TITLE: SITE LOCATION MAP 154 FRONT STREET EAST TORONTO, ONTARIO

REV. NO.: A
DATE: APRIL 2010
PROJECT NO: TC101006.1000.4
FIGURE No. 1

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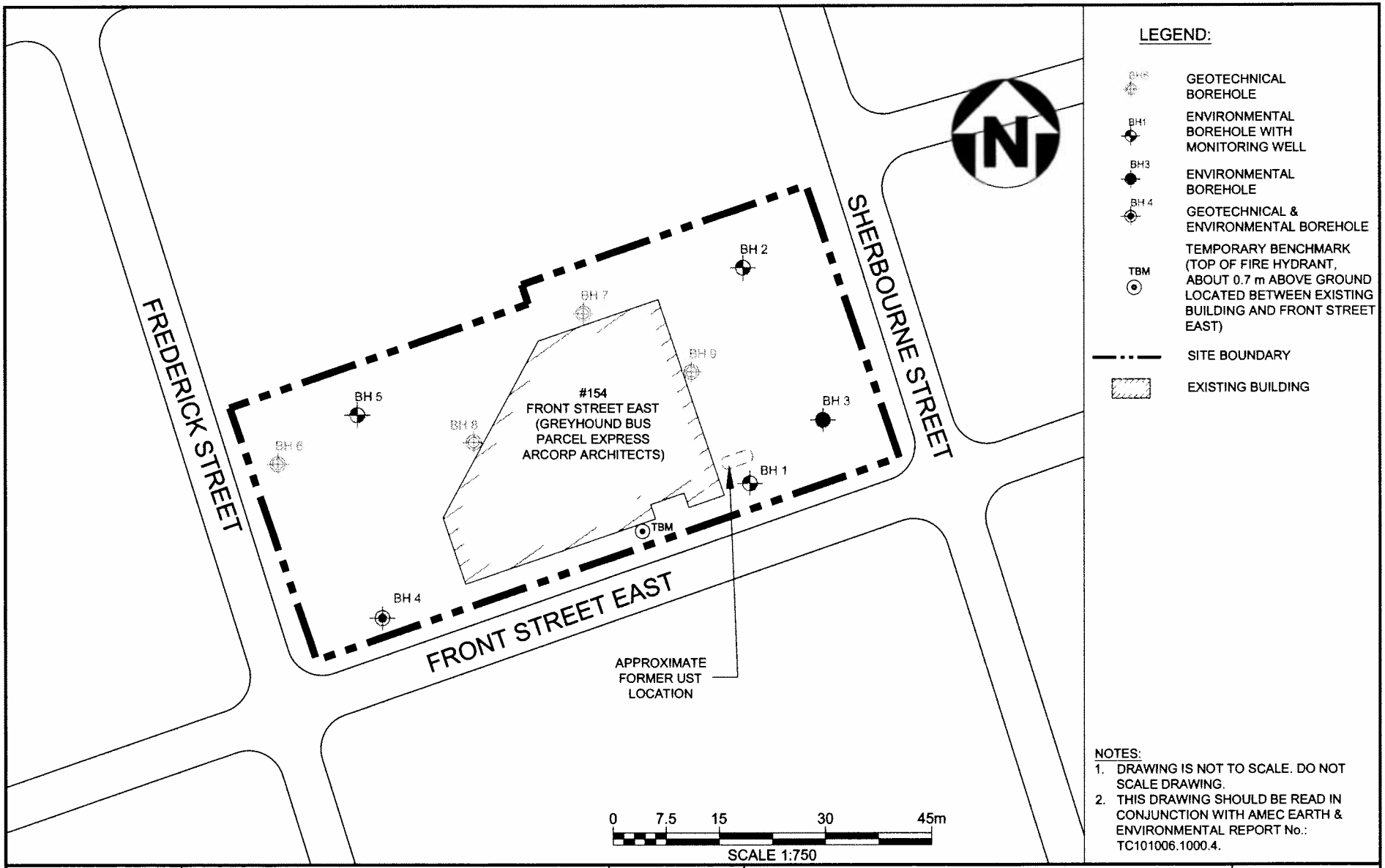
R:\01 - PROJECTS\2010\TC101006 -Build Toronto\1000.5 -154 Front St\Figures\GEO Investigation\TC101006.1000.4-Figure 1.dwg -- Fig 1 - Apr. 01, 2010 11:12am -- zhanna.furman



LEGEND:

- GEOTECHNICAL BOREHOLE
- ENVIRONMENTAL BOREHOLE WITH MONITORING WELL
- ENVIRONMENTAL BOREHOLE
- GEOTECHNICAL & ENVIRONMENTAL BOREHOLE
- TEMPORARY BENCHMARK (TOP OF FIRE HYDRANT, ABOUT 0.7 m ABOVE GROUND LOCATED BETWEEN EXISTING BUILDING AND FRONT STREET EAST)
- SITE BOUNDARY
- EXISTING BUILDING

NOTES:
1. DRAWING IS NOT TO SCALE. DO NOT SCALE DRAWING.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH AMEC EARTH & ENVIRONMENTAL REPORT No.: TC101006.1000.4.

BUILD TORONTO

CLIENT: BUILD TORONTO INC.

DWN BY: ZF
CHK'D BY: AM
SCALE: AS SHOWN

PROJECT: BUILD TORONTO 2010 PRELIMINARY GEOTECHNICAL INVESTIGATION

TITLE: BOREHOLE AND MONITORING WELL LOCATION PLAN 154 FRONT STREET EAST, TORONTO, ON

REV. NO.: A
DATE: APRIL 2010
PROJECT NO: TC101006.1000.4
FIGURE No. 2

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R:\01 – PROJECTS\2010\TC101006 –Build Toronto\1000.5 –154 Front St\Figures\GEO Investigation\TC101006.1000.4–Site Plan–Figure 2.dwg – Fig 3 – Apr. 05, 2010 9:16am – zhanna.furman

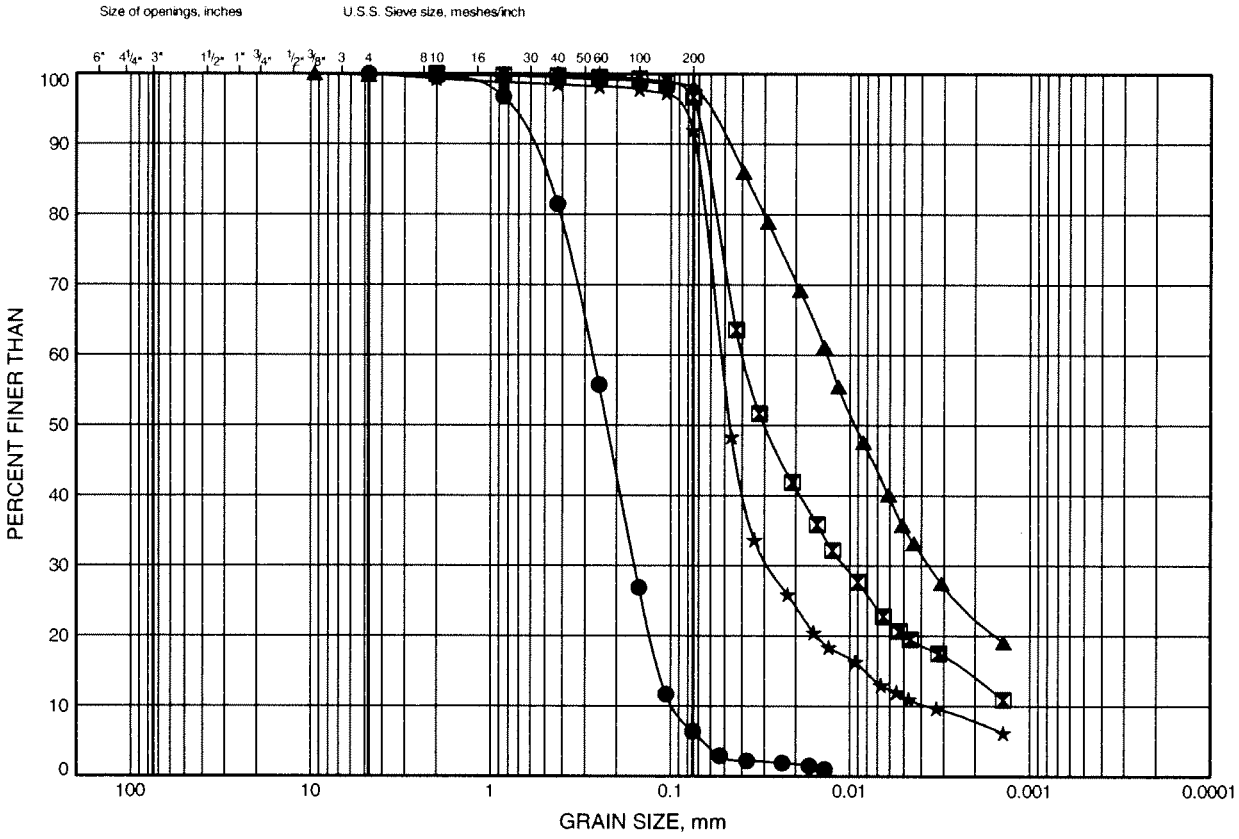
APPENDIX A

LABORATORY TEST RESULTS

Proposed Redevelopment

GRAIN SIZE DISTRIBUTION
SAND / SILT / CLAYEY SILT

FIGURE No. A 1



COBBLE SIZE	COARSE	FINE	COARSE	MEDIUM	FINE	SILT and CLAY
	GRAVEL		SAND			FINE GRAINED

SYMBOL	BOREHOLE	SAMPLE	DEPTH (m)	ELEVATION (m)
●	BH 1		2.29	96.80
⊠	BH 4		1.52	97.69
▲	BH 6		2.29	97.20
★	BH 8		0.76	98.33

Date April 2010

Project TC101006.1000.4

Prep'd .....

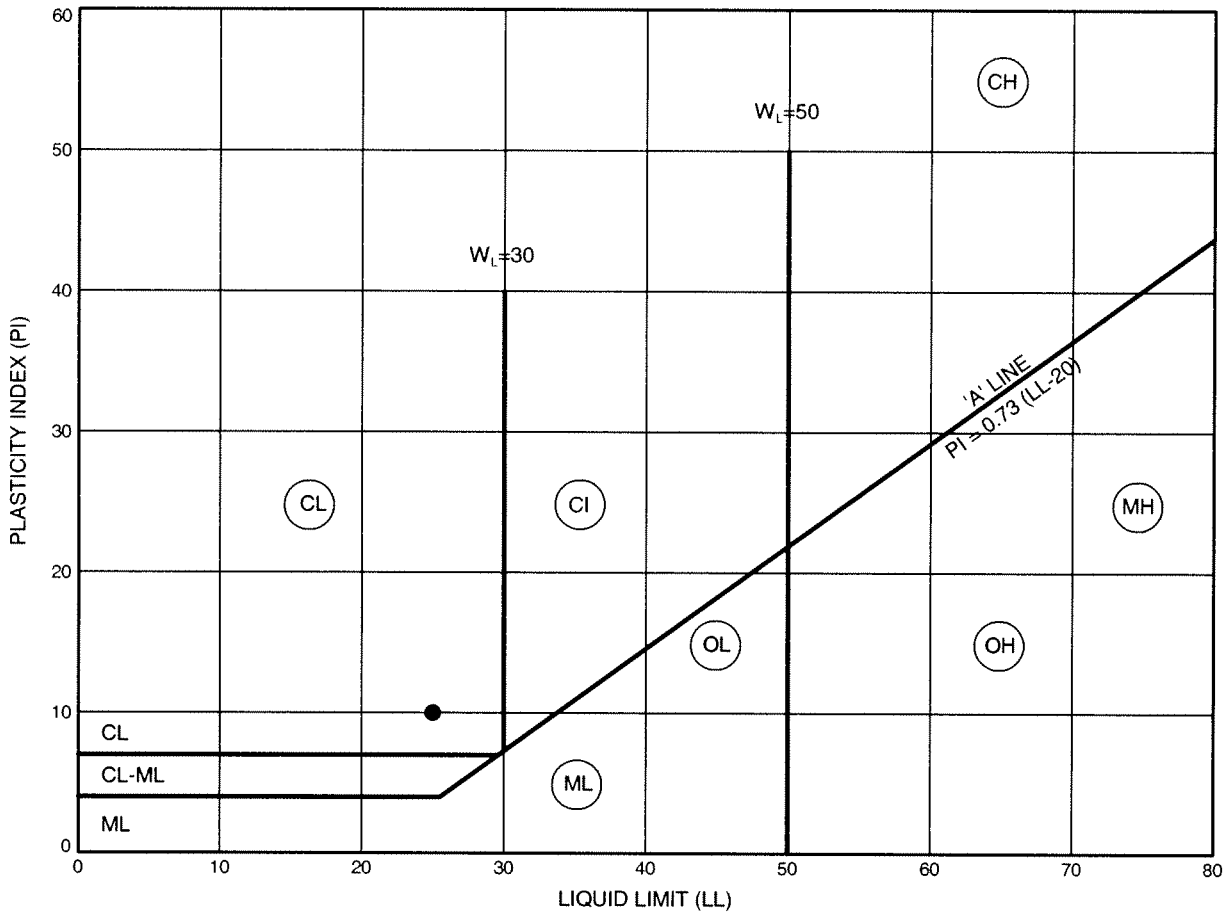
Chkd. .....

AMEC GRADATION CURVE TC101006.1000.4 FRONT STREET.GPJ AMEC SCARBOROUGH LOG 2009.GDT 05/04/10

Proposed Redevelopment

ATTERBERG LIMITS TEST RESULTS
CLAYEY SILT

FIGURE No. A 2



SYMBOL	BOREHOLE	SAMPLE	DEPTH (m)	ELEVATION (m)	LL	PL	PI
●	BH 6		2.29	97.20	25	15	10

Date March 2010

Project TC101006.1000.4

Prep'd SB

Chkd. SC

AMEC ATTERBERG LIMITS TC101006.1000.4 FRONT STREET.GPJ AMEC SCARBOROUGH LOG 2009.GDT 31/03/10

APPENDIX B

CERTIFICATE OF ANALYSES

Client:	AMEC Earth & Environmental, a division of AMEC Americas Limited 104 Crockford Boulevard Scarborough, Ontario M1R 3C3	Report Date: Received Date: Page:	March 31, 2010 March 12, 2010 1 of 2
Project Name:	Build Toronto (154 Front Street)	Sample Type:	Soil
Project Number:	TC101006.1000.4	Lab Ref.:	FN10-391/Rev01
Contact:	Mohammad Mollah		Final

CERTIFICATE OF ANALYSIS

Corrosivity Package

Lab Number **Sample ID** **Date Collected**			**10-02955** **BH1 SS1** **0'-0"-2'0"** **26-Feb-10**	**10-02956** **BH5 SS2** **2'-6"-4'-6"** **01-Mar-10**	**10-02956** **BH5 SS2** **2'-6"-4'-6"** **01-Mar-10**	**10-02957** **BH9 SS3** **5'-7'** **26-Feb-10**	**10-02957** **BH9 SS3** **5'-7'** **26-Feb-10**
Parameters	**Unit**	**MDL**			**(Replicate)**		**(Replicate)**
Chloride	(µg/g)	1	170	252	252	368	NR
pH	-	-	8.1	8.2	NR	8.2	8.2
Resistivity	(ohmscm)	-	2220	1720	NR	1200	NR
Sulphate	(µg/g)	1	76	29	29	29	NR
Sulphide	-	-	Not detected	Trace	NR	Not detected	NR

			Lab Blank	**Q. C. Standard Actual (mg/L)**	**Q. C. Standard Expected (mg/L)**	**Matrix Spike Recovery (%)**	**Date of Analysis**
Parameters	**Unit**	**MDL**					
Chloride	(µg/g)	1	<1	4.1	4.2	93	17-Mar-10
pH	-	-	6.4	6.0	6.0	-	17-Mar-10
Resistivity	(ohmscm)	-	-	-	-	-	17-Mar-10
Sulphate	(µg/g)	1	<1	23.2	24.0	91	17-Mar-10
Sulphide	-	-	-	-	-	-	17-Mar-10

			Method References
Parameters	**Unit**	**MDL**	
Chloride	(µg/g)	1	MOE 3013, APHA 4110 C
pH	-	-	MOE 9045
Resistivity	(ohmscm)	-	MOE 3137
Sulphate	(µg/g)	1	MOE 3013, APHA 4110 C
Sulphide	-	-	-

Suman Punani, C. Chem.
Laboratory Manager

Cynthia Ridge, C. Chem
Q.A./Q.C. Manager

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
Suman Punani
CHEMIST

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/bpj

Client:	AMEC - Scarborough	Report Date:	March 31, 2010
Lab Ref:	FN10-391/Rev01	Page:	2 of 2

This supersedes report issued on March 18, 2010. Project number changed.

Samples average temperature upon receipt: 14.3 °C

Results relate only to the items tested.

~ GENERAL COMMENTS ~

MDL	Method Detection Limit
ANR	Analysis not required
NA	Analysis not applicable
NP	Not Provided
NR	No Lab Replicate

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APPENDIX C

REPORT LIMITATIONS

REPORT LIMITATIONS

The conclusions and recommendations given in this report are based on information determined at the borehole locations. The information contained herein in no way reflects on the environmental aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Geotechnical Engineer be retained during the construction to confirm that the subsurface conditions across the site do not deviate materially from those encountered in the boreholes.

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. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

The comments made in this report relating to potential construction problems and possible methods of construction are intended only for the guidance of the designer. The number of boreholes 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. No other warranty is expressed or implied.

The benchmark and elevations mentioned in this report were obtained strictly for use by this office in the geotechnical design of the project. They should not be used by any other party for any other purpose.

Unless stated otherwise in the Closure Section of this Report, provided that the report is still reliable, and less than 12 months old, AMEC may issue a third-party reliance letter to parties client identifies in writing, upon payment of the then current fee for such letters. All third parties relying on AMEC's report, by such reliance agree to be bound by our proposal and AMEC's standard reliance letter. AMEC's standard reliance letter indicates that in no event shall AMEC be liable for any damages, howsoever arising, relating to third-party reliance on AMEC's report. No reliance by any party is permitted without such agreement.