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REPORT

Hydrogeological and Geotechnical Desktop Study

*Stormwater Servicing Master Plan for Regional Road Infrastructure,
Region of Peel*

Submitted to:

James Jorgensen, Infrastructure Planning, Partner

GM BluePlan Engineering Limited
Royal Centre
3300 Highway No. 7, Suite 402
Vaughan ON L4K 4M3

Submitted by:

Golder Associates Ltd.

6925 Century Avenue, Suite #100, Mississauga, Ontario, L5N 7K2, Canada

+1 905 567 4444

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder), member of WSP, has been retained by GM BluePlan Engineering Limited (GMBP) to assist in the preparation of a stormwater infrastructure master plan for the Region of Peel's (the Region) regional road stormwater infrastructure project for which, the terms of reference are outlined in the Region's Request of Proposal (RFP) document No. 2019-309P. The general location of the study area is shown in Figure 1.

The purpose of this report is to present the results of the preliminary hydrogeological and geotechnical desktop study. This report was prepared for the exclusive use by the Region and their design team and is intended to be used for planning and preliminary design purposes only. Any use that a 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. The report is based solely on the review of historical and publicly available information and data obtained by Golder as described in this report. Additional site-specific explorations of the subsurface conditions must be carried out prior to any further design activities.

The scope of work for this assignment, includes review of available information to summarize the existing subsurface soil and groundwater conditions and identify areas where additional geotechnical and hydrogeological investigation and information is required to support the design. To evaluate the feasibility and any risks, challenges, and constraints for a range of considered solutions for LID and stormwater management options, from hydrogeological and geotechnical perspective and provide high-level comments on various hydrogeological and geotechnical aspects of the considered solutions ranging from geohazards, need for borrow materials, construction considerations etc.

This report should be read in conjunction with the "Important Information and Limitations of This Report" contained in Appendix A of this report. The reader's attention is specifically drawn to this information, as it is essential for the proper use and interpretation of this report.

2.0 SITE AND PROJECT DESCRIPTIONS

The proposed project is comprised of nine sites spread out at different locations across region of Peel, as shown in Figure 2. The most important criteria used for identifying the most feasible sites for stormwater improvements and Low Impact Development (LID) implementation are:

Infiltration Potential: Infiltration style LIDs are prioritized to assist in water balance and peak flow reduction

Pipe State of Good Repair (SOGR): Locations with pipes requiring replacement or repair under existing conditions have been prioritized

Road Resurfacing Projects: A planned project will provide opportunity to bundle work implement improvements more efficiently

Sustainable Transportation Projects: A planned project will provide opportunity to bundle work implement improvements more efficiently

Roads Capital Projects: A planned project will provide opportunity to bundle work implement improvements more efficiently

Pipe Capacity: Locations with existing capacity concerns are prioritized due to the potential attenuation benefit of LIDs

Existing Quality Treatment: Areas with no existing quality treatment are prioritized due to the potential treatment benefit of LIDs

The proposed project sites are shared between the Region of Peel and its three lower tier municipalities: Town of Caledon, City of Mississauga, and City of Brampton. The Region of Peel owns, maintains, and operates all stormwater infrastructure located within regional road right of way (ROW). It has 26 Regional Roads located across Caledon, Brampton, and Mississauga and this project will focus on the stormwater infrastructure located on these regional roads wherein the Region is responsible for any flows entering the regional stormwater system. Therefore, it is critical to understand the origin of the flows entering the regional system - from the regional road system or from local municipality connections - to develop an effective stormwater management strategy. With increasing frequency and intensity of storms due to climate change, proper stormwater management strategies are becoming ever more vital to ensure the health and safety of residents and the environment.

The Project is a component of the Stormwater Servicing Master Plan, which is aimed to provide a strategy that will drive regional stormwater needs independently of other infrastructure to accommodate the demands of the growing population in the Region. It will recognize all stormwater assets together rather than separately to ensure the development of a holistic strategy. The project focusses on:

- Developing the integrated hydrological and hydraulic model(s) that will help assess capacity and current performance of the systems and support the evaluation of alternative stormwater strategies. The tool will also be able to confirm the effectiveness of the proposed servicing strategies.
- Develop a comprehensive list of stormwater servicing strategies that will ensure the protection of the environment and residents.
- Establish a risk-based framework for levels of service as it relates to stormwater infrastructure in a manner that will make the Region compliant with Ontario's new AM regulation (O. Reg. 588/17).
- Establishing the impact of the strategies on achieving the stormwater level of service goals and their impact on the lifecycle funding needs of the stormwater infrastructure system.
- Evaluating each strategy to understand its relative impact to the stormwater level of service goals.
- Developing an optimal implementation plan that best achieves the stormwater goals/objectives and,
- Preparing a Municipal Class EA Report that satisfies the requirements for all Schedule A/A+/B projects that are in the implementation plan (including Phase 1 {Problem / Opportunity} and Phase 2.

3.0 AVAILABLE INFORMATION

This preliminary hydrogeological and geotechnical desktop study is based on available subsurface information obtained from the existing reports available from Region of Peel, Golder, Ministry of Transportation, Ontario (MTO) Pavement and Foundations Sections, Geocres database, Ministry of Environment Water Well Records, and the database of the Ontario Ministry of Northern Development and Mines (OMNDM) within the vicinity of the Project area. The results of the available information and previous investigations are provided in the references

below and shown on Figures 3 to 7. The relevant historical Record of Borehole sheets from the previous investigations are provided in Appendix B of this report.

- Golder Associates Ltd., Draft Geotechnical Data Report, Front Street Station Wastewater Diversion, dated June 14, 2019, Region of Peel Project – 17-2415S, Lakeshore Road West, Mississauga, Ontario.
- WSP, Desktop Geotechnical Study, Front Street Station Wastewater Diversion Class Environmental Assessment, dated May 9, 2017
- Initial Hydrogeological Study and Plan and Profile of the Proposed Sewer – East to West Wastewater Diversion Class EA, City of Mississauga, Regional Municipality of Peel; GM Blue Plan, October 2016.
- Geotechnical Desktop Study Report – East to West Wastewater Diversion Region of Peel, Mississauga, Ontario; Golder Associates Ltd., June 2016.
- Quaternary Geology of Brampton Area, Ontario Geological Survey Report 257, 2005.
- Geotechnical Data Report (GDR), Detail and Contract Administration for the West Trunk Sewer – Region of Peel, Ontario; Golder Associates Ltd., July 2012.
- Geotechnical Design Memoranda – Zone 5 Sub-Transmission Main, City of Brampton, Regional Municipality of Peel, Project 14-1256, Golder Associates Ltd., September 2016.
- Prediction of Boulder Obstructions – Tunnels and Metropolises, Proceedings of World Tunnel Congress 1998, Sao Paulo, Brazil, A. Negro and A. Ferreira, editors, Balkema, Rotterdam, pp. 817-822.
- Preliminary Geotechnical Investigation and Design Report – Creditview Road Underpass, Highway 401 Improvements from East of the Credit River to Trafalgar Road – Regional Municipalities of Peel and Halton; Golder Associates Ltd., October 2012.
- Report on Geotechnical Investigation – East Brampton Watermains, Region of Peel, Ontario; SPL Consultants Limited, January 2015.
- Foundation Investigation Report – Derry Road Underpass, MTO GEOCRETS 30M12-193, W.P. No. 103- 69-15; Ministry of Transportation Ontario, December 1985.
- SPL Consultants Limited, Geotechnical Investigation Report, Watermain Replacement on Ibar Way, Queen Street West and Bexhill Road, Region of Peel Project 11-1345, Dated June 22, 2011
- Credit Valley Conservation, Appendix F, Hydrogeology Final Report, Lake Ontario Integrated Shoreline Strategy Background Review and Data Gap Analysis. dated September 12, 2011
- Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release-Data 228.
- Database of the Ontario Ministry of Northern Development and Mines (OMNDM)
- Oak Ridge Moraine Groundwater Program database (YPDT – CAMC database)

In reviewing the available historical data, Golder has relied in good faith on information obtained by others as referenced above. We assume the information is factual and accurate and accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretations, or fraudulent acts of others.

4.0 SITE GEOLOGY AND SUBSURFACE CONDITIONS

4.1 Regional Geology

The proposed project area and associated sites are located within the Peel Plain and South Slope physiographic regions as delineated in The Physiography of Southern Ontario¹ and shown on Figure 3. The surficial geology maps shown in Figure 4 illustrates that the study area is dominated by Glaciolacustrine-derived silty to clayey till. The Northeast side of the project area is composed of flow till, rainout deposits and silt and clay interbedded with modern and older alluvial till deposits. The Southern part of the study area consists of coarse - textured glaciolacustrine deposits (Deltaic deposits, Littoral-foreshore deposits, and Foreshore-basinal deposits).

The general topography of the Peel Plain is characterized by level to gently rolling terrain, sloping gradually southward toward Lake Ontario. The Plain is made up of deep deposits of dense, limestone and shale imbued till, often covered by a shallow layer of clay sediment. Many of the rivers and streams have cut deep valleys across this well-drained plain. This area has been subjected to extensive glaciations during the last 200,000 years. At least four periods of glaciations are known to have occurred within this period which were interrupted by warmer climate interglacial periods. The last glacier (Wisconsin Glacier) withdrew from the area approximately 8,000 years to 10,000 years ago.

A surficial till sheet, which is mapped as the Halton Till, is present throughout much of the Peel Plain and generally follows the surface topography. The Halton till typically consists of cohesive clayey silt to silty clay, with occasional non-cohesive sand to silt zones. Shallow, localized deposits of sand and silt and/or clay can overlie this uppermost till sheet, and these represent relatively recent deposits, formed in small glacial melt water ponds scattered throughout the Peel Plain and concentrated near river valleys. The recent sand, silt, and clay and uppermost till deposits in this area overlie and are interbedded with stratified deposits of sand, silt, and clay.

Sloping southward from the heights of the Oak Ridges Moraine into the Lake Ontario basin is a broad relatively featureless till plain, named the South Slope. The South Slope region is comprised of calcareous clay till with lacustrine clay and silt reworked by glaciers, with numerous scattered drumlins and deep valley cuts caused by flowing streams towards Lake Ontario.

The overburden in this area is underlain by shale bedrock of Georgian Bay and Queenston formations, which are known to have strong to very strong interlayers of limestone/siltstone/dolostone. The oldest unit is the Georgian Bay Formation which is characterized by blue-grey shale interbedded with strong to very strong interbeds. Upward and northward interbeds of pale grey to cream, fossiliferous limestone and dolostone become more predominant.

¹ Chapman, L. J. and Putnam, D. F., 1984. The Physiography of Southern Ontario; Ontario Geological Society, Special Volume 2, Third Edition. Accompanied by Map p. 2715, Scale 1:600,000.

The Queenston Formation consists of brownish red to maroon, slightly calcareous to non-calcareous, sparsely fossiliferous, and locally gypsiferous shale interbedded with grey-green shale, bioclastic limestone and calcareous siltstone.² Figure 5 shows the bedrock formations along the proposed project area.

Several rivers and creeks have cut deep valleys into the Peel Plain and South Slope physiographic regions. The Credit River crosses the western portion of the site between Mavis Road and Second Line. The Credit River incised channel dissects the Halton Till and assorted terrace sediments. The Credit River follows a bedrock valley that has mapped in this area with an estimated maximum depth of 60 m. The valley system is incised into the underlying shale bedrock and is partially infilled with modern alluvium soils. The alluvium deposit comprised of gravels, sands, and silts. The Fletcher Creek waterway which lies to the east of the Credit River waterway crosses Derry Road between McLaughlin Road and Martz Drive. The overburden beneath the watershed is comprised of a complex series of interbedded silty to clayey tills to clayey glaciolacustrine sediment layers.

4.2 Regional Hydrogeology

Regionally precipitation contributes to recharge of the overburden and bedrock aquifer systems although, the low permeability of the soils limit infiltration rates. The area is drained by streams such as the Credit River and Etobicoke Creek flowing into Lake Ontario. The portion of Credit River flowing within this stretch has a relative low gradient and broad valley. Bedrock outcrops that are typical along other stretches of the Credit River are absent along this section because of the presence of an underlying bedrock valley. Regional groundwater flow direction is primarily from headwater areas north of Brampton toward Lake Ontario with more variable flow directions occurring within the shallow overburden where local groundwater flow directions may be influenced by small watercourses and anthropogenic features.

The groundwater regime for the study area is controlled by the geological framework. Groundwater typically follows the general path of the topography and surface water courses with flow towards low lying and major surface water features. Recharge to the groundwater system is controlled by a combination of permeability, topography, and ground coverage. Hummocky terrain that has a higher permeability offers excellent recharge potential, while areas that are relatively flat and covered in fine textured till reduce this potential. Recharge across the region is concentrated to the north along the Oak Ridges Moraine and a few small areas scattered across the area watersheds. According to the TRCA, average recharge in the Etobicoke Creek watershed is estimated to be approximately 103 mm/year (Toronto Region Conservation, 2010). Discharge of groundwater generally occurs along streams, rivers, lakes, and springs, where the water table intersects the ground surface. This discharge can be variable and is subject to the quantity of water being recharged up gradient. The major sources of discharge on a regional scale are rivers and creeks, and Lake Ontario. The presence of the Halton Till at surface is important since it acts as an aquitard that reduces infiltration of precipitation and surface runoff into the groundwater system. Although the till unit is considered to have low permeability, there are reports of isolated pockets of sand and gravel within the Halton formation that could provide relatively significant yields of groundwater. Additionally, faulting in clay till is possible which can further improve the hydraulic conductivity. These isolated groundwater conditions could occur randomly across the study area. Additionally, the glaciolacustrine deposits that make up the Peel Plain sediments are also of low permeability and further act to reduce infiltration. Modern alluvium deposits have been described as undifferentiated gravels, sands, silts, and muck.³ Flowing conditions in the sand and gravel deposits found adjacent to the Credit River were encountered. Generally, the shale bedrock is

² Thurston, P.C. 1991. Geology of Ontario; Ministry of Northern Development and Mines, Ontario Geological Survey.

³ Karrow, P.F. 2005. Quaternary of the Brampton area; Ontario Geological Survey, Report 257, 59p.

considered to have a relatively low hydraulic conductivity with values in the range of 10^{-5} to 10^{-8} m/s. The hydraulic conductivity is expected to be controlled by secondary porosity features, such as fractures, jointing, or bedding planes. In some areas, the weathered zone in the shale bedrock can also act as a significant source of water. Due to the nature of the fractures, the hydraulic conductivity in the weathered zone can approach 10^{-4} m/s.⁴ A review of regional hydrogeological assessments was undertaken with a particular interest in isolating hydraulic conductivity values for the hydro stratigraphic units of interest, particularly the Halton Till, Peel Plain, Alluvial Deposits, Queenston Shale, and Georgian Bay Shale. A summary of the search results is available in Table 1: Summary of Geological Unit Hydraulic Conductivity Measurements⁵. The borehole location information in the proposed study area along with the location of the water well information is shown on Figure 6. The infiltration ratings in the project area have been shown in Figure 7.

Table 1: Summary of Geological Unit Hydraulic Conductivity Measurements

Location	Author	Unit	K - Hydraulic Conductivity (m/sec)	
Various	Gartner Lee Ltd (1978)	Halton Till	1×10^{-9}	
Various	Gartner Lee Ltd (1978)	Queenston Shale	8.10×10^{-7}	
Various	Gartner Lee Ltd (1978)	Lacustrine Clay Silt (Peel Plain)	1×10^{-8}	
Georgetown	Gartner Lee Ltd (1978)	Queenston Shale	1×10^{-6}	
Burlington	Gartner Lee Ltd (1978)	Shale	1×10^{-8}	1×10^{-6}
Oakville (East)	MOE (1979)	Peel Plain	5×10^{-6}	4×10^{-5}
Oakville (East)	MOE (1979)	Queenston Shale	3.2×10^{-5}	2.3×10^{-6}
Oakville (East)	MOE (1979)	Georgian Bay Shale	5.1×10^{-6}	
Milton	International Water Consultants (1977)	Upper Sand and Gravel	2.83×10^{-3}	
Mississauga	Conestoga Rovers and Associates (2013)	Shale	2.4×10^{-5}	

4.3 Anticipated Soil, Bedrock, Groundwater, and Infiltration Conditions – Site Specific

There are nine different sites that have been identified for LID and stormwater management options, from the hydrogeological and geotechnical perspective. The site-specific subsurface investigation requirements as needed to confirm the feasibility of a particular strategy is discussed for each of these sites. The term “bedrock” or “rock” in the following section refers to the in-situ shale bedrock forming a continuous part of the Earth’s crust along the proposed project area. The term “soil” or “overburden” refers to the portion of the earth’s crust that is fragmentary, or such that some individual particles of a dried sample may be readily separated by agitation in water.

⁴ Lee, P. K., & ESG International. (2002). *Shale Resources Review Final Report Technical Report Appendix*. City of Brampton.

⁵ Holysh, S. (1995). *Halton Aquifer Management Report: Phase 1 - Background Hydrogeology*.

4.3.1 Erin Mills North of Mississauga Road

4.3.1.1 Overburden

The subsurface conditions in the proposed area consist of a layer of fill or clayey silt containing organics underlain by a clayey silt deposit, underlain by till deposit comprised of a clayey silt to clayey silt with sand. Existing subsurface information have been obtained from Boreholes BH-01, BH-02, BH-03, BH-04, BH-04A, BH-04B, BH-05, BH-06, BH-07, BH-08, BH-9, BH-10, and BH-11 which were advanced as a part of West Trunk Sewer project in previous investigations by Golder in 2012. The borehole logs are attached in Appendix B. Cohesionless till deposits consisting of silty sand to silty sand and gravel were also encountered in Boreholes BH-02, BH-03, and BH-04A within or underlying the cohesive till deposit. The till deposits encountered in all four boreholes are underlain by shale bedrock of the Georgian Bay Formation. Photographs of the bedrock core samples are shown on Appendix C.

Fill materials comprised of clayey silt to silty clay and/or clayey silt/silty clay with sand and/or sand and gravel to silty sand were encountered at the ground surface or immediately below the topsoil or asphalt layer. An approximately 1.4 m thick deposit of possible fill consisting of brown clayey silt, some sand, trace gravel and containing organics was encountered at the ground surface (Elevation 171.0 m) in Borehole BH-01. A near surface deposit of dark brown clayey silt, trace to some sand, trace gravel and containing rootlets and organics was encountered at the ground surface in Boreholes BH-02, BH-03 and BH-04A. The top of this deposit ranges between Elevation 169.5 m and 166.9 m and its thickness varies from about 0.7 m to 0.9 m. A deposit of brown clayey silt, trace gravel, trace sand was encountered underlying the fill material and underlying the clayey silt with organics in Boreholes BH-01 and BH-04A, respectively. The top of the cohesive deposit is at about Elevation 169.6 m and 168.7 m in Boreholes BH-01 and BH-04A, respectively. The water content measured on one sample of this deposit obtained from Borehole BH-01 is about 28 percent. An Atterberg limit test was carried on one sample of this cohesive deposit. The liquid limit is about 31 percent, and the plastic limit is about 17 percent, corresponding to a plasticity index of about 14 percent. The results of the Atterberg limits test are shown on the plasticity chart on Appendix D (Figure C1) and indicate that the cohesive deposit of clayey silt of low plasticity.

A till deposit of brown to grey clayey silt, trace to some sand, trace gravel (containing rootlets and organics between a depth of about 3 m and 3.7 m as well as between a depth of about 4.6 m and 5.2 m in Borehole BH-04A) to grey clayey silt with sand, trace to some gravel and generally containing shale and limestone fragments were encountered in all boreholes. The top of the cohesive till deposit ranges between about Elevation 168.0 m to 166.1 m and the thickness of the overall deposit ranges from 3.9 m to 6.7 m. The water contents measured on samples of this deposit range from about 8 percent to 19 percent. Grain size distributions of four samples from the cohesive till deposit are shown on in Appendix D (Figure C2). Atterberg limits tests were carried out on four specimens of the clayey silt to clayey silt with sand deposit. The liquid limits range from about 19 percent to 32 percent, the plastic limits range from about 11 percent to 17 percent, and the plasticity indices range from about 8 percent to 16 percent. The results of the Atterberg limits tests are shown on the plasticity chart on Appendix D (Figure C3) and indicate that the till deposit is a clayey silt of low plasticity.

A cohesionless till deposit consisting of grey silty sand, trace to some gravel to silty sand and gravel, trace clay and containing shale/limestone fragments was encountered within or underlying the clayey silt with sand till deposit in Boreholes BH-02, BH-03 and BH-04A. The top of this tills deposit ranges from about Elevation 162.8 m to 160.6 m and its thickness ranges from about 1.1 m to 2.2 m. The water contents measured on samples of this deposit range from about 7 percent to 8 percent. A grain size distribution of one sample of the silty sand and gravel till deposit is shown on Appendix D (Figure C4).

4.3.1.2 Bedrock

Shale bedrock was encountered at depths ranging from 7.0 m to 10.9 m below ground surface, corresponding to between Elevation 161.7 m and 158.6 m. The bedrock can be generally described as shale interbedded with thin limestone and siltstone layers from the Queenston Formation underlain by shale interbedded with thin limestone layers from the Georgian Bay Formation. However, at the Highway 401 crossing, the Georgian Bay Formation lies directly below the overburden with the obvert approximately 20.6 m to 20.8 m below the Highway 401 grade or about 11.5 m below the bedrock surface (about Elevation 148.3 m). The uniaxial compressive strength (UCS) of the shale ranges from about 13 MPa to 36 MPa with an average of about 28 MPa. One UCS test was conducted for each of the fossiliferous limestone and siltstone layers and yielded a result of 93 MPa and 95 MPa respectively. The UCS test results classify the shale bedrock as weak to medium strong (R2/R3 grade) and the limestone and siltstone layers as strong (R4 grade) according to the rock strength classification in Table 3.5 of Canadian Foundation Engineering Manual (CFEM (2006)).

In general, the shale is thinly laminated, but occasionally thinly to thickly bedded horizons exist. There are numerous limestone and fossiliferous limestone beds throughout the rock mass ranging in thickness from 20 mm to 500 mm. The rock mass also contains zones of shale where thin (less than 20 mm) limestone lenses are dispersed throughout the core. Most of the logged discontinuities are beddings or contacts between shale and limestone interbeds while some discontinuities were logged as joints. Most of the identified bedding and contact surfaces are clean while some have stained surfaces and show no signs of alteration and further 3.3 % have only slightly altered walls. About 20 % of the logged bedding discontinuities have an infilling greater than 1 mm in thickness and composed mainly of clay or broken rock, and some are coated with gypsum.

4.3.1.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from 0 to 10 m depth and most of the nearest MECP WWR indicating bedrock depths of less than 5 m. The West Trunk Sewer investigations (Golder 2012) indicated that the depth to bedrock along the site was around 5 m or less with limited areas of deeper bedrock of depths over 10 m. The bedrock formations consist of Queenston and Georgian Bay shales. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping indicates that the water table in the central part of the site, from around the Mississauga Road/Turner Valley Road intersection to the Millcreek Drive intersection, occurs at a depth of 1 m or less. This shallow water table area may restrict infiltration capacity. At the northern and southern ends of the site, around the Argentia Road and Battleford Road intersections, respectively, the water table depth is mapped as greater than 5 m depth. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of clayey silt and clayey silt tills. Regional mapping (ORMGP 2018) indicates that there are limited deposits of fine-grained glaciolacustrine soils near the Mississauga Road and Turner Valley Road intersection and alluvial deposits cross the site along the historical Mullet Creek alignment (north of the current constructed drain along the railway) and along Millcreek Drive. Areas near the Millcreek Drive and Battleford Road intersections are mapped as Paleozoic bedrock

indicating shallow overburden. With the potential exception of the alluvial deposits, these surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones or in a significant groundwater recharge area. The central part of the site from around the Mississauga Road/Turner Valley Road intersection to near the Millcreek Drive intersection is designated as a Highly Vulnerable Aquifer area. A portion of the site just north of the Battleford Road intersection is also designated a Highly Vulnerable Aquifer. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

4.3.2 Derry Road near McLaughlin

4.3.2.1 Overburden

The subsurface conditions in the proposed area are obtained from the GDR of previous Golder investigation in 2020 (East to West Diversion Sanitary Trunk Sewer project). The borehole logs are attached in Appendix B. Boreholes S1-15, S2-14, S2-15, S1-16A, S1-16, S3-15, S1-17, S1-18, S2-17, and S1-19 were advanced on the travelled portion of Derry Road and municipal streets and encountered an approximately 150 mm to 280 mm thick layer of asphalt at ground surface. A 1.2 m to 7.0 m thick layer of non cohesive fill comprised of silty sand to gravelly sand to sand and gravel and cohesive fill comprised of silty clay was encountered below the asphalt between Elevations 200.1 m and 193.3 m in all boreholes. The fill layer occasionally contains trace organics, wood pieces and rootlets. The water content measured on samples of the non-cohesive fill ranges from 2% to 16%. The water content measured on samples of the cohesive fill ranges from 6% to 21%.

Atterberg limits testing was carried out on two samples of the cohesive fill and measured liquid limits of 26 and 34, plastic limits of 16 and 17 and plasticity indices of 10 and 17. The Atterberg limits testing results are shown on the plasticity chart in Appendix D (Figure C-1) and, considering accompanying grain size distribution testing, indicate that the samples tested are classified as clayey gravel of low plasticity to silty clay of intermediate plasticity. The results of grain size distribution tests completed on four samples of the various fill layers are shown in Appendix D (Figure C-2).

A 2.1 m and 3.1 m thick layer of silt was encountered below the fill layer in borehole S1-19 at Elevation 192.1 m and interlayered within the underlying till deposit in Borehole S2-14 at Elevation 191.7 m, respectively. A 0.6 m thick layer of clayey organic silt was encountered below the fill in borehole S1-15 at Elevation 191.6 m. The water content measured on samples of the silt layer/interlayer ranges from 11% to 21%. The water content measured on a sample of the clayey organic silt in borehole S1-15 is about 27%. The organic content of a sample of the silty clay layer is about 7%. An Atterberg limits test carried out on a sample of silt indicates that the sample tested is non-plastic. The results of two grain size distribution tests completed on samples of the silt are shown in Appendix D (Figure C-3).

A 3.2 m to 15.5 m thick interlayered deposit of till comprised of silty clay-clayey silt to clayey sand to silty clay to silt and sand to silty sand was encountered in Boreholes S3-14, S1-15, S2-14, S2-15, S1-16, S1-16A, S3-15, S1-17, and S1-18, below the fill layers and in borehole S1-19 below the silt deposit between Elevations 198.4 m and 189.9 m. Shale fragments were observed in the split-spoon samples of the till deposit in boreholes S2-14, S2-15, S1-16, S3-15, S1-17, and S1-18 between Elevations 192.3 m and 182.3 m. The water content measured

on samples of the interlayered till deposit ranges from 6% to 14%. Atterberg limits testing was carried out on eleven samples of the cohesive till deposit, and measured liquid limits ranging from 18 to 28, plastic limits ranging from 12 to 18 and plasticity indices ranging from 6 to 12. The Atterberg limits testing results are shown on the plasticity chart in Appendix D (Figure C-4) and indicate, together with grain size distribution tests, the materials tested are classified as silty clay-clayey silt, silty clay, and clayey sand of low plasticity. Atterberg limits testing was carried out on a sample of the silty sand till and indicate the material tested is non-plastic. The results of grain size distribution testing completed on 15 samples of the till deposit are shown in Appendix D (Figure C-5).

An approximately 3.9 m and 2.7 m thick layer of soil and rock mixture was encountered below the till in Boreholes S1-15 and S1-19 at Elevations 185.3 m and 186.7 m respectively. The soil component (86% to 92%) of this deposit consists of gravelly sandy silty clay. The rock component is inferred to be highly to moderately weathered shale and accounts for approximately 8% to 14% of the layer.

4.3.2.2 *Bedrock*

Bedrock was encountered in all boreholes between Elevations 192.1 m and 178.5 m except in borehole S1-16A which was terminated in overburden at Elevation 186.4 m.

Based on a review of the bedrock core samples, the bedrock generally consists of shale with interlayers of limestone or siltstone of the Georgian Bay Formation which is overlain by a 0.4 m to 12.9 m thick zone of shale of the Queenston Formation in boreholes S2-14, S2-15, S1-16, S3-15, S4-09, S1-17, S1-18, S4-08, S2-17, S4-07 and S1-19; in boreholes S3-15, S4-09, S4-08 and S4-07 the shale consists only of the Queenston Formation. The shale bedrock is generally described as moderately weathered to fresh (W3 to W1), laminated to thickly bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong (R2 to R3) shale with medium strong to extremely strong (R3 to R6) limestone/siltstone layers. The limestone/siltstone lenses in the Queenston and Georgian Bay Formations are dispersed throughout the core, where encountered, and are generally less than 20 cm, with one layer about 1.0 m thick in borehole S3-15. A zone with an increased degree of weathering and/or fracturing was generally encountered at the top of the boreholes, ranging in thickness from 0.5 m to 5 m (measured from top of core). This zone exhibits shale that is highly to moderately weathered (W4 to W3), of weak to medium strong strength (R2 to R3), interbedded with medium strong to extremely strong (R3 to R6) siltstone/limestone layers. The TCR and SCR of samples recovered within the highly to moderately weathered bedrock is between 79% and 100% and between 0% and 100%, respectively. The RQD within the highly to moderately weathered ranges from 25% to 87%, indicative of a rock mass of poor to good quality. Core samples of the shale encountered below the zone of higher degree of weathering and/or fracturing is generally slightly weathered to fresh (W2 to W1), and weak to medium strong strength (R2 to R3), interbedded with medium strong to extremely strong (R3 to R6) siltstone/limestone layers. The TCR and SCR of samples recovered are between 65% and 100% and between 0% and 100%, respectively. The RQD within this underlying zone of more competent rock ranges from 62% to 100%, indicative of a rock mass of fair to excellent quality. Most of the logged discontinuities are bedding within the shale bedrock or contacts between shale and limestone interbeds, while some discontinuities were logged as joints.

In general, the identified discontinuities surfaces are planar, undulating, curved, irregular or stepped with smooth to rough roughness. The surfaces of the identified discontinuities generally range from clean to completely coated (< 1 mm) with clay. Where the bedding planes have an infilling greater than 1 mm, the infill material is generally identified as clay. Ten (10) Unconfined Compression (UC) tests were carried out on samples of the bedrock recovered from boreholes and measured uniaxial compressive strengths of 15.9 MPa to 86.6 MPa. The water content measured on a sample of the shale is about 4%. Atterberg limits testing was carried out on a sample of

the shale and measured a liquid limit of 18, plastic limit of 16, corresponding to a plasticity index of 2. The Atterberg limits testing results are shown on the plasticity chart on in Appendix D (Figure C-6).

4.3.2.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from over 30 m depth near McLaughlin Road to less than 15 m at Fletcher's Creek. The East to West Sewer investigations (Golder 2020) indicated that the depth to bedrock along the site was around 10 m to 15 m. The bedrock formations consist of Queenston and Georgian Bay shales. The bedrock below this site is likely too deep to significantly influence shallow infiltration features.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at depths of around 6 to 8 m. Within the Fletcher Creek valley, at the eastern end of the site, the water table may occur as shallow as 2 m depth. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silt and silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that there are limited deposits of fine-grained glaciolacustrine soils in the area just west of McLaughlin Road and alluvial deposits at the far eastern and western limits of the site along the Fletcher Creek valley and a smaller watercourse west of McLaughlin Road. With the potential exception of the alluvial deposits, these surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones. The alluvial deposits associated with the watercourses located at the eastern and western edges of the site are mapped as significant groundwater recharge areas. The site is designated as a Highly Vulnerable Aquifer area or is immediately adjacent to Highly Vulnerable Aquifer areas. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

4.3.3 Derry Road east of Highway 410

4.3.3.1 Overburden

The subsurface conditions in the proposed area are obtained from the GDR of previous Golder investigation in 2020 (East to West Diversion Sanitary Trunk Sewer project). The borehole logs are attached in Appendix B. Boreholes S3-12, S1-05, S1-06, S3-13, S2-05, S1-08, S2 06, S1-09 and S2-07 were advanced on the travelled portion of Derry Road and municipal streets and encountered an approximately 140 mm to 200 mm thick layer of asphalt at ground surface. Boreholes 410C-1 to 410C-3 and 410C-8 were advanced on the travelled portion of the Derry Road-Highway 410 on/off ramps and encountered an approximately 150 mm and 330 mm thick layer of asphalt. Borehole 410C-5 was advanced on the travelled portion of Highway 410 southbound and encountered a 300 mm thick layer of asphalt.

Approximately 75 mm and 80 mm thick layer of topsoil was encountered in Boreholes 410C-6 and 410C-7, which were advanced at the edge of the shoulders of the Derry Road-Highway 410 on/off ramps. A 0.5 m to 8.3 m thick layer of fill comprised of a 0.1 m to 1.9 m thick upper layer of non cohesive gravelly silty sand to gravelly sand to sand and gravel underlain at most boreholes, or from ground surface, by a 0.4 m to 7.5 m thick layer of cohesive silty clay to gravelly sandy silty clay, was encountered below the asphalt/topsoil between Elevations 194.3 m and 172.8 m in all boreholes. The water content measured on samples of the non cohesive fill ranges from 2% to 17%. The water content measured on samples of the cohesive fill ranges from 3% to 22%. Atterberg limits testing was carried out on a sample of the cohesive fill and measured a liquid limit of 31, a plastic limit of 17, corresponding to a plasticity index of 14. The Atterberg limits testing result is shown on the plasticity chart in Appendix D (Figure A-1) and indicates the material is classified as a silty clay of intermediate plasticity. The result of a grain size distribution test completed on a sample of the cohesive fill is shown in Appendix D (Figure A-2).

A 1.4 m to 3.4 m thick deposit of silty clay, some sand to sandy silty clay was encountered below the fill in boreholes S1 05, S2 06, 410C-1 and 410C 8 at depths ranging from 1.1 m to 4.1 m (Elevations 187.6 m to 173.1 m). Traces of organics and hydrocarbon odour were noted within this deposit in Borehole S1-05 between depths of 3.0 m and 3.7 m. The water content measured on samples of this deposit generally ranges from 8% to 21%. A water content of about 41% was measured on a sample of this deposit from borehole S1 05 within the zone with trace organics. Atterberg limits testing was carried out on four samples of the silty clay deposit and measured liquid limits between 36 and 41, plastic limits between 17 and 22 and plasticity indices between 16 and 19. The Atterberg limits testing results are shown on the plasticity chart in Appendix D (Figure A-3) and indicate the samples tested are classified as silty clay of intermediate plasticity. The results of grain size distribution testing completed on four samples of the silty clay deposit are shown in Appendix D (Figure A-4).

A 1.7 m to 14.3 m thick deposit of till comprised of silty clay clayey silt to silty clay to silty clay and sand to silt and sand to silty sand to clayey sand interlayers was encountered in boreholes S3-12, S2 05, S1-08, S1-09, S2-07, S1 06, S3-13, S1-07, and 410C 2 to 410C-7 below the fill, in boreholes S2-06 and 410C-1 below the silty clay and in borehole 410C-8 below a silty sand deposit between Elevations 187.3 m and 169.2 m. The water content measured on samples of the silty clay clayey silt to silty clay to silty clay and sand till ranges generally from 6% to 20%. The water content measured on samples of the silt and sand to silty sand till ranges generally from 5% to 23%. Atterberg limits testing was carried out on 35 samples from the till deposit. The Atterberg limits testing results are shown on the plasticity chart in Appendix D (Figures A-5 and Figure A-6). and considering the accompanying grain size distribution testing, indicates that the samples tested are classified as silt with slight plasticity to silty clay-clayey silt to silty clay of low plasticity to silty clay of intermediate plasticity. Atterberg limits testing was carried out on a sample of the non cohesive silty sand portion of the till and indicates the sample tested is non plastic. The results of grain size distribution testing completed on 35 samples of the till deposit are shown in Appendix D (Figures A-7 and Figure A-8).

Boreholes 410C-2, 410C-5 and 410C-8 encountered 1.6 m to 2.0 m thick pockets of non-cohesive soils comprised of silt and sand to silty sand to gravelly sand between Elevations 186.2 m and 171.9 m, overlying or underlying the till deposit(s). The water content measured on samples of the silt and sand to silty sand to gravelly sand deposit ranges between 11% and 14%. Atterberg limits testing was carried out on a sample of the silt and sand portion of the deposit and indicated the material is non-plastic. The results of grain size distribution testing completed on two samples of the till deposit are shown in Appendix D (Figure A-9).

Shale fragments were observed in split-spoon samples during drilling in boreholes S1-05, S1 06, S3-13, S1-07, S2-05, S2-06, S1-09, S2-07, 410C 1, 410C 3, 410C-5 to 410C 8 between depths of 2.9 m and 21.3 m (between Elevations 177.1 m and 168.1 m).

4.3.3.2 *Bedrock*

Bedrock was encountered in all boreholes at depths ranging from 4.1 m to 21.3 m below ground surface (between Elevations 177.0 m and 162.1 m). A 0.5 m thick layer of intermixed gravelly clayey sand and highly weathered shale was encountered between the silty clay till and shale bedrock in Borehole S1-08 at Elevation 175.8 m.

The water content measured on nine samples of the shale fragments and clayey sand-highway weathered shale mixture ranges from 5% to 13%. Atterberg limits testing was carried out on a sample of the clayey sand and highly weathered shale mixture from Borehole S1-08 and measured a liquid limit of 28 and a plastic limit of 17, corresponding to a plasticity index of 11. The Atterberg limits testing result is shown on the plasticity chart in Appendix D (Figure A-10) and indicates that the soil portion of the sample tested is classified as silty clay of low plasticity. The result of a grain size distribution testing completed on a sample of the clayey sand and highly weathered shale mixture is shown in Appendix D (Figure A-11). Atterberg limits testing was carried out on two samples of the shale core specimens and measured liquid limits of about 22 and 23, plastic limits of about 15, and plasticity indices of 7 and 8. The Atterberg limits testing results are noted on the applicable drillhole records and are shown on the plasticity chart in Appendix D (Figure A-12).

Based on a review of the bedrock core samples, the bedrock consists of shale of Georgian Bay Formation with limestone or siltstone layers/interbeds, and is generally described as laminated to medium bedded, light grey, grey, dark blueish grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong (R2 to R3) shale with medium strong to extremely strong (R3 to R6) limestone/siltstone interbeds, as presented on the Record of Drillhole sheets. The shale bedrock contains limestone/siltstone lenses dispersed throughout the core which are generally less than 200 mm thick, but with one layer about 540 mm thick) dispersed throughout the core. A zone with a higher degree of weathering and/or fracturing, or lost core, was encountered at the top of the bedrock, ranging in thickness from 0.1 m to 4.6 m (measured from top of core). This zone exhibits shale with limestone/siltstone interbeds that is highly to moderately weathered (W4 to W3).

Below this zone, the shale bedrock is described as slightly weathered to fresh (W2 to W1). The TCR and SCR of samples recovered range between 82% and 100% and between 61% and 100%, respectively. The RQD measured on bedrock core runs that are described as slightly weathered (W2) to fresh (W1) underlying the upper higher weathered zone ranges from 53% to 100%, indicative of a rock mass of fair to excellent quality. The logged discontinuities are bedding planes within the shale bedrock or contacts between shale and siltstone/limestone interbeds. In general, the identified discontinuity surfaces are undulating, planar, curved or irregular in shape, with smooth to rough surface roughness. The surfaces of the identified discontinuities generally range from clean to completely coated (< 1 mm) with clay. Where the bedding planes have an infilling greater than 1 mm, the infill material is generally identified as clay. Seventeen (17) Unconfined Compression (UC) tests were carried out on samples of the bedrock recovered from boreholes and measured uniaxial compressive strengths of 11.0 MPa to 115.6 MPa.

4.3.3.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from over 10 m depth at the west end near Highway 410 to around 2 m near Maxwell Road. The East to West Sewer investigations (Golder 2020) indicated that the depth to bedrock along the site was around 8 m to 10 m. The bedrock formation consists of Georgian Bay shales. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at shallow depths of around 2 m or less. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that the entire length of the site is in an area of glaciolacustrine silty to clayey till. Along the western area of the site, there are nearby areas of glaciolacustrine deposits and alluvial deposits. These surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones or in a significant groundwater recharge area. Most of the site between Highway 410 and Tomken Road is designated as a Highly Vulnerable Aquifer area. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

4.3.4 Derry Road west of Highway 410

4.3.4.1 Overburden

The subsurface conditions in the proposed area are obtained from the GDR of previous Golder investigation in 2020 (East to West Diversion Sanitary Trunk Sewer project). The borehole logs are summarized in Appendix B. Approximately 70 mm to 280 mm of topsoil was encountered at ground surface in Boreholes MH4-1 to MH4-4.

An approximately 150 mm to 200 mm thick layer of asphalt at ground surface was encountered in Boreholes S2-08, S1-10, S2-09, S1-11, S2-10, S1-12, S2-11, S1-13, S2-12, S1-14, S2-13 advanced on the travelled portion of Derry Road and municipal streets. An approximately 0.5 m to 1.3 m thick layer of non cohesive fill comprised of gravelly silty sand, gravelly sand to sand and gravel was encountered below the asphalt in all boreholes advanced on the travelled portion of Derry Road and municipal streets. The top of the non-cohesive fill ranges from about Elevations 203.4 m to 192.5 m. An approximately 0.3 m to 4.3 m thick layer of cohesive silty clay fill was encountered below the topsoil in Boreholes MH4-1 to MH4-4, and below the non cohesive fill in Boreholes S2-09, S1-11, S2-10, S1-12 and S2-12. The top of the cohesive fill ranges from about Elevations 202.2 m to 195.1 m. The water content measured on samples of the non-cohesive fill ranges from about 3% to 8%. The water content measured on samples of the cohesive fill ranges from about 8% to 20%. Borehole S2-11 encountered a 1.9 m

thick layer of silty clay below the sand and gravel fill at about Elevation 202.5 m. The water content measured on samples of the silty clay layer in Borehole S2-11 ranges from 12% to 15%.

A till deposit comprised of interlayered strata ranging in composition from silty clay-clayey silt to silty clay to silty clay and sand to silt and sand to clayey sand to silty sand was encountered in all boreholes. The top of the till deposit ranges from Elevations 202.4 m to 191.6 m and its thickness varies between 11.5 m and 29.7 m.

In borehole MH4-2(PQ), cobbles ranging in size from 80 mm to 110 mm were encountered within the soil cores obtained from till deposit. Cobbles and boulders of varying sizes and at different elevations should be expected. The unit weight of a sample of the silty sand till deposit was measured to be about 21.7 kN/m³.

Atterberg limits testing was carried out on 18 samples of the silty clay-clayey silt and silty clay to silty clay and sand portion of the till deposit and measured liquid limits of ranging from 15 to 32, plastic limits of ranging from 11 to 19, and plasticity indices ranging from 4 to 13. Atterberg limits were also carried out on 12 samples of the silt and sand, clayey sand, and silty sand portion of the till deposit and measured liquid limits ranging from 13 to 21, plastic limits ranging from 11 to 14 and plasticity indices ranging from 2 to 7. The Atterberg limits testing results are shown on the plasticity charts on in Appendix D (Figures B-1 and B-2) and considering corresponding grain size distribution testing, indicate that the samples tested are classified as silty clay-clayey silt to silty clay to silty clay and sand of low to intermediate plasticity and silt and sand to clayey sand to silty sand of slight plasticity, respectively. Atterberg limits testing was carried out on a sample of the silty sand portion of the till deposit and indicates the sample tested is non-plastic. The results of grain size distribution testing completed on 18 samples of the silty clay-clayey silt and silty clay to silty clay and sand portion of the till deposit and 22 samples of the silt and sand, clayey sand, and silty sand portion of the till deposit are shown respectively, in Appendix D (Figures B-3 and B-4). Consolidated isotropic undrained triaxial testing was carried out on till samples collected from Borehole MH4 2(PQ) and the results are shown in Appendix B (Figure B-5).

Boreholes S1-11, S1-12, S2-12, MH4-1, and MH4-2(PQ) encountered a 1.5 m to 3.6 m thick interlayer consisting of sandy silt to silt and sand to sand below the upper till deposit at Elevations 188.7 m to 171.7 m. Borehole S2-10 encountered a 1.7 m thick layer of silt below the lower till at about Elevation 169.4 m. The water content measured on samples of the non-cohesive deposit range from 13% to 19%. Atterberg limits testing was carried out on a sample of the silt layer and measured a liquid limit of 20 and a plastic limit of 16, corresponding to a plasticity index of 4. The Atterberg limits testing result is shown on the plasticity chart in Appendix D (Figure B-6) and indicate that the sample tested is classified as a silt with slight plasticity. The results of grain size distribution testing completed on four samples of the silt to sand deposit are shown on in Appendix D (Figure B-7).

A 2.9 m to 7.7 m thick lower till deposit comprised of silty clay to clayey sand to silt and sand to silty sand was encountered below the silt to silty sand to sand deposit interlayer in boreholes S1-11, S1-12, S2-12, MH4-1 and MH4-2(PQ), between Elevations 185.4 m and 170.2 m. Cobbles ranging in size from 70 mm to 150 mm were encountered within this deposit in borehole MH4-2(PQ). The water content measured on samples of the lower till deposit range from 8% to 17%. Atterberg limits testing was carried out on two samples of the lower till deposit and measured liquid limits of 18 and 14, plastic limits of about 12, corresponding to plasticity indices of 6 and 2. The results of the Atterberg limits tests are shown on the plasticity chart in Appendix D (Figure B-8) and considering corresponding grain size distribution testing, indicate that the samples tested are classified as clayey sand and silt and sand of low and slight plasticity, respectively. The results of grain size distribution tests completed on two samples of the lower till deposit are shown in Appendix D (Figure B-9).

A 2.2 m and 1.5 m thick layer of soil and rock mixture was encountered below the lower till in Boreholes MH4-1 and MH4-2(PQ) at Elevations 177.2 m and 177.8 m, respectively. The soil component of this deposit, which accounts for about 8% of the layer in Borehole MH4-2(PQ), is gravelly sandy silty clay. The rock portion is inferred to be highly to moderately weathered shale and accounts for about 92% of the layer in Borehole MH4-2(PQ). Borehole MH4-2(PQ) was terminated within this layer.

4.3.4.2 **Bedrock**

Shale fragments were encountered in boreholes S1-12 to S1-14 and S2-09 to S2-12 below between Elevations 178.1 and 167.6 m as observed in split-spoon samplers during drilling. Bedrock was encountered and cored in all boreholes.

Based on a review of the bedrock core samples, the bedrock consists of shale of the Georgian Bay Formation with limestone or siltstone layers/interbeds, and is generally described as laminated to medium bedded, reddish brownish grey to grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong (R2 to R3) shale with medium strong to extremely strong (R3 to R6) limestone/siltstone interbeds. The shale bedrock contains limestone/siltstone lenses dispersed throughout the core which are generally less than 200 mm thick, dispersed throughout the core.

A zone with a higher degree of weathering and/or fracturing was generally encountered at the top of the bedrock, ranging in thickness from 0.2 m to 3.0 m (measured from top of the core runs) which exhibits shale that is highly to slightly weathered (W4 to W2), weak to medium strong (R2 to R3), interbedded with medium strong to extremely strong (R3 to R6) siltstone/limestone interbeds. The TCR and SCR of core samples recovered within the zone of higher degree of weathering and/or fracturing are generally between about 59% and 100% and between about 25% and 100%, respectively. The RQD within the zone of higher degree of weathering and/or fracturing ranges from about 0% to 60%, indicative of a rock mass of very poor to fair quality.

Core samples of the shale encountered below the zone of higher degree of weathering and/or fracturing is fresh to moderately weathered (W1 to W3), but generally fresh to slightly weathered (W1 to W2), and weak to medium strong (R2 to R3), interbedded with medium strong to extremely strong (R3 to R6) siltstone/limestone interbeds. The TCR and SCR of core samples recovered below the higher weathered zone are between about 77% and 100% and between about 74% and 100%, respectively. The RQD within this underlying zone ranges from about 70% to 100%, indicative of a rock mass of fair to excellent quality.

Most of the logged discontinuities are bedding planes within the shale bedrock or contacts between shale and siltstone/limestone interbeds, while some discontinuities were logged as joints. In general, the identified discontinuity surfaces are undulating, planar, curved or irregular in shape, with smooth to rough surface roughness. The surfaces of the identified discontinuities generally range from clean to completely coated (< 1 mm) with clay. Where the bedding planes have an infilling greater than 1 mm, the infill material is generally identified as clay.

Fourteen (14) Unconfined Compression (UC) tests were carried out on samples of the bedrock recovered from boreholes within the Tunnel Drive C and measured uniaxial compressive strengths of 16.0 MPa to 119.6 MPa. The results are summarized in Table 9 following the text of the report.

4.3.4.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from around 10 m depth at the east end near Highway 410 to near 30 m deep near Kenderry Gate. The East to West Sewer investigations (Golder 2020) indicated that the depth to bedrock along the site ranged from around 30 m at the western end, near Kenderry Gate, to 15 m near Highway 410. The bedrock formation consists of Georgian Bay shales. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at shallow depths of around 2 m or less but up to 5 m deep at the western end, near Kenderry Gate. Groundwater levels measured in shallow monitoring wells (MH3-3 and MH3-4) installed during the East to West Sewer investigations (Golder HDR ref) varied from 189.3 m to 189.5 m between May 22, 2019, to July 10, 2019. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that the portions of the site around Kennedy Road and Highway 410 are overlain by glaciolacustrine deposits. Along the watercourse on the west side of Highway 410 is an area of alluvial deposits. These surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones or in a significant groundwater recharge area. Part of the site between Highway 410 and Kennedy Road is designated as a Highly Vulnerable Aquifer area. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

4.3.5 Mayfield Road east of Dixie Road

4.3.5.1 Overburden

The subsurface conditions in the proposed area are obtained from the Foundation Investigation & Design Report of previous Terraprobe Limited (Proposed High Mast Light Poles Highway 410 Extension-Phase III From 300 m East of Heart Lake Road to Highway 10). The borehole logs are summarized in Appendix B. Topsoil approximately 150 mm to 500 mm thick was encountered across the site. Topsoil thickness may vary between and beyond the boreholes. A surficial layer of clayey silt containing trace to some sand, trace gravel and trace to some organics was encountered in some of the boreholes. This layer extends to depths ranging from 0.7 m (Elev. 268.0 m) to 1.4 m (Elev. 251.9 m) below ground surface. The moisture content of samples from this deposit ranged from 18% to 28% by weight.

Layers of clayey silt till were encountered along the alignment. In some of the boreholes this deposit was fully penetrated at depths of 2.1 m to 13.2 m below ground surface or elevations ranging between 261.6 m and 244.8 m. Some boreholes were terminated in this clayey silt till at depths of 11.1 m and 11.2 m below ground

surface i.e., at elevations of 255.3 m to 246.1 m. The grain size distribution curves of tested samples of this clayey silt till are shown in Figures B1 to B4. These results show a grain size distribution consisting of 0-30% gravel, 6-45% sand, 25-69% silt and 11-38% clay size particles. Till soils are also known to contain cobbles and boulders. Samples were also subjected to Atterberg Limits tests and the results are plotted on the plasticity charts in Appendix D (Figures B1 to B6). The Atterberg's limits varies from 19-28% in case of liquid limit, 14-17% in case of plastic limit, 5-13% in case of plasticity index and 9-16% for natural moisture content. The moisture content of samples from these deposits ranged from 7% to 23% by weight and the bulk unit weight of samples ranged between 21 kN/m³ and 23.1 kN/m³.

Layers of sand and silt and silty sand till were encountered below ground surface. These layers were fully penetrated in some of the boreholes at depths of 6.9 m to 28.4 m below ground surface or to elevations ranging from 258.2 m to 224.9 m. Some of the boreholes were terminated in this deposit at depths ranging from 9.6 m to 27.6 m below ground surface i.e., at elevations of 259.1 m to 219.3 m. The results of grain size distribution tests conducted on samples obtained from these deposits are shown in Appendix D (Figures B7 and B8). These results show grain size distributions consisting of 0-35% gravel, 28-79% sand, 11-49% silt and 3-9% clay size particles. Cobbles and boulders can also be expected in till soils. The moisture content of samples from this stratum ranged from 3% to 18% by weight.

Silty sand layers were encountered in Boreholes VB3, EC2, EC5 and HML10. The silty sand extends to depths ranging from 16.2 m to 22.3 m below ground surface or to elevations ranging from 239.0 m to 230.7 m. In Borehole HML 10 the silty sand deposit extends to a borehole termination depth of 15.7 m (Elev. 251.1 m). Refer to Figure B9 in Appendix D for three grain size distribution curves of samples of this silty sand. The results show a grain size distribution consisting of 0% gravel, 60-86% sand, 10-33% silt and 4-7% clay size particles. The moisture content of samples from this deposit ranged from 4% to 30% by weight.

Boreholes VB3, VB4 and EC5 encountered a lower layer of clayey silt. In Boreholes VB3 and VB4 the clayey silt layer extends to borehole termination depths of 26.2 m i.e., at elevations of 233 m to 232.6 m. In Borehole EC5 this lower clayey silt deposit extends to a depth of 13.2 m (Elev. 233.7 m) below ground surface. The grain size distribution curves of samples of this clayey silt are presented in Appendix D (Figure B10). These results show a grain size distribution consisting of 0% gravel, 1-7% sand, 65-81% silt and 18-34% clay size particles. The moisture content of samples from this deposit ranged from 11% to 20% by weight. An Atterberg Limits test was conducted on a sample of the clayey silt and the results are illustrated in Appendix D (Figure B11).

Silt soils were encountered in Boreholes HML4, HML5A and EC2. This silt layer extends to a depth of 17.8 m (Elev. 235.5 m) below ground surface in Borehole EC2 and to borehole termination depths of 11.2 m (Elev. 248.0 m) and 14.2 m (Elev. 245.9 m) in Boreholes HML4 and HML5A respectively. The grain size distribution curves of samples of the silt are illustrated in Appendix D (Figure B12). These results show a grain size distribution consisting of 0-2% gravel, 0-32% sand, 63-93% silt and 5-9% clay size particles.

Boreholes EC2 and EC5 encountered a layer of sandy silt. This sandy silt layer extends to depths ranging from 22.3 m to 23.9 m below ground surface or to elevations ranging from 229.4 m to 224.6 m. The grain size distribution curves of two samples from this deposit are illustrated Appendix D (Figure B13). These results show a grain size distribution consisting of 0% gravel, 27-34% sand, 56-69% silt and 4-10% clay size particles.

Gravelly sand and sand and gravel deposits were encountered at some locations along the alignment. A surficial sand and gravel deposit was encountered in Borehole EC2 extending to a depth of 2.1 m (Elev. 251.2 m) below ground surface. The gravelly sand layer extends to borehole termination depths of 15.3 m (Elev. 256.3 m) and

10.8 m (Elev. 256 m) below ground surface in Boreholes HML9 and HML10 respectively. Refer to Figure B14 in Appendix D for the grain size distribution results of two samples from this deposit. These results illustrate a grain size distribution that consists of 26-36 % gravel, 47-67 % sand, 7-9 % silt and 8 % clay size particles.

4.3.5.2 Bedrock

Bedrock was encountered in Borehole EC2 at a depth of 30.7 m (Elev. 222.6 m) below ground surface. Bedrock was proved by coring. The bedrock is described as moderately to highly weathered, and its colour is grey. It is thin to medium bedded with medium strong to strong fossiliferous limestone interbeds. Core recovery in this borehole ranged from 63% to 85%. The RQD values generally ranged from 10% to 20% indicating very poor rock quality. Vertical and subvertical joints were observed in the rock cores which contributed to the relatively low RQD values.

4.3.5.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from about 40 m depth along the western portion to over 50 m near Bramalea Road. A bedrock valley is mapped trending in a northwest-southeast direction in the vicinity of the Bramalea Road intersection. Investigations carried out at the northeast corner of Dixie Road and Mayfield Road (MTE, 2021) indicated that the depth to bedrock in that area ranged from around 20 mbgs to 35 mbgs. The bedrock formation consists of Queenston Formation shales. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at shallow depths of around 5 m or less, however the water table is deeper than 10 m just east of Kilamanagh Creek and deeper than 15 m just east of Bramalea Road. Groundwater elevations measured in shallow monitoring wells installed during the MTE investigation (2021) varied from 244.24 m to 252.28 m between November 13 to December 14, 2020. These elevations equate to depths to groundwater of about 4 to 11 mbgs. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that the section of the site crossing Kilamanagh Creek is an area with alluvial deposits. These surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones or in a significant groundwater recharge or Highly Vulnerable Aquifer area. As the site is located at the edge of the developed area of Brampton it is possible that some local residents are not connected to municipal water supply and may rely on private groundwater wells for water supply.

4.3.6 Erin Mills south of Mississauga Road

4.3.6.1 Overburden

The subsoil conditions along the proposed project area consist of relatively shallow overburden deposits with local deep deposits along sections where it is believed that former river valleys and buried erosion channels may exist. The overburden is underlain by shale bedrock of the Queenston and/or Georgian Bay Formations. Existing subsurface information have been obtained from four boreholes (BH-12, BH-12A, BH-13, and BH-14) which were advanced as a part of West Trunk Sewer project in previous investigations by Golder in 2012. The borehole logs are attached in Appendix B.

A surficial layer of topsoil ranging in thickness from 0.1 m to 0.6 m was encountered at the ground surface in BH-12 and BH-12A. Fill materials comprised of clayey silt to silty clay and/or clayey silt/silty clay with sand and/or sand and gravel to silty sand were encountered at the ground surface or immediately below the topsoil or asphalt layer in Boreholes 12 and 12A. A deposit of clayey silt to silty clay, trace gravel and sand was generally encountered at the ground surface or below the topsoil/fill in BH-14. A residual clayey silt deposit was also encountered below the silty clay fill in Borehole BH-13 and its thickness is approximately 0.9 m. A deposit of cohesionless till which ranges in composition from silty sand and gravel, trace clay to gravelly sand, trace to some silt, trace clay was encountered below the sand and silt till in Borehole BH-14. A silty sand to sand and silt till deposit was encountered below the silty clay in Borehole BH-14.

4.3.6.2 Bedrock

The bedrock encountered can be generally described as shale interbedded with thin limestone and siltstone layers from the Queenston Formation overlying shale interbedded with thin limestone layers from the Georgian Bay Formation. The rock quality designation (RQD) based on the borehole data ranges from 0% to 100% with an overall average value of 78%, indicating a rock mass of very poor to excellent quality and on average good quality.

4.3.6.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from about 2 m depth, to the north of the Banfield Road/McFarren Boulevard intersection, to around 4 m to the south. Investigations carried out for the West Trunk Sanitary Sewer near Thomas Street and Erin Centre Boulevard (Golder 2012) indicated that the depth to bedrock in those areas ranged from 2.4 mbgs to 7.0 mbgs, respectively. The bedrock formation consists of Queenston Formation shales. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at depths of just over 10 m at the southern end and increases toward the north to over 20 m. Groundwater elevations measured in shallow monitoring well BH-13 installed near Erin Centre Boulevard during the West Trunk Sewer investigation (2012) varied from 161.71 m to 161.92 m between August 2010 to March 2012. These elevations equate to depths to groundwater of 6.54 to 6.75 mbgs. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that the site is an area of Paleozoic bedrock, suggesting shallow overburden depths. The southern section of the site near Erin Centre Boulevard is mapped as alluvial deposits. These surficial geologies and shallow bedrock would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones. Limited sections of the Erin Mills Parkway right of way, between McFarren Boulevard and Erin Centre Boulevard, are mapped as significant groundwater recharge areas. Significant groundwater recharge areas are areas with permeable soils that allow above average amounts of infiltration to recharge aquifers that support drinking water sources. Most of the site, from a few hundred metres north of the Erin Centre Boulevard intersection, is within a Highly Vulnerable Aquifer area. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

4.3.6.4 Natural Gas

Natural gas was initially encountered at Borehole BH-12A, BH-13 and BH-14. The basic protocol included cementing casing to a depth of 3 m and checking for natural gas after each rock core run using a gas detector. However, when natural gas was encountered with much higher pressure, then drilled was carried out with more extensive natural gas control measures including blowout prevention and casing cemented to a depth of approximately 30 m.

4.3.7 Dixie Road south of Highway 401

4.3.7.1 Overburden

Existing subsurface information have been obtained from the boreholes which were advanced as a part of detailed design for a dedicated busway running from the City Centre Station (Highway 403 at Hurontario Street) to the Renforth Drive Station (Renforth Drive at Eglinton Avenue) in Mississauga, Ontario by Thurber Engineering Ltd. (Thurber) in 2009. The borehole logs are attached in Appendix B. The subsurface stratigraphy encountered in the boreholes generally comprises surficial topsoil, pavement structure, fill and/or silty clay layers overlying silty clay till. In many boreholes, the till grades to a sandy silt/silty sand with depth. Shale bedrock was encountered below the till at relatively shallow depth in the west (Hurontario Street to Central Parkway) and east (Fieldgate Drive to Renforth Drive) sections of the busway alignment.

At nine locations, the granular material extended to greater depths of 1.1 to 3.6 m, possibly indicative of culvert or service trench backfill. At one location on Eglinton Avenue (borehole 09-126), a granular thickness of 310 mm was encountered. Fill was encountered surficially or below the pavement structure or topsoil in 82 boreholes. The fill typically comprises brown silty clay to clayey silt, however sand and gravel, sandy silt and sand fill were also encountered. Broken shale fill was identified in the stockpiles and berms adjacent to Highway 403 and Eastgate Parkway (boreholes 09-23, 09-23B, 09-24A, 09-33, 09-35, 09-37, 09-38 and 09-57), as well as east of Commerce Boulevard (boreholes 09-157 and 09-158). The fill also contains organics, wood, brick, concrete and asphalt locally, and shale and limestone fragments/slabs at many locations. Moisture contents in the clay and clayey silt

fill ranged from 4 to 36%, typically in the range of 10 to 20%. In the sand/silt fill, the moisture contents ranged from 4 to 12%.

A layer of native silty clay was encountered surficially or below the topsoil, fill or pavement in 28 boreholes. This layer was present primarily in the vicinity of Tomken Road (boreholes 09-62 to 09-73) and along the north-south section of Eastgate Parkway to Eglinton Avenue (boreholes 09-104 to 09-123). A clayey silt layer was encountered around Little Etobicoke Creek (boreholes 09-79, 09-81, 09-82 and 09-84). The clay and clayey silt layers ranged in thickness from 0.6 to 3.0 m, with a lower boundary at depths of 0.8 to 4.1 m.

Native brown to grey silty clay till was encountered in all boreholes except five boreholes at the west limit of the busway, 20 boreholes primarily in the Eastgate Parkway section, and five boreholes between Satellite Drive and Orbitor Drive. The upper boundary of the native material was contacted surficially and at depths of up to 5.5 m, locally at 7.2 and 9.5 m depth in boreholes 09-23B and 09-57 located on fill stockpiles. Where fully penetrated, the lower boundary of the clay till was encountered at depths of 1.4 to 10.7 m, and the layer was 0.4 to 9.0 m thick. Many of the boreholes between about Central Parkway and Dixie Road were terminated in the clay till at depths of 3.7 to 12.8 m, indicating a layer thickness greater than 1.5 to 9.5 m. The Atterberg Limits indicate that the till is a CL-to-CI soil (low to medium plasticity). The grain size results indicate that the till grades to a clayey sand and silt in some areas. The till often contains cobbles, boulders and fragments/slabs of shale and limestone.

The silty clay till graded to a silty sand/sandy silt till at depths of 1.5 to 13.8 m in 45 boreholes, primarily between Central Parkway and the Eastgate Parkway crossing, as well as between Satellite Drive and Orbitor Drive. All but 15 of these boreholes were terminated in the sand/silt till at depths of 3.3 to 18.6 m. The layer thickness was greater than 0.5 to 11.0 m where the lower boundary was not encountered, and 0.6 to 9.4 m where fully penetrated.

Discontinuous layers of gravelly to silty sand, sand and gravel, sandy silt and silt were encountered above, below or within the till units at various depths and locations throughout the busway alignment. Between Orbitor Drive and Explorer Drive (boreholes 09-145 to 09-151), these deposits form a continuous layer of water-bearing cohesionless sands and silts between the till and underlying shale bedrock. Where fully penetrated, these layers ranged in thickness from 0.3 to 5.1 m.

4.3.7.2 Bedrock

Bedrock was encountered in nearly all boreholes located between the west project limit and the Central Parkway Station (boreholes 09-1 to 09-31, 09-162 and 09-163), and from the Eastgate Parkway crossing to the east project limit (boreholes 09-101 to 09-161). The depth to bedrock ranged from 0.8 to 8.7 m. Bedrock was also encountered at 16.5 and 16.8 m depth in boreholes 09-47 and 09-48 located at the Highway 403-Eastgate Parkway N/S-W ramp. The bedrock consists of grey shale and interbedded limestone of the Georgian Bay formation. The limestone interbeds encountered in the rock cores were typically less than 150 mm in thickness, with occasional layers up to 450 mm. Thick layers of 1000 and 530 mm were noted in boreholes 09-122 and 09-157, respectively. Limestone layers greater than 50 mm thick are listed on the borehole logs. Rubble zones, seams of very weathered material (essentially a silty clay), and sub-vertical fractures are present in the rock, and these are also noted on the logs. In general, the bedrock becomes less weathered and more sound with depth. The rock core descriptions indicate that the rock is highly weathered to depths of 0.6 to 4.8 m below the bedrock surface (typically about 2 to 3 m), becoming moderately weathered and then slightly weathered to fresh at depths of 1.0 to 7.5 m (typically 2.5 to 5.5 m) below the rock surface. At the Eastgate Parkway crossing, highly weathered zones were encountered to depths of 5.6 to 11.0 m in boreholes 09-102, 09-103 and 09-103A.

Total Core Recovery (TCR) during coring typically ranged from 90 to 100%, with occasional values as low as 60%. The Rock Quality Designation (RQD) determined from the rock cores varied, generally less than 50% (poor to very poor-quality rock) in the initial one to three core runs, and 75 to 100% (The unconfined compressive strength of the shale determined by UCS testing ranged from 5 to 25 MPa, averaging 12 MPa. The compressive strength of the shale assessed from a limited number of Point Load tests ranged from 3 to 13 MPa, with two values of 31 MPa. Based on these results, the shale is classified as a weak to medium strong rock. The unconfined compressive strength of the limestone interbeds assessed from the Point Load tests ranged from 9 to 271 MPa, typically greater than 30 MPa. The compressive strength determined by a limited number of UCS tests ranged from 32 to 75 MPa. Based on these results the limestone is classified as a medium strong to very strong rock (good to excellent quality) below this zone.

4.3.7.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from around 10 m depth between Highway 410 and Eglinton Avenue, shallower than 5 m depth between Eglinton Avenue and Eastgate Parkway and increases to greater than 10 m depth at the northern (Highway 401) and southern (Eastgate Parkway) extents of the site. Borehole investigations carried out near the northern end of the site at the Dixie Road bridge over Highway 401 (MTO 1973) indicated that the depth to bedrock ranged from 6.7 mbgs to 10.7 mbgs. Borehole investigations carried out near the south end of the site at the Eastgate Parkway intersection (Thurber, 2009) indicated that the depth to bedrock was greater than 15.5 mbgs. The bedrock formation consists of Georgian Bay Formation shales. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at depths of around 5 m at the north end, near Highway 401, decreases to over 10 m depth near Eglinton Avenue and then rises to near 5 m depth at the south end near Eastgate Parkway. Groundwater elevations measured in the boreholes installed near Highway 401 during the MTO investigation (1973) varied from 159.1 m to 160.0 m. These elevations equate to groundwater depths of approximately 0.3 mbgs. Groundwater elevations measured in shallow monitoring wells (09-089 and 09-095) installed near Eastgate Parkway during the Thurber investigation (2009) varied from 146.8 m to 150.3 m. These elevations equate to groundwater depths of 1.3 to 1.9 mbgs. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that the northern half of the site, from Highway 401 to Aimco Boulevard, is underlain by fine-textured glaciolacustrine deposits. The southern half of the site, from Aimco Boulevard to Eastgate Parkway, is mapped as silty to clayey till deposits. These surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not generally located in any Wellhead or Intake Protection Zones or in a significant groundwater recharge or Highly Vulnerable Aquifer area. However, the area west of the Eastgate Parkway intersection is identified as Intake Protection Zone 3 for the South Peel and City of Toronto drinking water systems and the area

of the Highway 401 intersection to the north and west of the site is identified as a Highly Vulnerable Aquifer. Zone 3 Intake Protection Areas are areas where modelled spills or storm events could have an impact on surface water quality for a water supply intake. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

4.3.8 Erin Mills south of Highway 403

4.3.8.1 Overburden

The subsurface conditions near the northern limit of the proposed Highway 403 crossing consists of fill underlain by a till deposit comprised of clayey silt with sand, which in turn is underlain by a clayey silt deposit. The clayey silt stratum is underlain by a deposit of silty sand or a localized pocket of clayey silt with sand till, in turn is underlain by a cohesionless till deposit. A localized sand to sand and silt deposit and a clayey silt with sand till stratum were also encountered within or underlying the cohesionless till deposit. The subsurface conditions encountered in the vicinity of the southern limit of the proposed Highway 403 crossing consist of fill or fill underlain by a near surface deposit of sand and silt. Existing subsurface information have been obtained from ten boreholes (BH-15 to BH-20, BH-21, BH-21A, BH-21B, BH-30) which were advanced as a part of West Trunk Sewer project in previous investigations by Golder in 2012. The borehole logs are attached in Appendix B. Shale bedrock was encountered at all borehole locations. Photographs of the bedrock core samples are presented in Appendix C.

An approximately 100 mm thick layer of topsoil was encountered at the ground surface in Boreholes BH-15 to BH-17 and BH-20. An approximately 100 mm layer of asphalt was encountered at the ground surface in Borehole BH-18 which was advanced on the right shoulder of the Erin Mills Parkway southbound lane to Highway 403 eastbound on-ramp. A cohesive deposit of fill consisting of clayey silt to silty clay, trace to some sand, trace gravel and trace organics was encountered at the ground surface in Borehole BH-30 and below the topsoil in Boreholes BH-15 to BH-17 and BH-20. Cohesive deposits were also encountered below the upper about 4.6 m of overburden (daylighted to expose existing underground utilities) in Boreholes BH-21B and BH-21C as well as interlayered within the sand to silty sand deposits in Borehole BH-21A.

Sand to sand and gravel pockets were also encountered above a depth of 1.5 m in Borehole BH-17. Occasional clayey silt interlayers were also encountered in Borehole BH-21. The top of this deposit ranges between Elevation 164.7 m and 163.4 m and the thickness of the deposit ranges from about 1.3 m to 2.9 m. An approximately 0.5 m thick deposit of cohesionless fill comprised of reddish-brown sand and gravel was encountered immediately below the asphalt at Elevation 162.0 m in Borehole BH-18. The water content measured on samples of the cohesive fill material ranges from about 11 percent to 25 percent. Atterberg limits tests were carried out on two specimens of the cohesive fill material and measured liquid limits of about 29 percent and 37 percent, the plastic limits of about 16 percent and 17 percent, and plasticity indices of about 12 percent and 21 percent. The results of the Atterberg limits tests are shown on the plasticity chart in Appendix D (Figure C1) and indicate that the cohesive fill deposit is a clayey silt of low plasticity to a silty clay of intermediate plasticity.

An upper cohesive till deposit consisting of clayey silt with sand, trace gravel was encountered below the cohesive fill in Boreholes BH-15, BH-16, and BH-30. Organics and shale/limestone fragments were also encountered within the till deposit in Borehole BH-30. The top of this till deposit was encountered between 1.6 m and 3.0 m below ground surface, ranging from about Elevation 161.8 m to 161.3 m and the thickness of the deposit ranges from about 0.7 m to 2.4 m. The water content measured on one sample of this deposit obtained from Borehole BH-01 is about 28 percent. An Atterberg limit test was carried on one sample of this cohesive till deposit and measured a

liquid limit of about 27 percent, a plastic limit of about 17 percent, and a corresponding plasticity index of about 10 percent. The results of the Atterberg limits test are shown on the plasticity chart in Appendix D (Figure C2) and indicate that the cohesive till deposit is a clayey silt of low plasticity.

An upper deposit of brown to reddish brown sand and silt, trace to some clay, trace gravel was encountered below the clayey silt fill in Borehole BH-17. The top of this deposit was encountered at a depth of 1.4 m below ground surface, corresponding to about Elevation 162.1 m and the thickness of the deposit is about 1.5 m. The water content measured on a sample of this deposit is about 10 percent. The grain size distribution of one sample of the sand and silt deposit is shown in Appendix D (Figure C3).

A deposit of clayey silt, trace sand was encountered below the upper deposit of clayey silt till in Boreholes BH-15, BH-16, and BH-30. Oxidation stains were also noted within the clayey silt deposit between a depth of 3.7 m and 5.2 m below ground surface in Borehole BH-16. The top of this till deposit was encountered at depths between 3.5 m and 4.6 m below ground surface, ranging from about Elevation 161.0 m to 158.9 m and the thickness of this deposit ranges from about 3.7 m to 8.2 m. The water content measured on seven samples of this deposit ranges from 15 percent to 25 percent. The grain size distributions of two samples of the clayey silt deposit are shown in Appendix D (Figure C4). Atterberg limits tests were carried out on two specimens of the cohesive deposit. The liquid limits are about 23 percent and 28 percent, the plastic limits are about 16 percent and 19 percent, and the plasticity indices are about 7 percent and 9 percent. The results of the Atterberg limits tests are shown on the plasticity chart in Appendix D (Figure C5) and indicate that the cohesive deposit is a clayey silt of low plasticity.

A deposit of silty sand, trace to some gravel, trace gravel was encountered below the clayey silt in Boreholes BH-15 and BH-30. The top of this deposit was measured at depths of 10.2 m and 7.2 m below ground surface in the respective boreholes, corresponding to about Elevation 153.3 m and 156.2 m, and the thickness of the deposit is about 3.1 m and is 1.5 m, respectively. A water content measured on one sample of this deposit is about 15 percent.

A cohesive till pocket consisting of clayey silt with sand, trace to some gravel was encountered below the clayey silt deposit in Boreholes BH-16. The top of this till pocket was encountered at about 11.9 m below ground surface, corresponding to about Elevation 152.8 m and the thickness of the deposit is about 1.4 m. The water content measured on one sample of this deposit is about 13 percent.

A cohesionless till deposit consisting of silty sand to sand and silt to gravelly sand was encountered below the silty sand deposit in Boreholes BH-15 and BH-30 and below the intermediate clayey silt till deposit in Borehole BH-16. Rock fragments and cobbles were noted in Boreholes BH-21A. Cobbles were inferred to be present within the gravelly sand till in Borehole BH-15 and cobbles and possibly boulders are anticipated to be present throughout the cohesionless till deposit as inferred by the grinding of augers during drilling. The top of this till deposit was encountered at depths between about 8.7 m and 13.3 m, corresponding to between about Elevation 154.7 m and 150.2 m and the thickness ranges from about 2.6 m to 5.1 m. The grain size distribution of one sample of the sand and silt till deposit is presented in Appendix D (Figure C6). An Atterberg limits test was carried out on one specimen of the sand and silt till deposit from Borehole BH-16 and indicates that the material is non-plastic.

A deposit of sand to sand and silt, trace to some clay, trace gravel was encountered as an interlayer within the gravelly sand till in Borehole BH-15 and below the sand and silt till in Borehole BH-16. The top of this granular deposit was encountered at about 14.8 m and 15.9 m below ground surface in the respective boreholes, corresponding to about Elevation 148.7 m and 148.8 and the thickness is about 1.5 m and 2.4 m, respectively.

The water content measured on three samples of this deposit range from about 9 percent to 18 percent. The grain size distributions of two samples of the sand to sand and silt deposit are shown in Appendix D (Figure C7).

A lower deposit of cohesive till consisting of clayey silt with sand, trace gravel was encountered below the gravelly sand till deposit in Borehole BH-15. The top of this till deposit was encountered at about 19.3 m below ground surface, corresponding to about Elevation 144.2 m and the thickness is about 3 m. The water content measured on one sample of this till deposit is about 13 percent. The grain size distribution of one sample of the clayey silt with sand till deposit is shown in Appendix D (Figure C8).

A grey till-like deposit of sand and gravel, trace to some silt, trace clay was encountered below the sand to sand and gravel deposit in Borehole BH-21A. The thickness of this deposit is about 2.1 m. A deposit consisting of a mixture of limestone and shale slabs, containing layers of gravel to cobble sized subrounded to rounded shale, limestone and granitic fragments within a coarse sand matrix was encountered in Borehole BH-21A, BH-21B and BH-21C advanced near the intersection of Burnhamthorpe Road and Erin Mills Parkway. The percentage recovery within this deposit (where soil coring operations were undertaken) was variable and it is anticipated that significant proportion of fines was washed out during the sampling. Based on the nature of the material recovered; the deposit has been classified as a deformation till. The thickness of this deposit varies from about 4.3 m to 20.1 m.

4.3.8.2 Bedrock

Shale bedrock was encountered at depths ranging from approximately 0.6 m to 22.3 m below ground surface, corresponding to between Elevation 161.5 m and 141.2 m. The rock quality designation (RQD) measured on the recovered shale bedrock core samples, ranges from 0 percent to 100 percent with an overall average value of 70 percent (very poor to excellent quality and on average fair quality rock).

The uniaxial compressive strength (UCS) of the shale ranges from about 21 MPa to 47 MPa with an average of about 31 MPa.

Natural gas was not encountered during the drilling of Borehole BH-19. Upon completion of drilling (August 2, 2011) the entire water column in the borehole was displaced with compressed air. Immediately after displacement of water the gas detector registered a 75% LEL reading. The borehole was shut in and the natural gas was diverted into test separator tank.

In general, the shale is thinly laminated, but occasionally thinly to thickly bedded horizons exist. There are numerous limestone and fossiliferous limestone beds throughout the rock mass ranging in thickness from 20 mm to 500 mm. The rock mass also contains zones of shale where thin (less than 20 mm) limestone lenses are dispersed throughout the core. Most of the logged discontinuities are bedding joints or contacts between shale and limestone interbeds while some discontinuities were logged as joints. Most of the identified bedding joints and contact surfaces are clean while some have stained surfaces and show no signs of alteration, and some have only slightly altered walls. Very few of the logged bedding discontinuities have a coating or an infilling greater than 1 mm, which when it occurs is composed mainly of clay or broken rock.

4.3.8.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from less than 5 m depth for most of the site alignment and increases to greater than 15 m depth at the southern extent of the site (Burnhamthorpe Road). Borehole investigations carried out near the northern end of the site at Highway 403 (Golder, 2012) indicated that the depth to bedrock ranged from 0.6 mbgs to 4.4 mbgs BH-17, BH-18, BH-19, and BH-20). Near the south end of the site, about 300 m north of Burnhamthorpe Road, the depth to bedrock was 6.2 mbgs. Near the Burnhamthorpe Road intersection, the depth to bedrock was 45.97 mbgs to 50.00 mbgs. At other locations along the site alignment, the depth to bedrock was noted to range from 1.5 mbgs to 3.1 mbgs (WSP 2017; BH17-1 to BH17-4) or to be greater than 3.7 mbgs (DBA 2015; BH E01-15 to BH E04-15). The bedrock formation consists of Queenston Formation shales in the northern portions of the site and Georgian Bay Formation shales in the southern portions. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at depths of around 10 m but is slightly shallower, at close to 5 m depth, just to the north of Burnhamthorpe Road in the vicinity of Sawmill Creek. Groundwater elevations measured in a monitoring well (BH-20) installed near Highway 403 during the Golder investigation (2012) varied from 160.49 m to 161.88 m. These elevations equate to groundwater depths of 2.92 mbgs to 4.31 mbgs. Groundwater was not observed in the shallow boreholes drilled by WSP (2017) and DBA (2015). Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that the site is underlain by Paleozoic bedrock, with thin overburden cover. Just north of Burnhamthorpe Road, along the Sawmill Creek valley, is mapped as alluvial deposits. These surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones. The Erin Mills Parkway right of way, south of Burbank Drive, is mapped as a significant groundwater recharge area. Significant groundwater recharge areas are areas with permeable soils that allow above average amounts of infiltration to recharge aquifers that support drinking water sources. Most of the site, from just south of the Highway 403 access ramps, is within a Highly Vulnerable Aquifer area. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

4.3.9 Kennedy Road south of Queen Street

4.3.9.1 Overburden

Existing subsurface information have been obtained from boreholes 15-54, 17-15, 17-27 to 17-30, 17-212, 17-28, and 17-29 which were advanced as a part of West Brampton Watermain project in previous investigations by Golder in 2018. The borehole logs are attached in Appendix B. In general, the subsurface soil, conditions as encountered in Boreholes 15-54, 17-15, 17-27 to 17-30 and 17-212, consist of asphalt or topsoil underlain by fill which in turn is underlain by a till deposit. The till deposit ranges in composition from cohesive silty clay to non-cohesive sandy silt to silt sand. Boreholes 15-54, 17-15, 17-27, 17-30 and BH-17-212 were terminated within the till deposit and boreholes 17-28 and 17-29 further penetrated a layer of silt below the till deposit.

Topsoil ranging in thickness from approximately 80 mm to 300 mm was, encountered at ground surface in Boreholes 15-54, 17-15, 17-27 to 17-30. Borehole 17-212 encountered 150 mm of asphalt at ground surface.

Boreholes 15-54, 17-30 and 17-21, encountered approximately 0.5 m to 0.8 m of fill consisting of (CL-ML) silty clay to (SM) silty sand to (SP/GP) sand and gravel below the topsoil and asphalt the base of tile fill extended to between Elevations 234.1 m and 228.8 m. The water content measured on samples of the non-cohesive fill ranges from about 3% to 12%.

A deposit of till ranging in composition from cohesive (CL) sandy silty clay, trace gravel to gravelly to non-cohesive (ML) sandy silt, trace to some gravel to (SM) gravelly silty sand was encountered below the topsoil in Boreholes 17-15, 17-27 to 17-29, and below the fill in Boreholes 15-54, 17-30 and 17-212.

The till deposit contains traces of organics and rootlets up to a depth of 0.7 m in Boreholes 17-27 to 17-291. Till deposits in the Greater Toronto area typically, contain cobbles and boulders and they should be expected throughout the till deposit. The water content measured on samples of the cohesive till deposit ranges from about 7% to 20%. The water content measured on samples of the non-cohesive till deposit ranges from about 7% to 21%. The bulk unit weight measured on five samples of the cohesive till ranges from about 21.4 kN/m³ to 22.6 kN/m³. The bulk unit weights measured on two samples of the non-cohesive till are about 21.2 kN/m³ and 22.6 kN/m³. The results of grain size distribution testing completed on six samples of the cohesive till and five, samples of the non-cohesive till are shown on Figures B1-A and B1-B, respectively, in Appendix D.

Atterberg limits testing was carried out on six samples of cohesive till and measured liquid limit ranges from about 18% to 29%, plastic limits ranges from about 11% to 16%, and plasticity indices ranges from about 7% to 13%. The results of the Atterberg limits tests are shown on Figure B2 in Appendix D and indicate that the material is classified as a silty clay of low plasticity.

A deposition of silt, trace to some sand, trace gravel was encountered below the cohesive till in Boreholes 17-28 and 17-29. The water content measured on samples of the silt deposit ranges from about 8% to 18%. The bulk unit weight measured on one sample of tile silt is about 20.1 kN/m³. The result of a grain size distribution test completed on one sample of tile silt is shown on Figure B3 in Appendix D.

4.3.9.2 Bedrock

The area of study, western portion of the Peel plain, is underlain by reddish brown shale bedrock of the Queenston formation. Bedrock was not, encountered in the boreholes advanced along Kennedy Road.

4.3.9.3 Hydrogeology

Depth to Bedrock

The depth to bedrock along the site alignment is variable with regional mapping (ORMGP 2018) indicating it ranges from about 35 m to 50 m depth, being deepest near the Centre Street intersection and gradually shallower to the north and south. Borehole investigations carried out along the southern portion of the site, from Williams Parkway to Vodden Street (Golder 2018) indicated that the depth to bedrock was greater than 21.6 mbgs at borehole 17-15. The bedrock formation underlying the site consists of Queenston Formation shales. Site-specific field investigations should be carried out to confirm the depth to bedrock at locations where LID features are proposed.

Depth to Water Table

Regional mapping (ORMGP 2018) indicates that the water table under the site occurs at depths of less than 10 m near Bovaird Drive then increases to about 15 m depth south of Rutherford Road/Centre Street. Southward from here, the water table gradually increases, reaching just over 10 m depth near Vodden Street. Groundwater elevations measured in monitoring wells installed during the Golder investigation (2018) varied from 227.3 m to 231.5 m. These elevations equate to groundwater depths of 1.1 mbgs to 4.4 mbgs. Site-specific field investigations should be carried out to confirm the depth to water table at locations where LID features are proposed.

Surficial Geology

As noted in the preceding sections, the overburden across this site consists mainly of silty to clayey tills with some sand content. Regional mapping (ORMGP 2018) indicates that the site is underlain by silty to clayey till deposits. The borehole investigations by Golder (2018) identified silt and sandy and silty tills below the silty and clayey tills at depths of 2.2 mbgs to 8.3 mbgs. These surficial geologies would not generally be considered good for infiltration but may locally allow for LID features. Site-specific field testing should be carried out to confirm infiltration capacities at locations where LID features are proposed.

Source Protection Considerations

The site is not located in any Wellhead or Intake Protection Zones or Significant Groundwater Recharge Areas. The site is within a Highly Vulnerable Aquifer area. Highly Vulnerable Aquifer areas are considered vulnerable to aquifer contamination due to their close connection to surface water and infiltration. These close connections to surface water are typically due to shallow water table depths and/or highly conductive subsurface materials between the surface and the aquifer.

5.0 HYDROGEOLOGICAL AND GEOTECHNICAL CHALLENGES AND MITIGATION MEASURES

The following text of this report outlines, geotechnical challenges, associated potential impacts on construction, and suggested mitigation measures to minimize subsurface risks.

Table 2: Geotechnical Challenges

Geotechnical Challenges	Description of Potential Risks	Mitigation Measures
Presence of Cobbles and Boulders	The presence of cobbles and/or boulders should be considered in machine selection and adopted method for tunnelling through overburden and excavations at shaft locations. It should be assumed that cobbles/boulders are comprised of a variety of different lithology's including native bedrock but also glacial erratic from the Canadian Shield with a wide range in strengths.	The Contract Documents should include provisions to manage the excavation and disposal of cobbles and boulders.
Infiltration through the low permeable materials		
Management of excess soil		

5.1 Management of Excess Soil, Rock and Groundwater

5.1.1 Assessment Criteria

Samples of soil, rock, and groundwater for the project will be collected, tested and the analytical results will be compared to appropriate criteria to assess options for the management of excess soil and rock as well as groundwater disposal. The following sections provide general assessment criteria.

5.1.1.1 Soil

Analytical results from the soil samples collected will be compared to the following criteria to assess options for the management of excess soil from the project:

- The Table 1 Background Standards as listed in the MOECC April 15, 2011 "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act".
- The Table 3 and Table 9 Site Condition Standards as listed in the MOECC April 15, 2011 "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Soil, Ground Water, and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act"; and
- The confined and unconfined fill standards as listed in the MOECC March 2011 "Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario" (hereinafter "the Lakefill Guidelines").

The Table 1 Standards are generally considered to be the standards that would indicate relatively unrestricted use. With respect to geo-environmental quality, excess soil meeting the Table 1 Standards may be reused within the project site, used on receiving sites that are undergoing the filing of a Record of Site Condition (RSC), for the rehabilitation of aggregate pits or quarries, or similar beneficial uses such as backfilling or grading. The Table 3 Site Condition Standards (SCS) apply to most of the project area. With respect to geo-environmental quality,

excess soil meeting the Table 3 SCS may be reused within the project site, or could be used on a receiving site undergoing an RSC filing process provided the following criteria are met:

- The receiving site must have been used for an industrial use, or for a commercial use that included a repair garage, a bulk liquid dispensing facility (including a fuel outlet), or for the operation of dry-cleaning equipment.
- The receiving site must have had a potentially contaminating activity on, in, or under the property.
- The receiving site cannot be currently used for agricultural, community, institutional, parkland or residential uses; and,
- One or more contaminants must have already been identified on the receiving site at concentrations exceeding the applicable site condition standards prior to the proposed importation of material from off-site.

Reuse of the Table 3 SCS would be limited to portions of the project site that are situated at a distance greater than 30 m from the boundaries of a watercourse. For areas within 30 m of a watercourse, the Table 9 SCS should be considered. Receiving sites capable of accepting soil quality which meets the Table 3 SCS and/or Table 9 SCS may not be easily found.

Comparison of the analytical results against the Table 3 SCS also provides an evaluation of whether soil quality may impose any considerations from a human health standpoint during construction, such as a condition that may require the use of personal protective equipment or administrative controls on soil management if the Table 3 SCS are exceeded.

Comparison to the confined and unconfined Lakefill Guidelines could be completed if excess soils from the project area are intended for eventual reuse in a shore infilling or similar project that may take place concurrently with the construction of the project. The confined fill standards would apply to use of the material below the water line within a containment structure that is designed to withstand a 1-in-100-year storm frequency. The unconfined fill standards apply to materials that would be intended for placement directly in contact with open water, without a containment structure in place. Less stringent acceptance standards may exist if an intended lakefill receiving site is permitted as a confined disposal facility.

Few options exist for management of excess soils that exceed the standards and guidelines listed above. It may be possible for excess materials to be managed under the general provisions of the January 2014 “Management of Excess Soil – A Guide for Best Management Practices” (hereinafter “the Excess Soil BMP”). For this option to be viable, it would be necessary under the provisions of the Excess Soil BMP to identify a receiving site with a fill management plan that accounts for the quality of the excess soil originating from this project. It should be noted that, as of the date of this document, MOECC has released a draft excess soil management regulation for comment. The requirements of this regulation, if passed during the project, would apply to the management of excess soils.

5.1.1.2 **Rock**

Options for the management of excess rock spoil may be like those for soil. In general, the assessment criteria described above in Section 5.1.1.1 for soil may be applied to rock spoil by the receiving site, particularly where spoil has a particle size of 2 mm or less. For spoil having a larger particle size than 2 mm, the assessment criteria provided above may still be used to evaluate management options. However, the criterion that would generally apply to such “non-soil” materials would be that the reuse of this material should not create an adverse effect to

human health or the natural environment and should not impair groundwater quality. Assessment of these larger rock fragments to demonstrate that there is no impairment to environmental quality that would be associated with their use could be demonstrated through:

Comparison to the soil standards described above:

- Leachate testing using the Synthetic Precipitation Leaching Procedure (SPLP) to evaluate the potential for the reuse of rock to impair groundwater quality, through comparison against the non-potable groundwater standards as listed in Table 3 (for intended reuse at distances greater than 30 metres from a water body) or Table 9 (for intended reuse within 30 metres of a water body) of the “Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”; or
- Evaluation against the criteria listed in the Lakefill Guideline for confined or unconfined fill as applicable.

As an initial analysis of the potential for rock spoil to impair groundwater quality if reused, or to evaluate the need for manifesting as a hazardous waste if disposal is required, the following comparisons will be made:

- Comparison of leachate (i.e., toxicity characteristic leaching procedure and SPLP) testing results; and,
- Comparison of leachate testing results against the criteria listed in Schedule 4 of Ontario Regulation 347.

5.1.1.3 Groundwater

An initial comparison of groundwater quality of project samples against the Table 3 groundwater standards will be made to identify conditions that may require consideration during management, such as groundwater conditions that would impose the use of personal protective equipment or administrative controls during construction.

Options for the management of excess groundwater that may be recovered from construction dewatering or similar activities are generally limited to:

- Discharge to the environment (e.g., to ground surface or to a watercourse) under a Permit to Take Water and an Environmental Compliance Approval issued by the MOECC.
- Discharge to the storm sewer system following settling under a permit with the Region of Peel and/or City of Mississauga; and,
- Discharge to the sanitary sewer system following settling under a permit with the Region of Peel.

Groundwater meeting the Region of Peel and/or City of Mississauga discharge limits may be discharged directly to the storm or sanitary sewer system under a permit with the Region of Peel. If these discharge limits are exceeded, then groundwater treatment may be required to meet the applicable limits prior to discharge. For discharge under an Environmental Compliance Approval, discharge limits are generally set on a project specific basis. However, limits comparable to the Region of Peel and/or City of Mississauga storm sewer discharge limits may be expected as a preliminary evaluation of the feasibility of this approach for groundwater management. If discharge is not feasible under these options, then haulage and disposal of groundwater that exceeds these limits and which cannot be treated may be required in some circumstances. Further discussion and seeking approval from the Region of Peel is required for the haulage and disposal option.

5.1.2 Reuse of Excavated Materials

There is limited opportunity to reuse the excavated soil/rock on the project site. Consideration should be given to the use of imported granular materials such as Granular B Type I.

5.1.2.1 Geotechnical Considerations

Crushed shale bedrock typically has relatively poor engineering properties, particularly when exposed to wetting and drying cycles. Wetting and drying cycles can significantly affect the shear/bearing strength, settlement behaviour, and durability of shale backfill. Hence, shale fill is not recommended to be used as engineered/structural fill for the purpose of supporting settlement sensitive structures. However, shale may be considered for general fill applications where settlements can be tolerated/accommodated. In this regard, shale fill could be considered for general lake filling/landscaping applications or for the construction of embankments with relatively gentle slopes that do not support settlement sensitive structures. Reuse of excavated soils as fill must be approved by Geotechnical Engineer prior to placement. In general, soils that are significantly above their optimum water content for compaction are considered not suitable for re-use as fill; these soils would require drying or mixing with drier materials prior to re-use as engineered fill. Soils that are wetter than their estimated laboratory optimum water contents for compaction would require some drying prior to placement. In addition, the fine grained- (clayey) soils will be sensitive to moisture conditions during placement and compaction, and some difficulty would be expected in achieving adequate compaction during wet weather.

5.1.2.2 Geo-Environmental Considerations

The evaluation of the excess soil/rock from a geo-environmental standpoint is dependent on the anticipated end use of the material, and generally can be evaluated in the context of one of three categories of reuse for preliminary considerations:

- Beneficial onshore reuse (inclusive of excavation backfill or use as fill for grading) at a receiving site that is undergoing the process of filing a (RSC;
- Beneficial onshore reuse at a receiving site that is not undergoing the process of filing an RSC; and,
- Use as lakefill at a lake filling project.

Opportunities for Reuse at an RSC Property

If the material is intended for use as fill for the purposes of grading or backfilling at an onshore site, then the following procedure would apply to the evaluation of its suitability for reuse:

- Consultation would be required with the Qualified Person (QP), per the definition under Ontario Regulation 153/04, who is intending to file the RSC for the receiving site to confirm whether the excess rock would be assessed as “soil” for the purposes of importation of the material.
- The specific program of assessment or testing for the soil and rock would be determined based on consultation with the QP.
- If the excess rock is not being considered as “soil”, then the scope of testing (if required) would be primarily at the QP’s discretion.

If the material is to be evaluated as “soil”, then the scope of testing would be defined under the requirements of Ontario Regulation 153/04 as follows:

- The material would need to be tested at a frequency of one sample per 160 cubic metres for the first 5,000 cubic metres of material to be exported to a given site;
- The material would need to be tested at a frequency of one sample per 300 cubic metres for quantities exceeding 5,000 cubic metres to be exported to a given site; and,
- Comparison would be made to applicable generic SCS or risk assessment-derived Property Specific Standards to determine whether the material could be used at a particular receiving site.

Opportunities for Reuse at a non-RSC Property

The process of assessing the potential for reuse of the excess soil/rock at a receiving site that is not undergoing the process of filing an RSC is less prescriptive than for an RSC site. In general, the requirements under the MOECC document titled “Management of Excess Soil – A Guide for Best Management” would apply. A soil management plan describing the frequency of testing and parameters to be tested would be developed once potential receiving site(s) for the material have been identified. This plan should be developed by a QP (per the definition under Ontario Regulation 153/04) in consultation with a QP acting for the receiving site, who would be required to develop a fill management plan for the receiving site. The development of these plans would include requirements to confirm through the initial establishment of receiving criteria and subsequent testing that the use of the material would not present an adverse effect to human health or the natural environment on the receiving site. It should be noted that, as of the date of this document, MOECC has released a draft excess soil management regulation for comment. The requirements of this regulation, if passed during the project, would apply to the management of excess soils.

Opportunities for Reuse as Lakefill

Tunnel spoil that has originated from tunnelling operations in the Georgian Bay formation shale has previously been used as fill material within the Leslie Street Spit. However, receipt of materials at this facility takes place within a permitted confined disposal facility, the requirements of which may not apply to other uses of tunnel spoil for lakefill. The Leslie Street Spit at Toronto’s Tommy Thompson Park is being developed by the Toronto Port Authority (TPA) in association with the Toronto and Region Conservation Authority (TRCA). The project involves the creation of parkland and wetland habitat for fish, birds and wildlife. The TRCA currently owns the land and water bodies included in Tommy Thompson Park. Those areas under construction are owned by the Ministry of Natural Resources and are leased to the TPA. The TRCA is responsible for the development and implementation of the Master Plan and the annual operating program, which includes both biological and public interest activities. Consideration could also be given to reusing the tunnel spoil at the Lakeview Waterfront Connection project (<http://lakeviewwaterfrontconnection.ca/>).

If excess materials from the project area are intended for eventual reuse in a shore infilling, best practices for the use of materials for lake filling purposes in Ontario are described in the MOECC Lakefill Guideline. Fill materials intended for use as lakefill are categorized as either “confined fill” or “unconfined fill” based on their chemical characteristics, and are intended to be used or managed as follows:

- Confined fill requires placement in an impermeable structure that is designed to withstand the waves of a one-in-100-year frequency storm. This containment structure is intended to prevent direct contact between the fill material and surface water, and to prevent washout or exposure of the materials through a storm event. It is recommended in the Lakefill Guideline that the design of a containment structure also consider the potential effects of ice scour on the potential for containment system failure and contaminant dispersion.
- Unconfined fill is of an environmental quality that allows it to be placed in direct contact with open water without concerns regarding impairment of water quality or the aquatic environment.

5.1.3 Disposal of Surplus or Unsuitable Excavated Materials

Surplus or unsuitable excavated materials (i.e., excess soils or rock) generated during the construction that cannot be reused should be disposed of as waste. A determination of the waste classification is made through the completion of Toxicity Characteristic Leaching Procedure (TCLP) analysis and comparison of the results to the Leachate Quality Criteria provided in Schedule 4 of Ontario Regulation 347 General – Waste Management. Materials that exceed these criteria would require management as a hazardous waste in accordance with Ontario Regulation 347. For liquids (i.e., excess groundwater that could not be treated and/or discharged), direct comparison to the criteria listed in Schedule 4 is conducted to confirm whether these liquids would be hazardous waste.

5.1.4 Assessment of Soil and Groundwater Aggressiveness

Analytical testing of soil and groundwater samples will be carried out during the site-specific subsurface information. For preliminary design purposes and according to ANSI/AWWA, it may be assumed that shale bedrock has a moderate to high potential for corrosion. In the assessment of corrosion potential factors such as the leachate from de-icing salts, stray currents, etc. should be considered.

6.0 RECOMMENDATION FOR FUTURE WORK

As discussed in previous sections of this report, the soil conditions at the site are anticipated to consist of varying amounts of fill materials, underlain by granular deposits of silt to silty sand, underlain by cohesive deposits of silty clay. The granular and cohesive deposits are typically underlain by glacial till grading from silty clay to clayey sand to clayey gravel. The till deposit overlies shale bedrock of the Georgian Bay formation along the proposed trunk sewer alignment.

Further, additional geotechnical investigation will be required along the proposed project area to:

- Fill in subsurface gaps in the stratigraphic profile where subsurface information is not known and may impact design, and to minimize risk of unforeseen ground conditions during construction.
- Identify thickness / elevation of highly weathered bedrock in conjunction with borings and geophysical survey.
- Identify potential elevated groundwater levels or pressurized aquifers along the Project alignment.
- Test and assess environmental quality of soil and groundwater for handling, re-use, and disposal.
- Target water bearing soil zones to assess the need for groundwater control and support of excavation options.

- Provide soil parameters of the existing subsurface materials for design through insitu and laboratory testing and analysis.
- A dewatering specialist should be retained to design the dewatering system.
- It is recommended that a Permit to Take Water (PTTW) be obtained from the Ministry of Environment prior to commencement of construction.
- If the excavation side slopes cannot be maintained as recommended due to lack of space or any other reason, the excavation sides must be supported by an engineered shoring system. The shoring system should be designed in accordance with relevant codes, standards, and regulations such as the latest version of Canadian Engineering Foundation Manual and the OHSA Regulations for Construction Projects.
- In areas where a less competent subgrade is encountered, it may be necessary to increase the sewer bedding thickness.
- Provisions should be made for the control of ice build up in open shafts during winter. Ice could also form at any discrete open joints where potential groundwater flow could occur. A monitoring program with periodic removal of ice hazards is recommended.
- Soil Aggressiveness and Corrosion Potential evaluation should be carried out to avert sulphate attack on buried structures.
- The successful performance of the new facilities will depend largely on good workmanship and quality control during construction. It is therefore recommended that geotechnical inspection and testing by qualified personnel be provided during construction.

7.0 CLOSURE

We trust that this desktop study report meets your current requirements. If you have any questions regarding the contents of this report, please do not hesitate to contact this office.

Signature Page

Golder Associates Ltd.

DRAFT

Priyanka Talukdar, PhD
Associate, Geotechnical Engineer I

PT/DLW/pt/ml/mp

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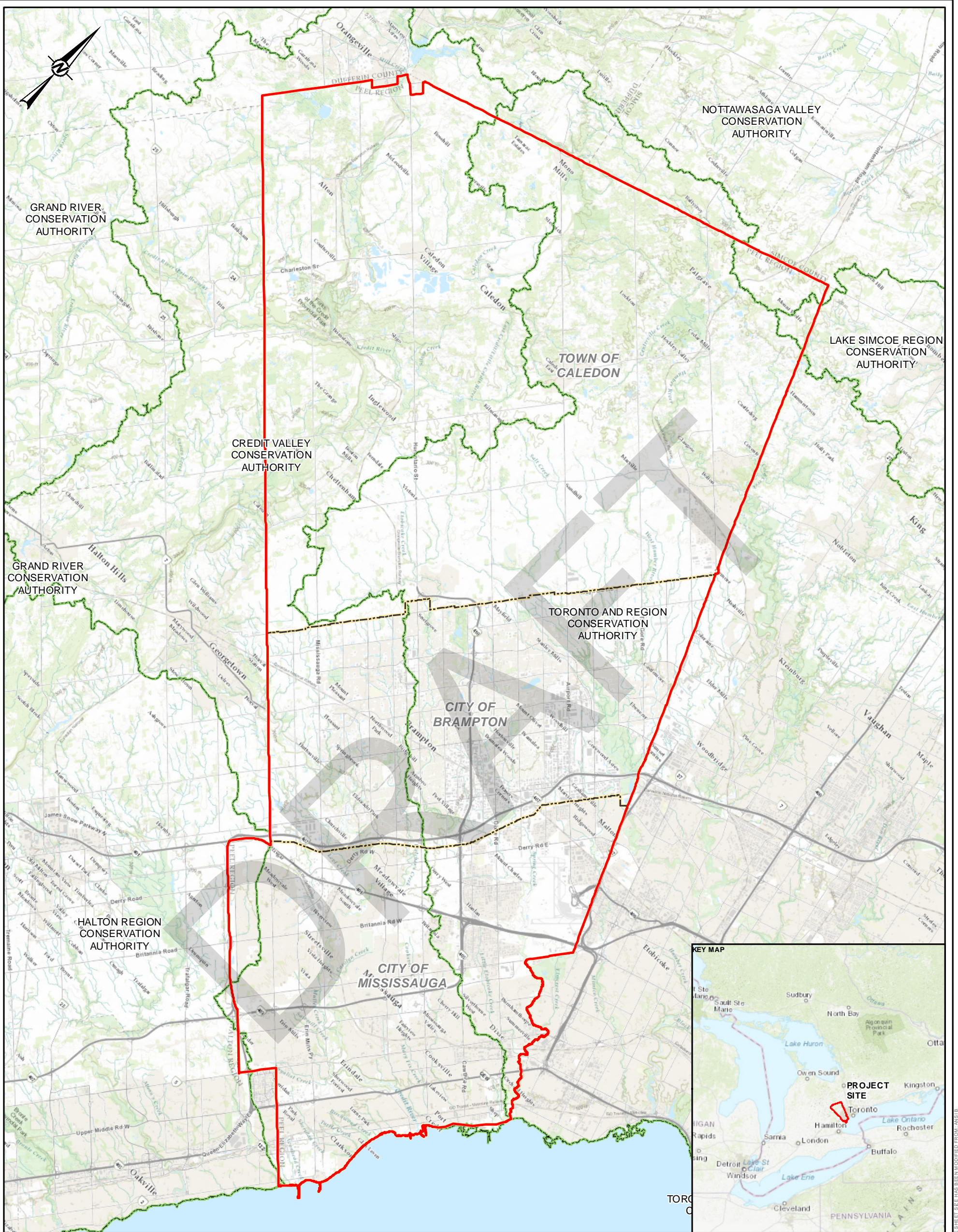
Dave Walters, PhD, PEng
Principal, Senior Geotechnical Engineer

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[https://golderassociates.sharepoint.com/sites/111670/project files/6 deliverables/hydrogeological and geotechnical desktop report/rev b-draft/19126124-4000-r-revb-hydrog and geotech desktop study-25jan2022.docx](https://golderassociates.sharepoint.com/sites/111670/project%20files/6%20deliverables/hydrogeological%20and%20geotechnical%20desktop%20report/rev%20b-draft/19126124-4000-r-revb-hydrog%20and%20geotech%20desktop%20study-25jan2022.docx)

DRAFT

FIGURES



- LEGEND**
- CITY / TOWN BOUNDARY
 - CONSERVATION AUTHORITY BOUNDARY
 - STUDY AREA

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
PROJECT LOCATION



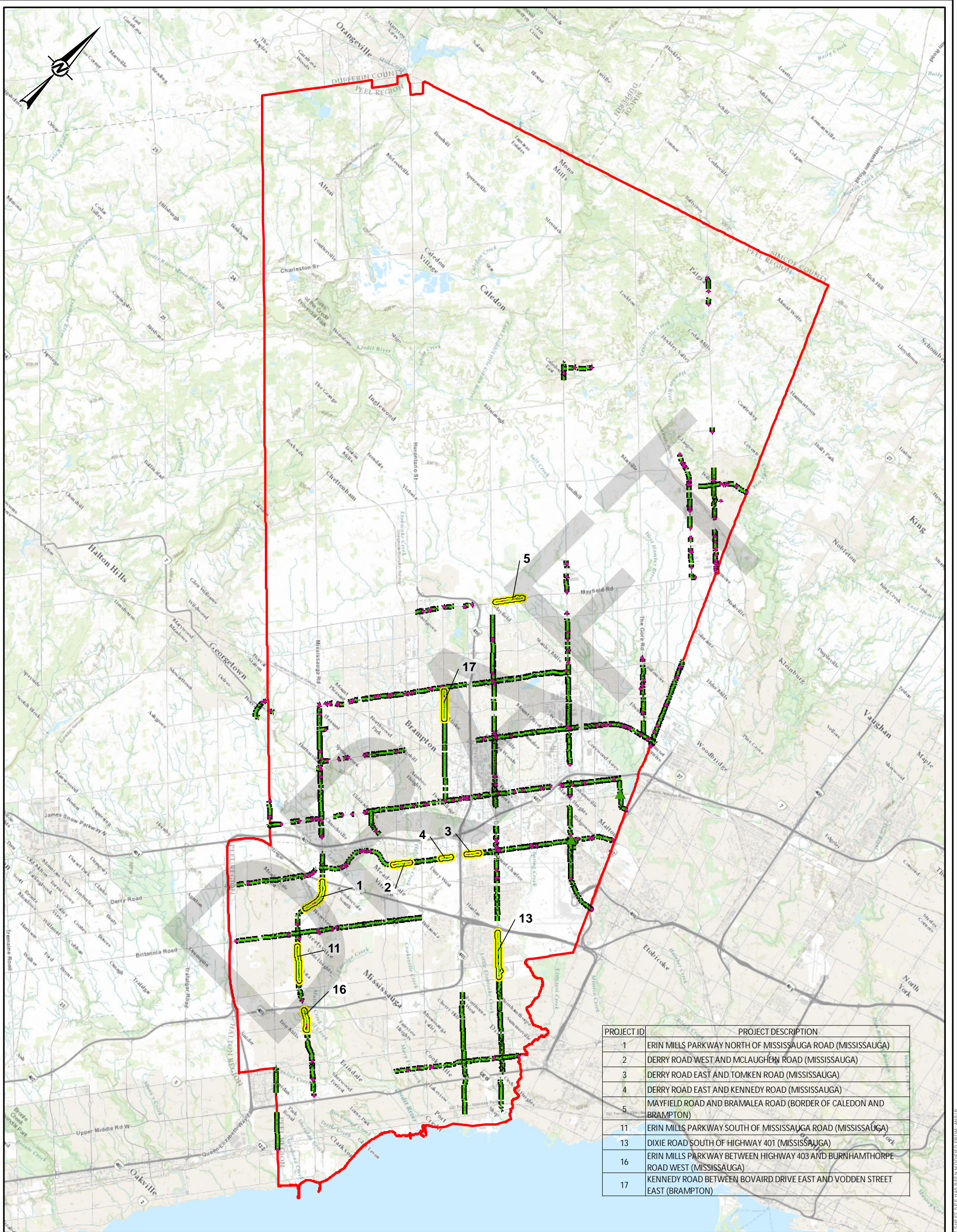
- REFERENCE(S)**
1. BASE DATA - MNRF LIO, 2020. CITY OF MISSISSAUGA OPEN DATA, 2020. CITY OF BRAMPTON OPEN DATA, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. BASE IMAGE - SOURCES: ESRI HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CONSULTANT	YYYY-MM-DD	2022-01-31
DESIGNED	PT	
PREPARED	STB	
REVIEWED	PT	
APPROVED	---	

PROJECT NO. 19126124 CONTROL 0006 REV. A FIGURE 1



IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN ON THE SHEET, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSIS



PROJECT ID	PROJECT DESCRIPTION
1	ERIN MILLS PARKWAY NORTH OF MISSISSAUGA ROAD (MISSISSAUGA)
2	DERRY ROAD WEST AND MCLAUGHLEN ROAD (MISSISSAUGA)
3	DERRY ROAD EAST AND TOMKEN ROAD (MISSISSAUGA)
4	DERRY ROAD EAST AND KENNEDY ROAD (MISSISSAUGA)
5	MAYFIELD ROAD AND BRAMALEA ROAD (BORDER OF CALEDON AND BRAMPTON)
11	ERIN MILLS PARKWAY SOUTH OF MISSISSAUGA ROAD (MISSISSAUGA)
13	DIXIE ROAD SOUTH OF HIGHWAY 401 (MISSISSAUGA)
16	ERIN MILLS PARKWAY BETWEEN HIGHWAY 403 AND BURNHAMTHORPE ROAD WEST (MISSISSAUGA)
17	KENNEDY ROAD BETWEEN BOVAIRD DRIVE EAST AND VODDEN STREET EAST (BRAMPTON)

- LEGEND**
- STUDY AREA
 - SITE AREA
 - STORMWATER INFRASTRUCTURE**
 - ◆ STORM OUTFLOW
 - ▲ STORM PUMPING STATION
 - STORM MAINS / INLET LEADS



REFERENCE(S)

1. BASE DATA - MNR F LIO, 2020. CITY OF MISSISSAUGA OPEN DATA, 2020. CITY OF BRAMPTON OPEN DATA, 2020.
2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
3. BASE IMAGE - SOURCES: ESRI HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

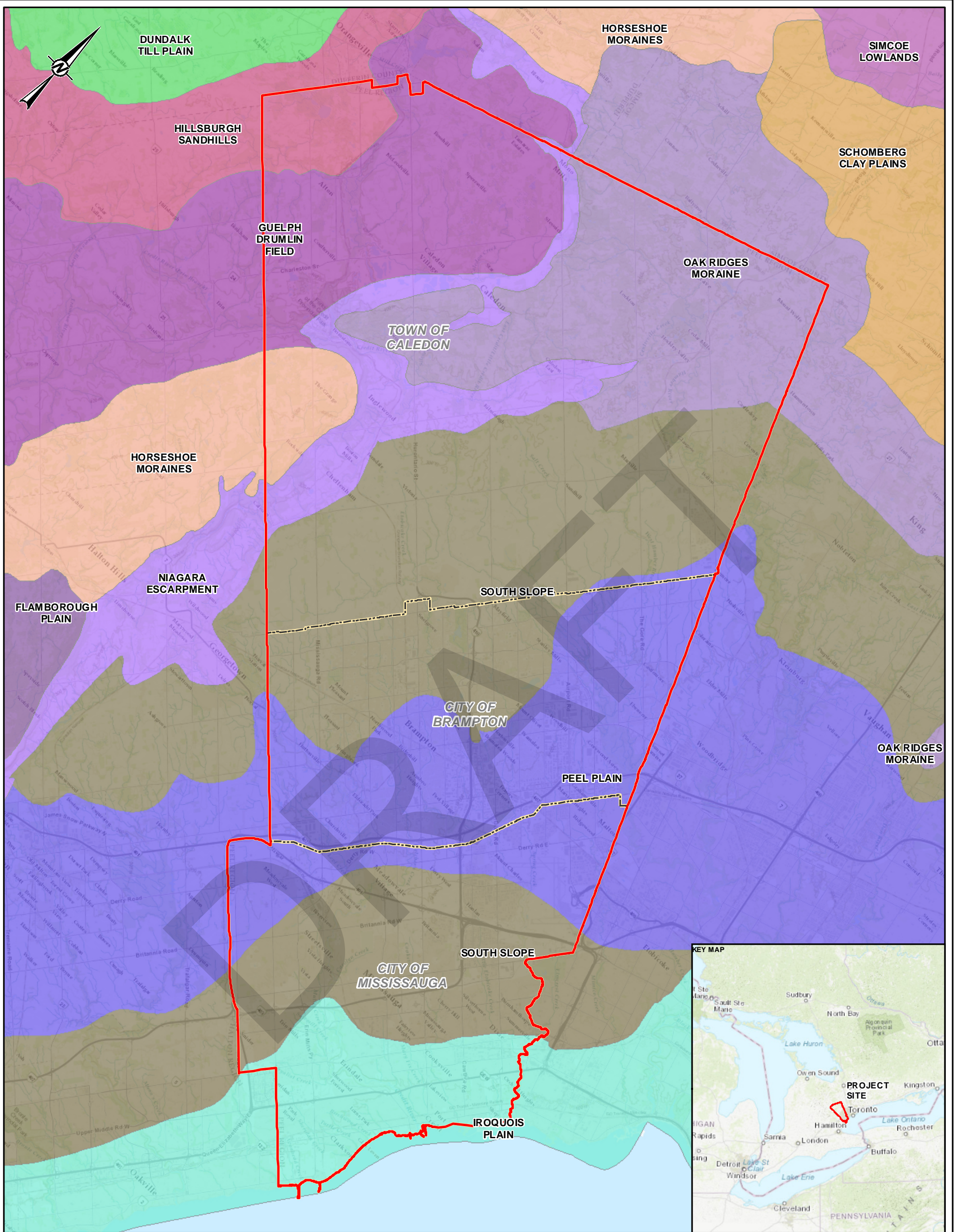
CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
STORMWATER INFRASTRUCTURE LOCATION

CONSULTANT	DATE
GOLDER MEMBER OF WSP	YYYY-MM-DD
	DESIGNED
	PREPARED
	REVIEWED
	APPROVED

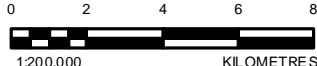
PROJECT NO.	CONTROL	REV.	FIGURE
19126124	0006	A	2



- LEGEND**
- CITY / TOWN BOUNDARY
 - STUDY AREA
 - PHYSIOGRAPHIC REGION**
 - DUNDALK TILL PLAIN
 - FLAMBOROUGH PLAIN
 - GUELPH DRUMLIN FIELD
 - HILLSBURGH SANDHILLS
 - HORSESHOE MORAINES
 - IROQUOIS PLAIN
 - NIAGARA ESCARPMENT
 - OAK RIDGES MORAINE
 - PEEL PLAIN
 - SCHOMBERG CLAY PLAINS
 - SIMCOE LOWLANDS
 - SOUTH SLOPE
 - STRATFORD TILL PLAIN

REFERENCE(S)

1. BASE DATA - MNR/LIO, 2020. CITY OF MISSISSAUGA OPEN DATA, 2020. CITY OF BRAMPTON OPEN DATA, 2020.
2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
3. BASE IMAGE - SOURCES: ESRI HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N



CLIENT
GM BLUEPLAN ENGINEERING LIMITED

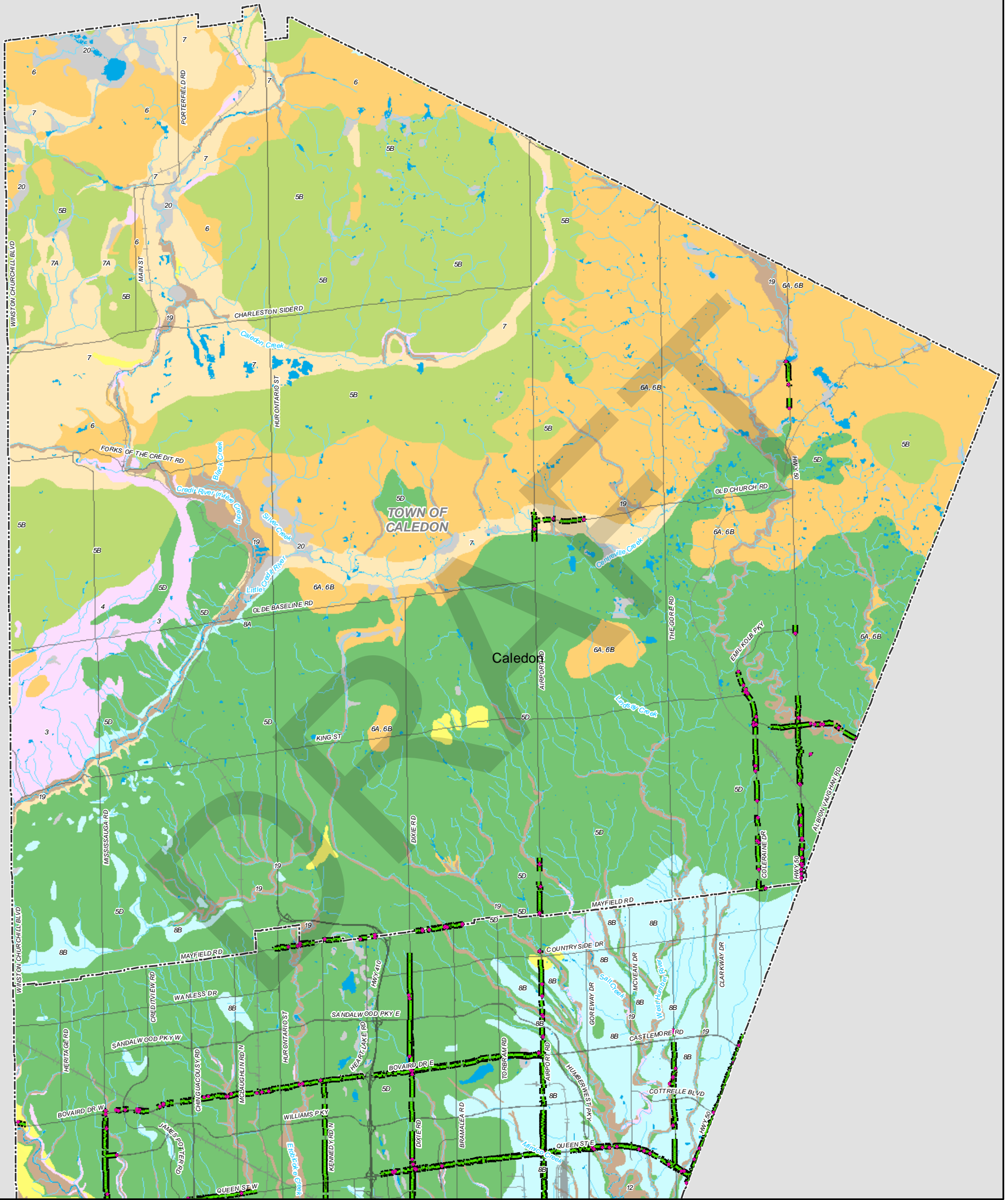
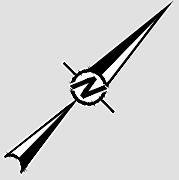
PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
PHYSIOGRAPHIC REGIONS

CONSULTANT	YYYY-MM-DD	2022-01-31
GOLDER MEMBER OF WSP	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

PROJECT NO. 19126124 CONTROL 0006 REV. A FIGURE 3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN ON THE SHEET, SEE HAS BEEN OBTAINED FROM ANSIS



- LEGEND**
- HIGHWAY
 - MAIN ROAD
 - RAILWAY TRACK
 - WATERCOURSE
 - WATERBODY
 - - - CITY / TOWN BOUNDARY
 - STORMWATER INFRASTRUCTURE
 - STORM OUTFLOW
 - ▲ STORM PUMPING STATION
 - STORM MAINS / INLET LEADS

- SURFICIAL GEOLOGY**
- 3: PALEOZOIC BEDROCK
 - 4: PALEOZOIC BEDROCK-DRIFT COMPLEX
 - 5B: STONE-POOR, CARBONATE-DERIVED SILTY TO SANDY TILL
 - 5D: GLACIOLACUSTRINE-DERIVED SILTY TO CLAYEY TILL
 - 6: ICE-CONTACT STRATIFIED DEPOSITS
 - 7: GLACIOFLUVIAL DEPOSITS
 - 7A: SANDY DEPOSITS
 - 7B: GRAVELLY DEPOSITS

- 8A: MASSIVE-WELL LAMINATED
- 8B: INTERBEDDED FLOW TILL, RAINOUT DEPOSITS AND SILT AND CLAY
- 9A: DELTAIC DEPOSITS
- 9B: LITTORAL-FORESHORE DEPOSITS
- 9C: FORESHORE-BASINAL DEPOSITS
- 12: OLDER ALLUVIAL
- 19: MODERN ALLUVIAL
- 20: ORGANIC DEPOSITS

REFERENCE(S)

1. BASE DATA - MNR F.L.I.O., 2020.
2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

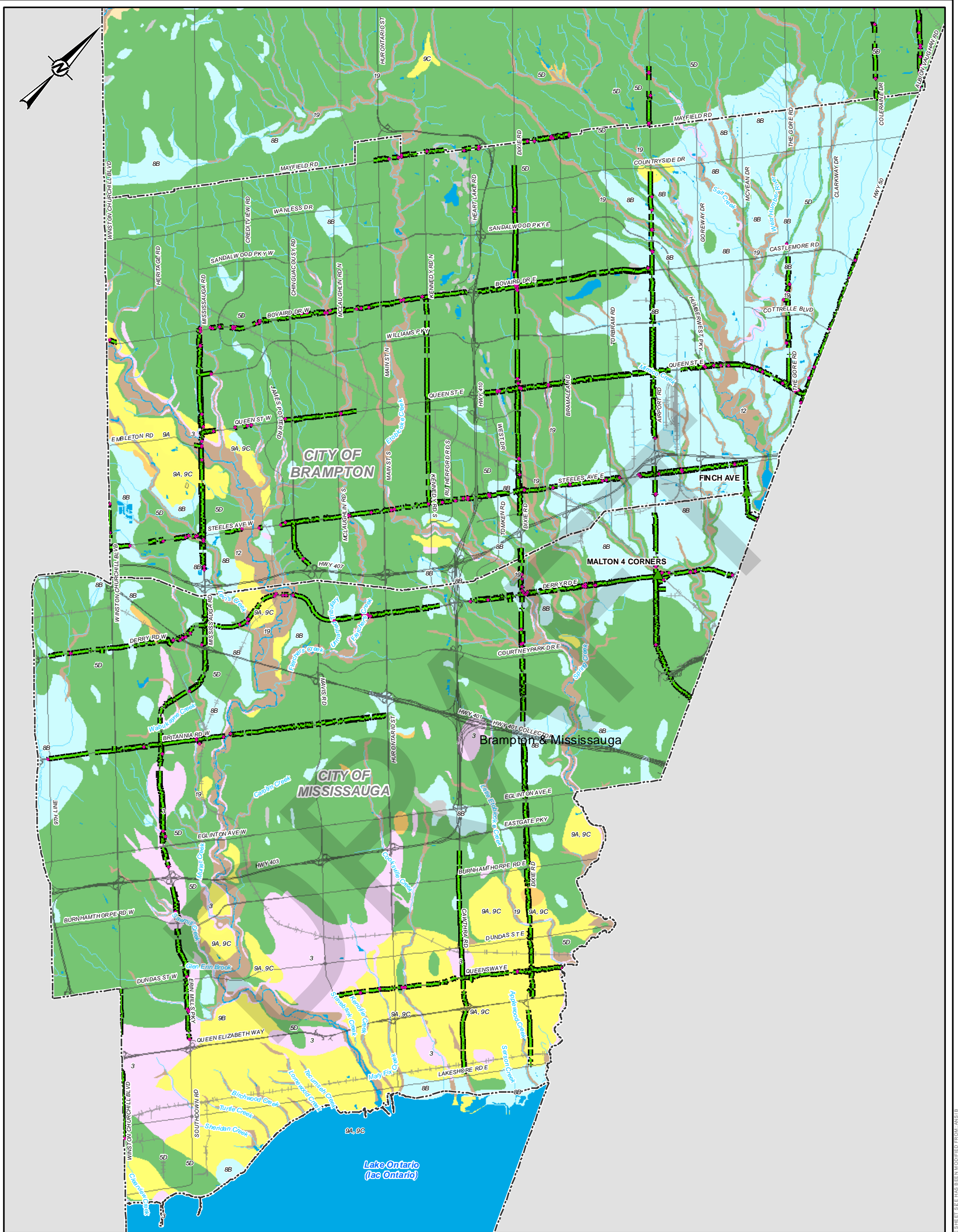
TITLE
SURFICIAL GEOLOGY

CONSULTANT	DATE	REVISION
GM BLUEPLAN ENGINEERING LIMITED	2021-11-08	0006
DESIGNED	PT	
PREPARED	STB	
REVIEWED	PT	
APPROVED	---	



PROJECT NO. 19126124 CONTROL 0006 REV. A FIGURE 4A





- LEGEND**
- HIGHWAY
 - MAIN ROAD
 - RAILWAY TRACK
 - WATERCOURSE
 - WATERBODY
 - CITY / TOWN BOUNDARY
 - STORMWATER INFRASTRUCTURE
 - STORM OUTFLOW
 - ▲ STORM PUMPING STATION
 - STORM MAINS / INLET LEADS

- SURFICIAL GEOLOGY**
- 3: PALEOZOIC BEDROCK
 - 4: PALEOZOIC BEDROCK-DRIFT COMPLEX
 - 5B: STONE-POOR, CARBONATE-DERIVED SILTY TO SANDY TILL
 - 5D: GLACIOLACUSTRINE-DERIVED SILTY TO CLAYEY TILL
 - 6: ICE-CONTACT STRATIFIED DEPOSITS
 - 7: GLACIOFLUVIAL DEPOSITS
 - 7B: GRAVELLY DEPOSITS
 - 8A: MASSIVE-WELL LAMINATED

- 8B: INTERBEDDED FLOW TILL, RAINOUT DEPOSITS AND SILT AND CLAY
- 9: COARSE-TEXTURED GLACIOLACUSTRINE DEPOSITS
- 9A: DELTAIC DEPOSITS
- 9B: LITTORAL-FORESHORE DEPOSITS
- 9C: FORESHORE-BASINAL DEPOSITS
- 12: OLDER ALLUVIAL
- 19: MODERN ALLUVIAL
- 20: ORGANIC DEPOSITS

- REFERENCE(S)**
1. BASE DATA - MNR/LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
SURFICIAL GEOLOGY

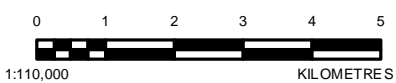
CONSULTANT	DATE	REVISION
YYYY-MM-DD	2021-11-08	
DESIGNED	PT	
PREPARED	STB	
REVIEWED	PT	
APPROVED	---	

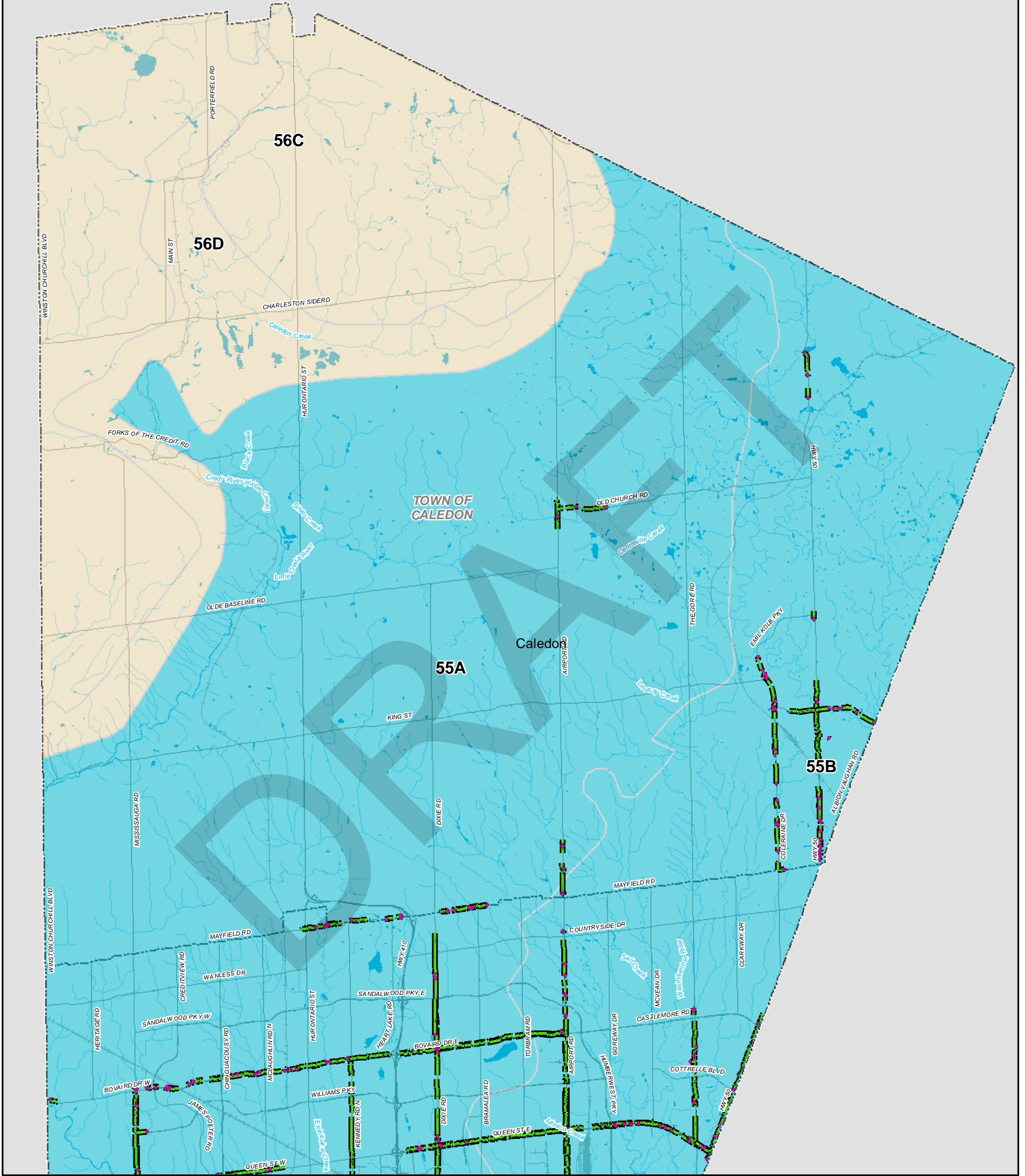
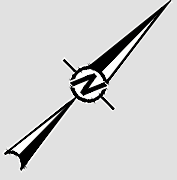
PROJECT NO.
19126124

CONTROL
0006

REV.
A

FIGURE
4B





- LEGEND**
- HIGHWAY
 - MAIN ROAD
 - RAILWAY TRACK
 - WATERCOURSE
 - WATERBODY
 - CITY / TOWN BOUNDARY
 - STORM OUTFLOW
 - ▲ STORM PUMPING STATION
 - STORM MAINS / INLET LEADS

- BEDROCK GEOLOGY**
- 56C: ARMABEL FORMATION
 - 56D: CLINTON GROUP; CATARACT GROUP
 - 55A: QUEENSTON FORMATION
 - 55B: GEORGIAN BAY FORMATION; BLUE MOUNTAIN FORMATION; BILLINGS FORMATION; COLLINGWOOD MEMBER; EASTVIEW MEMBER

- REFERENCE(S)**
1. BASE DATA - MNR F.LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

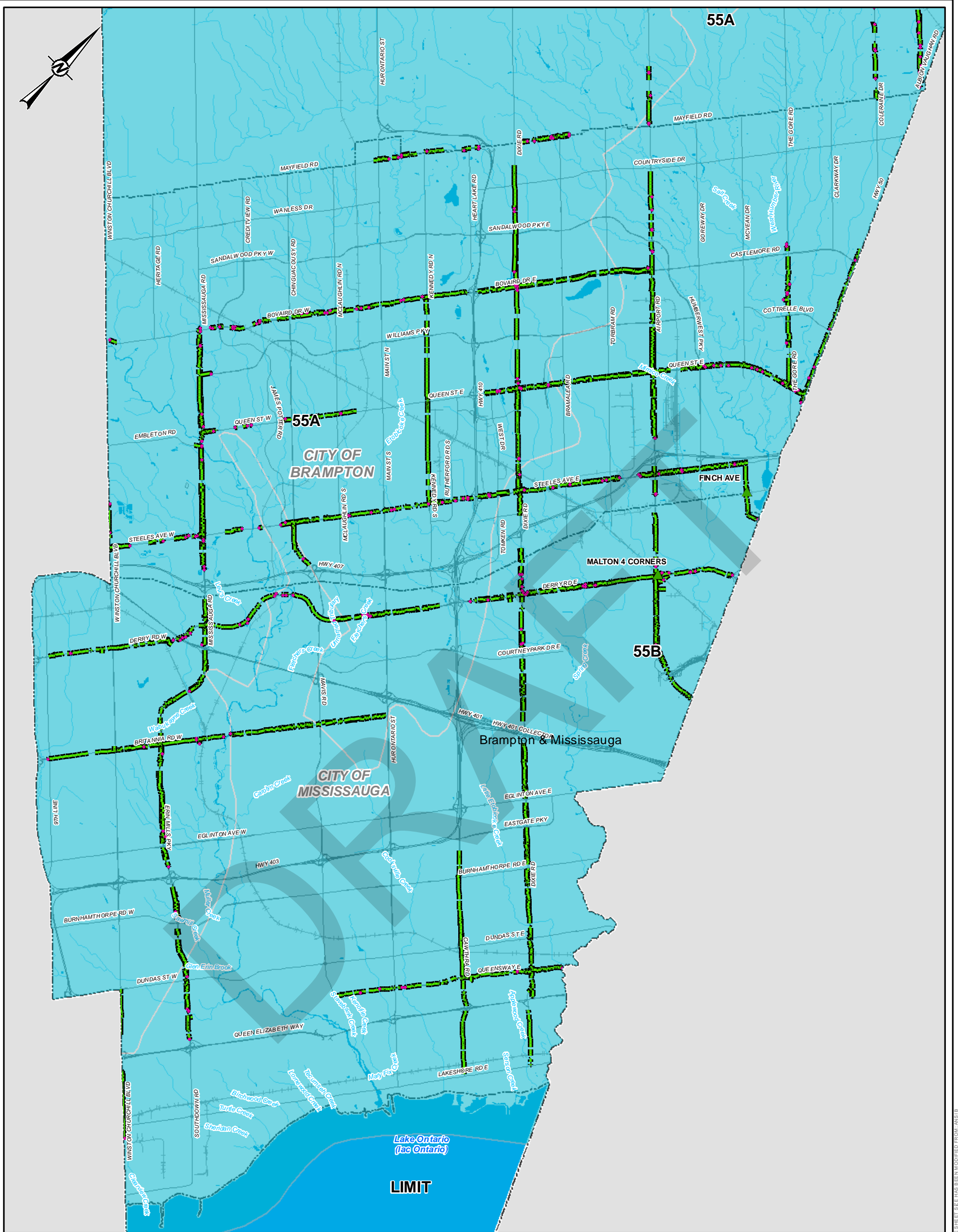
TITLE
BEDROCK GEOLOGY

CONSULTANT	YYYY-MM-DD	2021-11-08
DESIGNED	PT	
PREPARED	STB	
REVIEWED	PT	
APPROVED	---	



PROJECT NO. 19126124 CONTROL 0006 REV. A FIGURE 5A





- LEGEND**
- HIGHWAY
 - MAIN ROAD
 - RAILWAY TRACK
 - WATERCOURSE
 - WATERBODY
 - CITY / TOWN BOUNDARY
 - STORMWATER INFRASTRUCTURE**
 - STORM OUTFLOW
 - ▲ STORM PUMPING STATION
 - STORM MAINS / INLET LEADS

- BEDROCK GEOLOGY**
- 56C: ARMABEL FORMATION
 - 56D: CLINTON GROUP; CATARACT GROUP
 - 55A: QUEENSTON FORMATION
 - 55B: GEORGIAN BAY FORMATION; BLUE MOUNTAIN FORMATION; BILLINGS FORMATION; COLLINGWOOD MEMBER; EASTVIEW MEMBER

- REFERENCE(S)**
1. BASE DATA - MNR F LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
BEDROCK GEOLOGY

CONSULTANT	YYYY-MM-DD	2021-11-08
DESIGNED	PT	
PREPARED	STB	
REVIEWED	PT	
APPROVED	---	

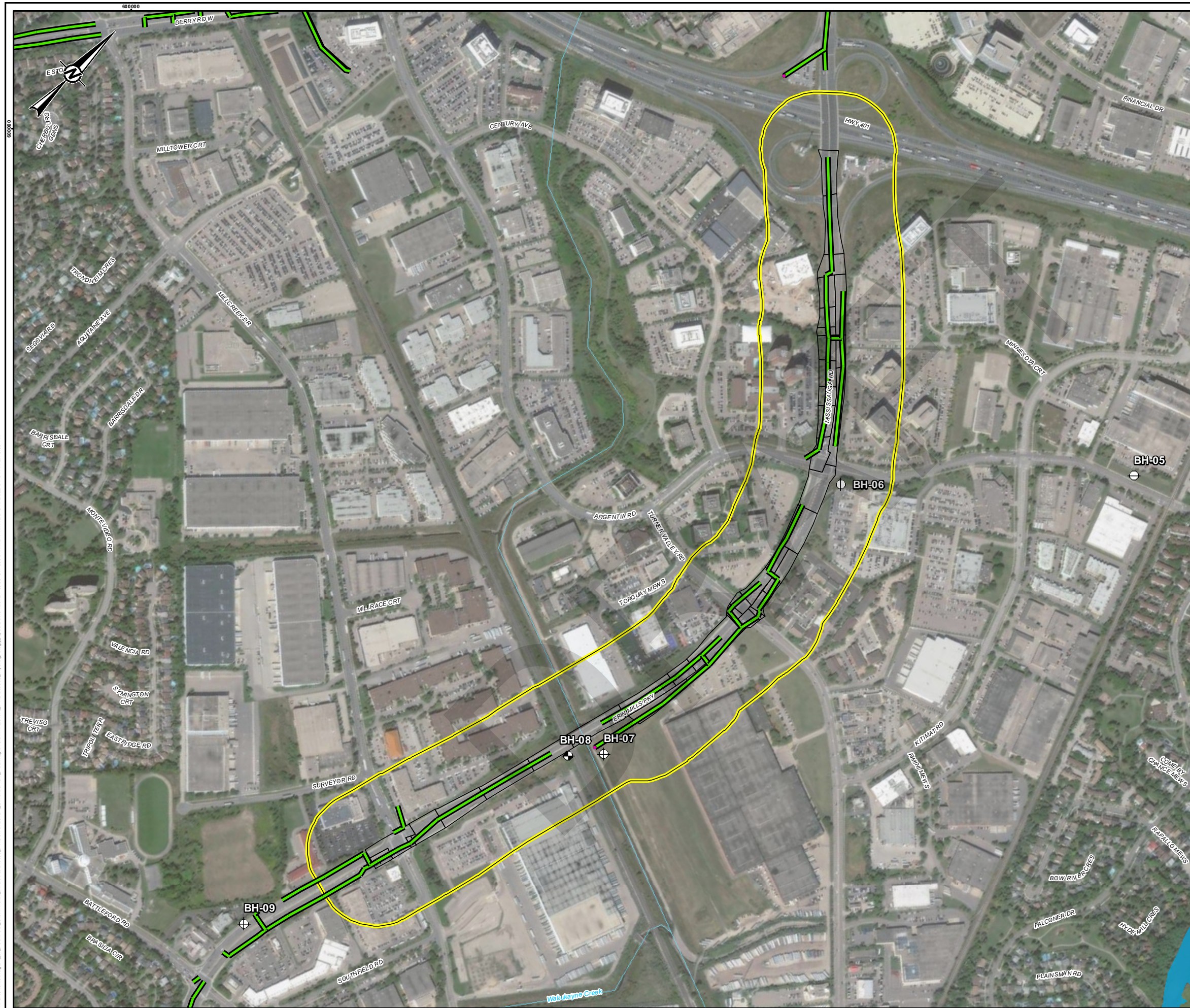


PROJECT NO.
19126124

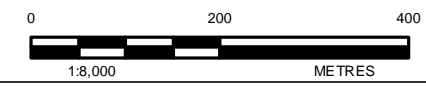
CONTROL
0006

REV.
A

FIGURE
5B



- LEGEND**
- BOREHOLE LOCATION
 - MONITORING WELL LOCATION
 - RAILWAY TRACK
 - WATER COURSE
 - SITE AREA
 - PROJECT SITE
 - WATERBODY
- STORMWATER INFRASTRUCTURE**
- STORM OUTFLOW
 - STORM PUMPING STATION
 - STORM MAINS / INLET LEADS



NOTE(S)

REFERENCE(S)

1. BASE DATA - MNRF LIO, 2020.
2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

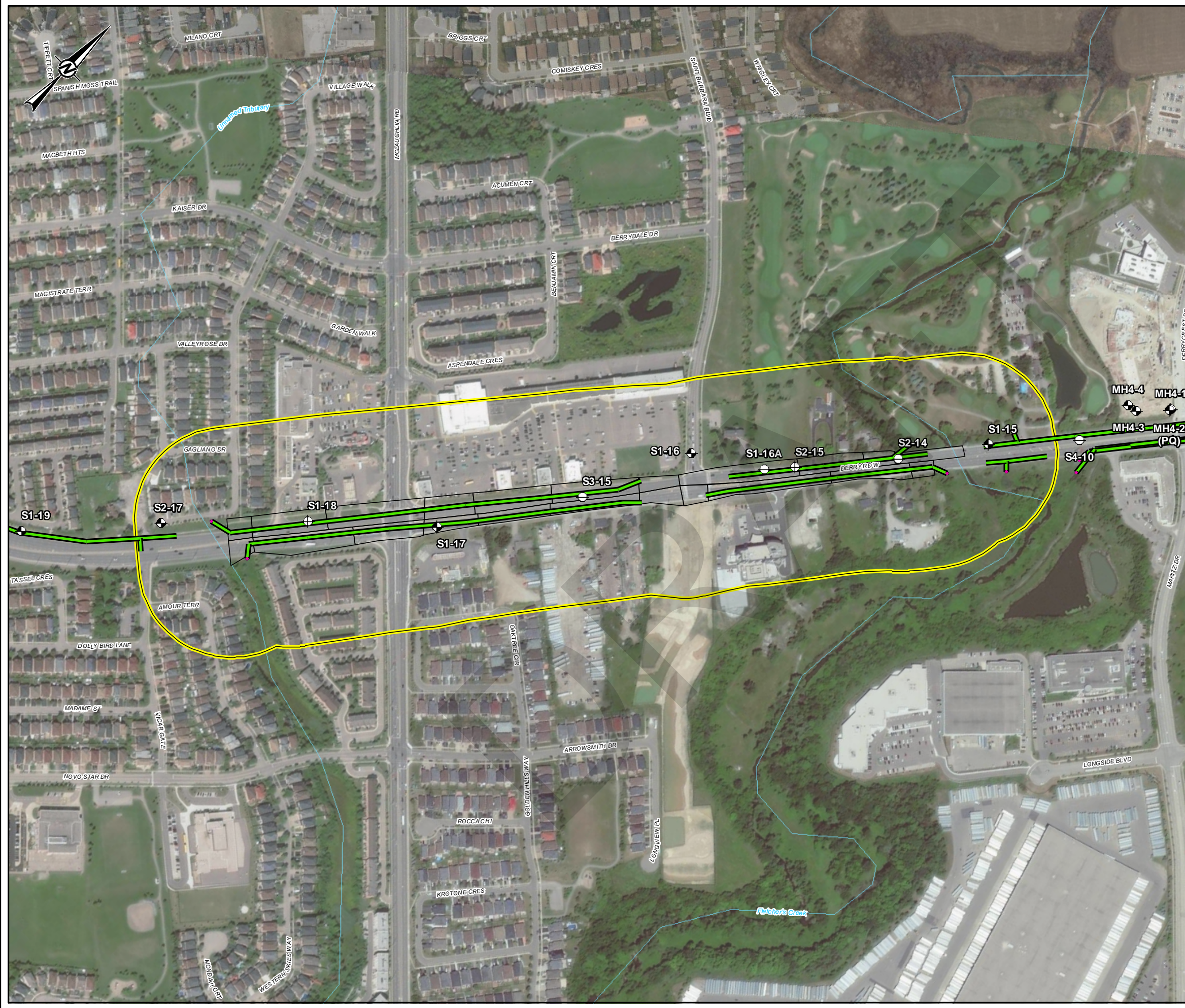
TITLE
EXISTING BOREHOLE LOCATION PLAN - ERIN MILLS PARKWAY NORTH OF MISSISSAUGA ROAD (MISSISSAUGA)











CONSULTANT	YYYY-MM-DD	2022-01-31
GOLDER MEMBER OF WSP	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

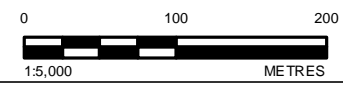
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IF THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

P:\14 - S:\Clients\Region of Peel\Stormwater Infrastructure\19126124_GM Blueplan_PeelRegionStormwaterA10_P100.DWG, Hydrography, uctd\19126124_006-CH-0006B.mxd PRINTED ON: 2022-01-31 AT 2:18:03 PM



- LEGEND**
-  BOREHOLE LOCATION
 -  MONITORING WELL LOCATION
 -  RAILWAY TRACK
 -  WATERCOURSE
 -  SITE AREA
 -  PROJECT SITE
 -  WATERBODY
- STORMWATER INFRASTRUCTURE**
-  STORM OUTFLOW
 -  STORM PUMPING STATION
 -  STORM MAINS / INLET LEADS



NOTE(S)

- REFERENCE(S)**
1. BASE DATA - MNRF LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN
FOR REGIONAL ROADS

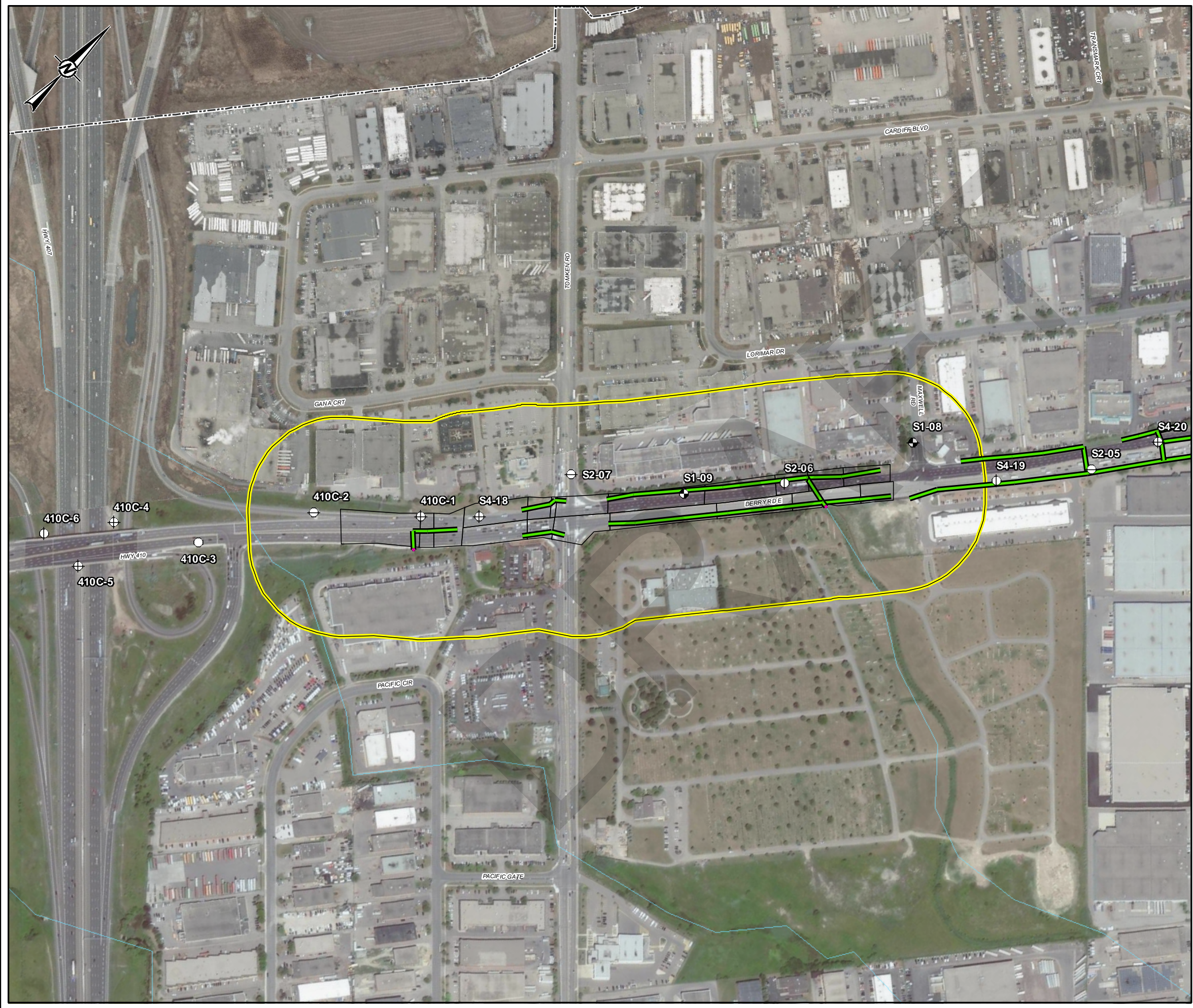
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**EXISTING BOREHOLE LOCATION PLAN - DERRY ROAD WEST
AND MCLAUGHLIN ROAD (MISSISSAUGA)**











CONSULTANT	YYYY-MM-DD	2022-01-31
 GOLDER MEMBER OF WSP	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

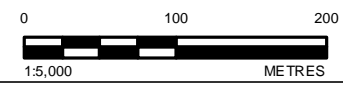
PROJECT NO.	CONTROL	REV.	FIGURE
19126124	0006	A	6B

IF THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
-  BOREHOLE LOCATION
 -  MONITORING WELL LOCATION
 -  RAILWAY TRACK
 -  WATER COURSE
 -  SITE AREA
 -  PROJECT SITE
 -  WATERBODY
- STORMWATER INFRASTRUCTURE**
-  STORM OUTFLOW
 -  STORM PUMPING STATION
 -  STORM MAINS / INLET LEADS



NOTE(S)

REFERENCE(S)

1. BASE DATA - MNRF LIO, 2020.
2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

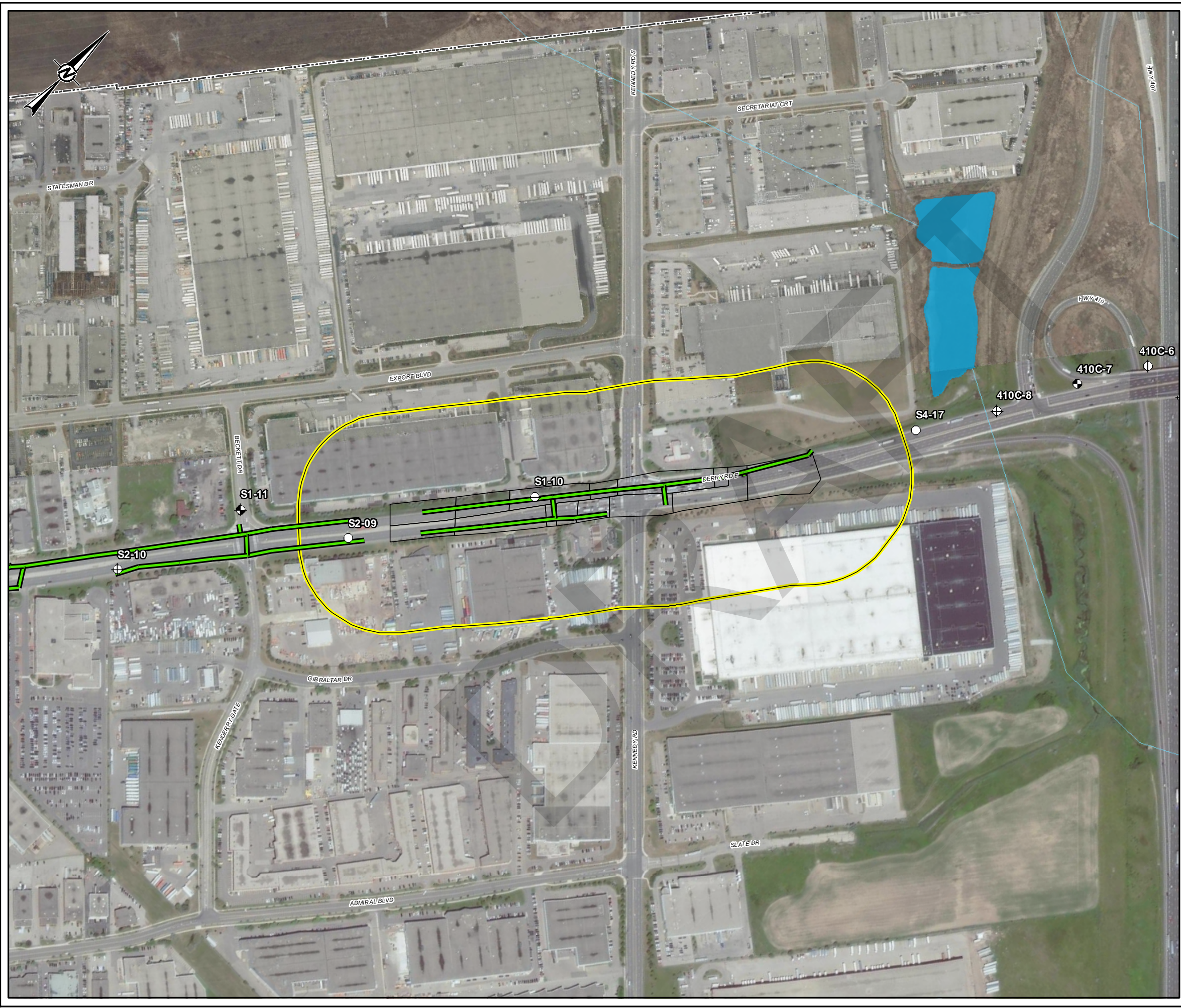
PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN
FOR REGIONAL ROADS

TITLE
**EXISTING BOREHOLE LOCATION PLAN - DERRY ROAD EAST
AND TOMKEN ROAD (MISSISSAUGA)**

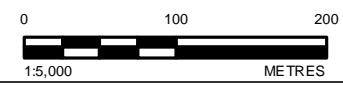
CONSULTANT	YYYY-MM-DD	2022-01-31
 GOLDER MEMBER OF WSP	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

IF THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- BOREHOLE LOCATION
 - MONITORING WELL LOCATION
 - RAILWAY TRACK
 - WATERCOURSE
 - SITE AREA
 - PROJECT SITE
 - WATERBODY
 - STORMWATER INFRASTRUCTURE**
 - STORM OUTFLOW
 - STORM PUMPING STATION
 - STORM MAINS / INLET LEADS



NOTE(S)

- REFERENCE(S)**
1. BASE DATA - MNRF LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN
FOR REGIONAL ROADS

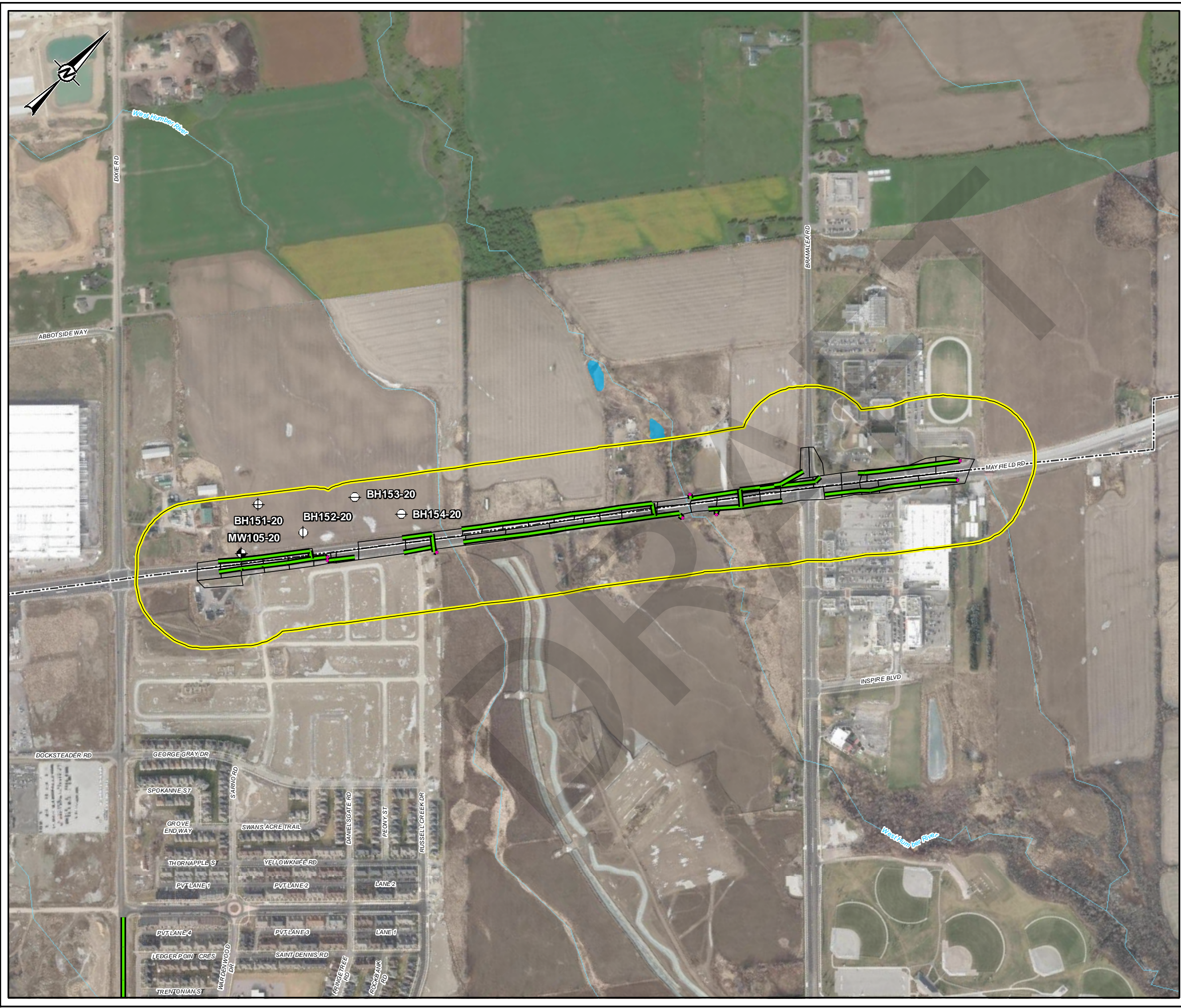
TITLE
**EXISTING BOREHOLE LOCATION PLAN - DERRY ROAD EAST
AND KENNEDY ROAD (MISSISSAUGA)**

CONSULTANT	YYYY-MM-DD	2022-01-31
GOLDER MEMBER OF WSP	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

PROJECT NO. 19126124	CONTROL 0006	REV. A	FIGURE 6D
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IF THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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- LEGEND**
- BOREHOLE LOCATION
 - MONITORING WELL LOCATION
 - RAILWAY TRACK
 - WATER COURSE
 - SITE AREA
 - PROJECT SITE
 - WATERBODY
 - STORMWATER INFRASTRUCTURE**
 - STORM OUTFLOW
 - STORM PUMPING STATION
 - STORM MAINS / INLET LEADS



NOTE(S)

- REFERENCE(S)**
1. BASE DATA - MNRF LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN
FOR REGIONAL ROADS

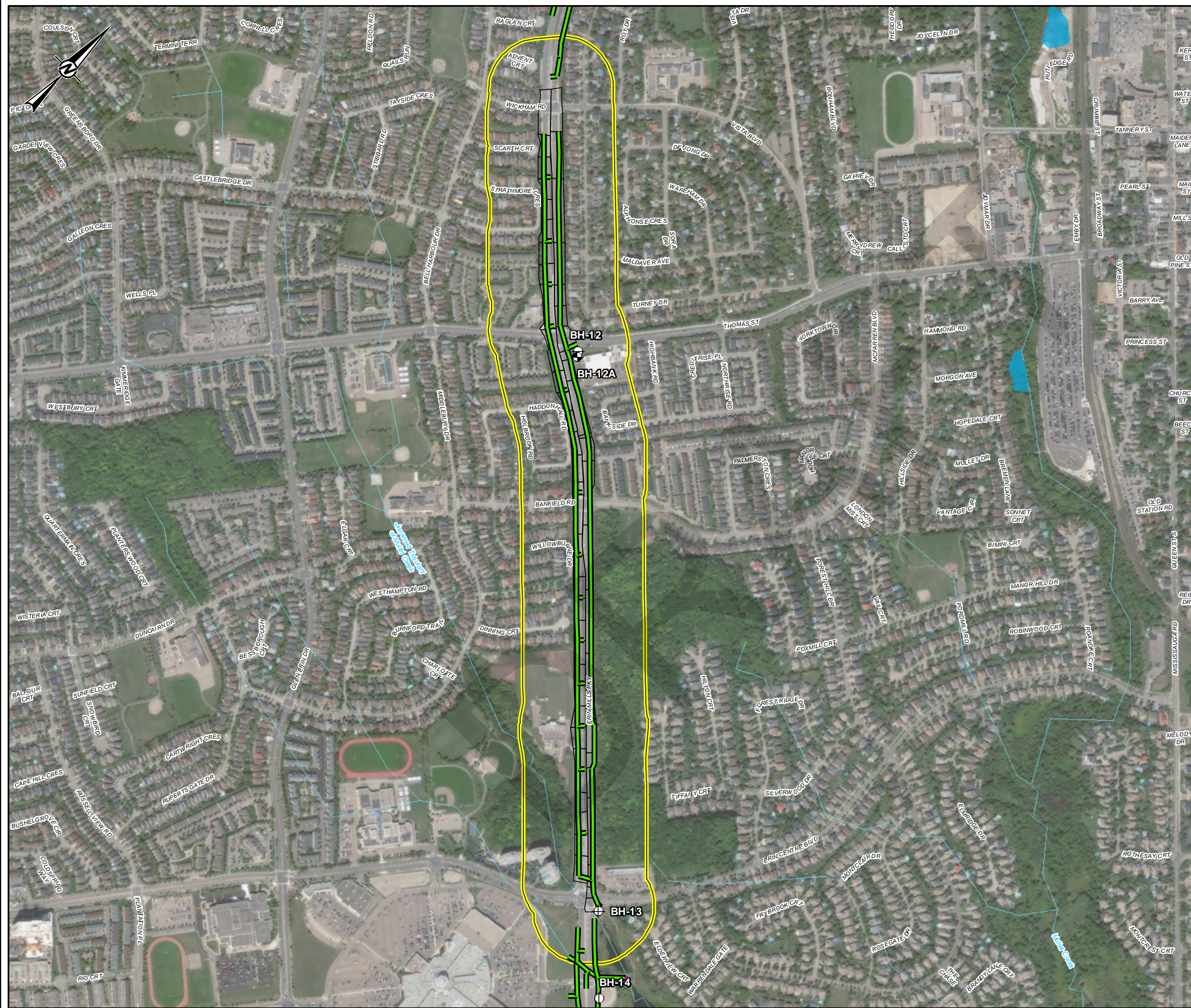
TITLE
**EXISTING BOREHOLE LOCATION PLAN - MAYFIELD ROAD AND
BRAMALEA ROAD (BORDER OF CALEDON AND BRAMPTON)**

CONSULTANT	YYYY-MM-DD	2021-12-09
GOLDER MEMBER OF WSP	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

PROJECT NO. 19126124	CONTROL 0006	REV. A	FIGURE 6E
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IF THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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LEGEND

- BOREHOLE LOCATION
- MONITORING WELL LOCATION
- RAILWAY TRACK
- WATER COURSE
- SITE AREA
- PROJECT SITE
- WATERBODY

STORMWATER INFRASTRUCTURE

- STORM OUTFLOW
- STORM PUMPING STATION
- STORM MAINS / INLET LEADS

0 200 400
1:9,000 METRES

NOTE(S)

REFERENCE(S)

1. BASE DATA - MNRF LIO, 2020.
2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

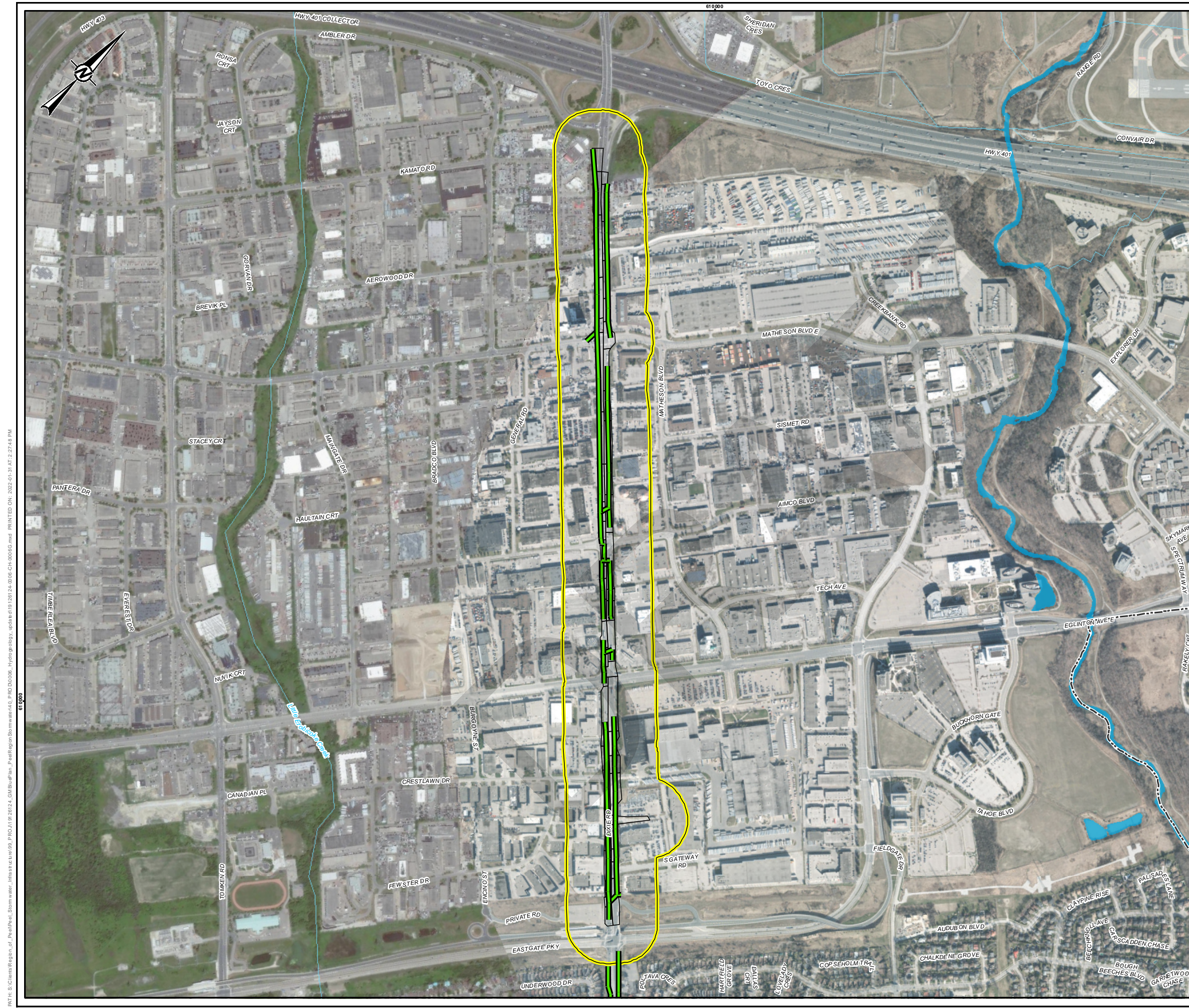
PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
EXISTING BOREHOLE LOCATION PLAN - ERIN MILLS PARKWAY SOUTH OF MISSISSAUGA ROAD (MISSISSAUGA)

CONSULTANT	YYYY-MM-DD	2021-12-09
	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

PROJECT NO. 19126124 CONTROL 0006 REV. A FIGURE 6F

THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN. THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



- LEGEND**
- BOREHOLE LOCATION
 - MONITORING WELL LOCATION
 - RAILWAY TRACK
 - WATER COURSE
 - SITE AREA
 - PROJECT SITE
 - WATERBODY
- STORMWATER INFRASTRUCTURE**
- STORM OUTFLOW
 - STORM PUMPING STATION
 - STORM MAINS / INLET LEADS



NOTE(S)

- REFERENCE(S)**
1. BASE DATA - MNRF LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
EXISTING BOREHOLE LOCATION PLAN - DIXIE ROAD SOUTH OF HIGHWAY 401 (MISSISSAUGA)

CONSULTANT	DATE	REVISION
 GOLDER MEMBER OF WSP	YYYY-MM-DD	2021-12-09
	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
19126124	0006	A	6G

P:\14_S\GIS\Region_of_Peel\Regional_Stormwater_A10_Peel_Division_Hydrography\data\19126124_0006_CH_0006G.mxd PRINTED ON: 2022-01-31 AT 2:27:48 PM
 610000

IF THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B
 2mm

B:\14 - S:\Clients\Region of Peel\Peel Stormwater Infrastructure\19126124 - GM Blueplan - Peel Region Stormwater A10 - P100.DWG, Hydrography, uctd\19126124_006-CH-000\BHM.mxd, PRINTED ON: 2022-01-31 AT: 2:31:04 PM

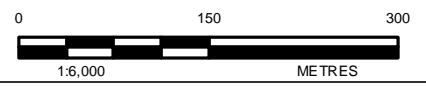


LEGEND

- BOREHOLE LOCATION
- MONITORING WELL LOCATION
- RAILWAY TRACK
- WATER COURSE
- SITE AREA
- PROJECT SITE
- WATERBODY

STORMWATER INFRASTRUCTURE

- STORM OUTFLOW
- STORM PUMPING STATION
- STORM MAINS / INLET LEADS



NOTE(S)

- REFERENCE(S)**
1. BASE DATA - MNRF LIO, 2020.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
 4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

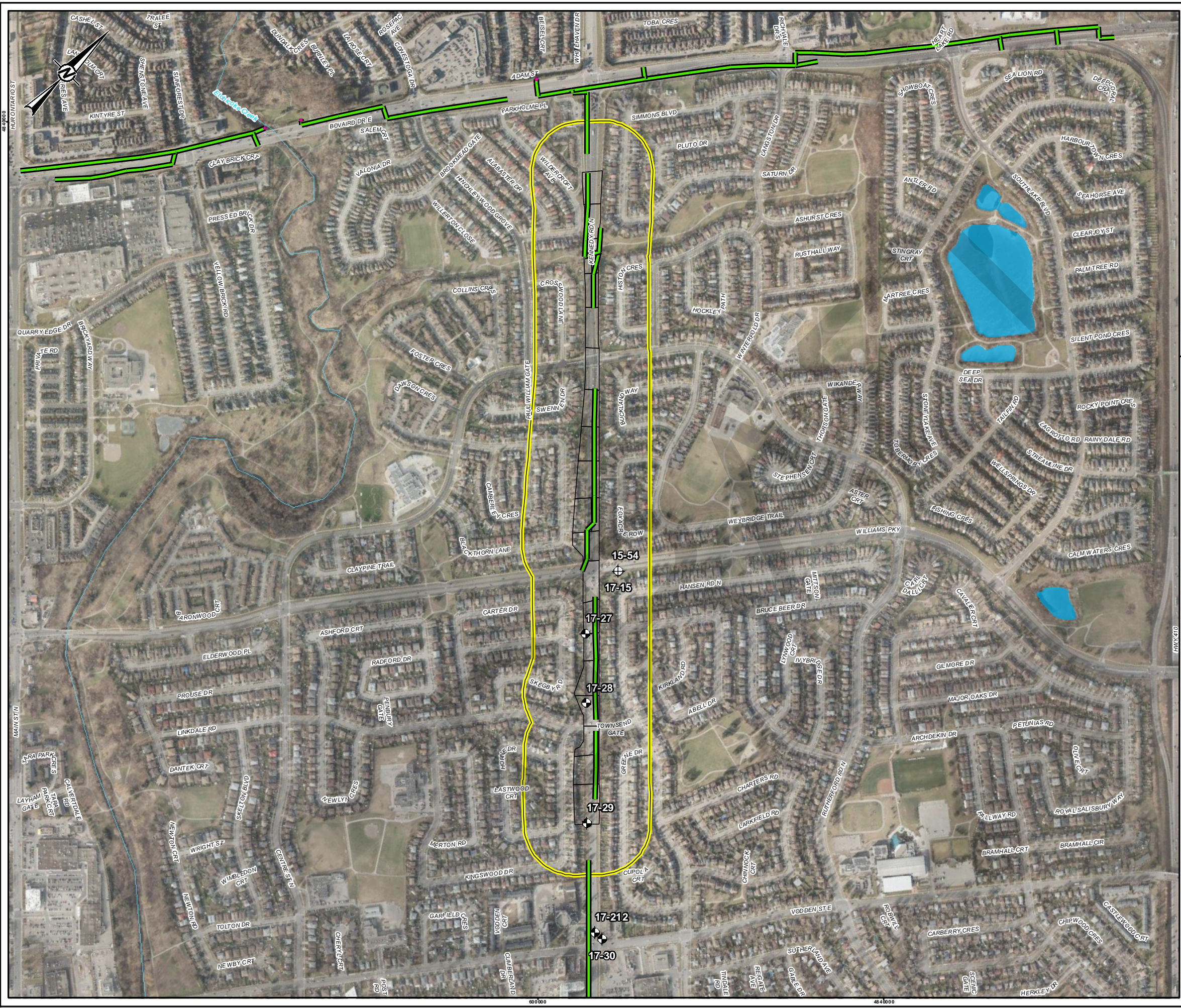
CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
EXISTING BOREHOLE LOCATION PLAN - ERIN MILLS PARKWAY BETWEEN HIGHWAY 403 AND BURNHAMTHORPE ROAD WEST (MISSISSAUGA)

CONSULTANT	DATE	REVISION
 GOLDER MEMBER OF WSP	YYYY-MM-DD	2022-01-31
	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

IF THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



LEGEND

- BOREHOLE LOCATION
- MONITORING WELL LOCATION
- RAILWAY TRACK
- WATER COURSE
- SITE AREA
- PROJECT SITE
- WATERBODY

STORMWATER INFRASTRUCTURE

- STORM OUTFLOW
- STORM PUMPING STATION
- STORM MAINS / INLET LEADS

0 250 500
1:9,000 METRES

NOTE(S)

REFERENCE(S)

1. BASE DATA - MNRF LIO, 2020.
2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
3. SURFICIAL GEOLOGY - MINISTRY OF NORTHERN DEVELOPMENT AND MINES, 1:250 000. SCALE SURFICIAL GEOLOGY OF ONTARIO; ONTARIO GEOLOGICAL SURVEY
4. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

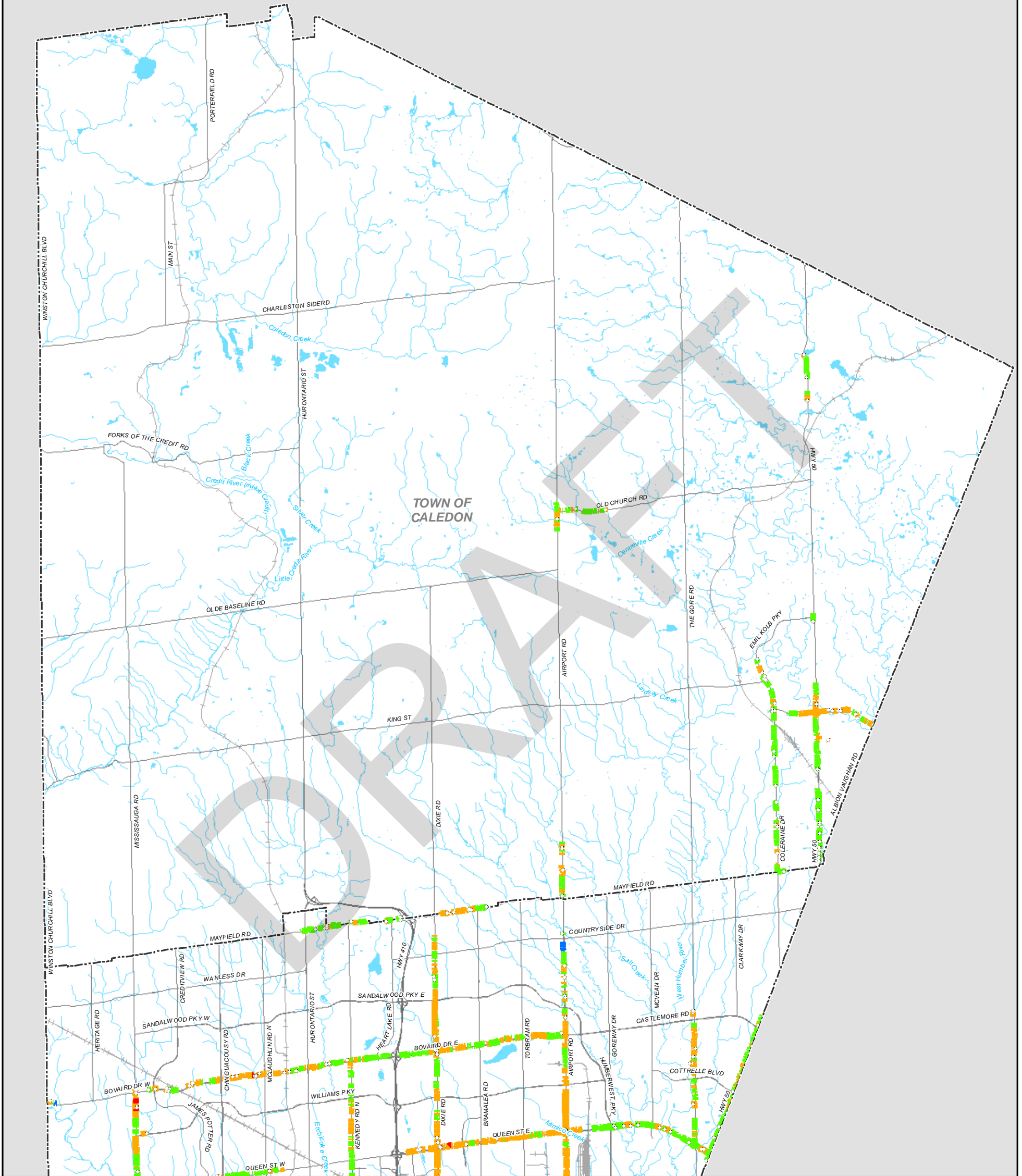
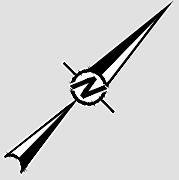
TITLE
EXISTING BOREHOLE LOCATION PLAN - KENNEDY ROAD BETWEEN BOVAIRD DRIVE EAST AND VODDEN STREET EAST (BRAMPTON)

CONSULTANT	YYYY-MM-DD	2021-12-09
	DESIGNED	PT
	PREPARED	STB
	REVIEWED	PT
	APPROVED	---

PROJECT NO.	CONTROL	REV.	FIGURE
19126124	0006	A	61

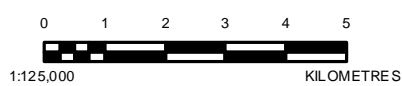
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THIS MEASUREMENT DOES NOT MATCH WHAT'S SHOWN. THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B



- LEGEND**
- HIGHWAY
 - MAIN ROAD
 - RAILWAY TRACK
 - WATERCOURSE
 - WATERBODY
 - - - CITY / TOWN BOUNDARY
- STORMWATER INFRASTRUCTURE**
- STORM OUTFLOW
 - ▲ STORM PUMPING STATION

- STORM MAINS / INLET LEADS INFILTRATION RATING SCORE**
- 2
 - 3
 - 4
 - 5



REFERENCE(S)
 1. BASE DATA - MNR F LIO, 2019.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

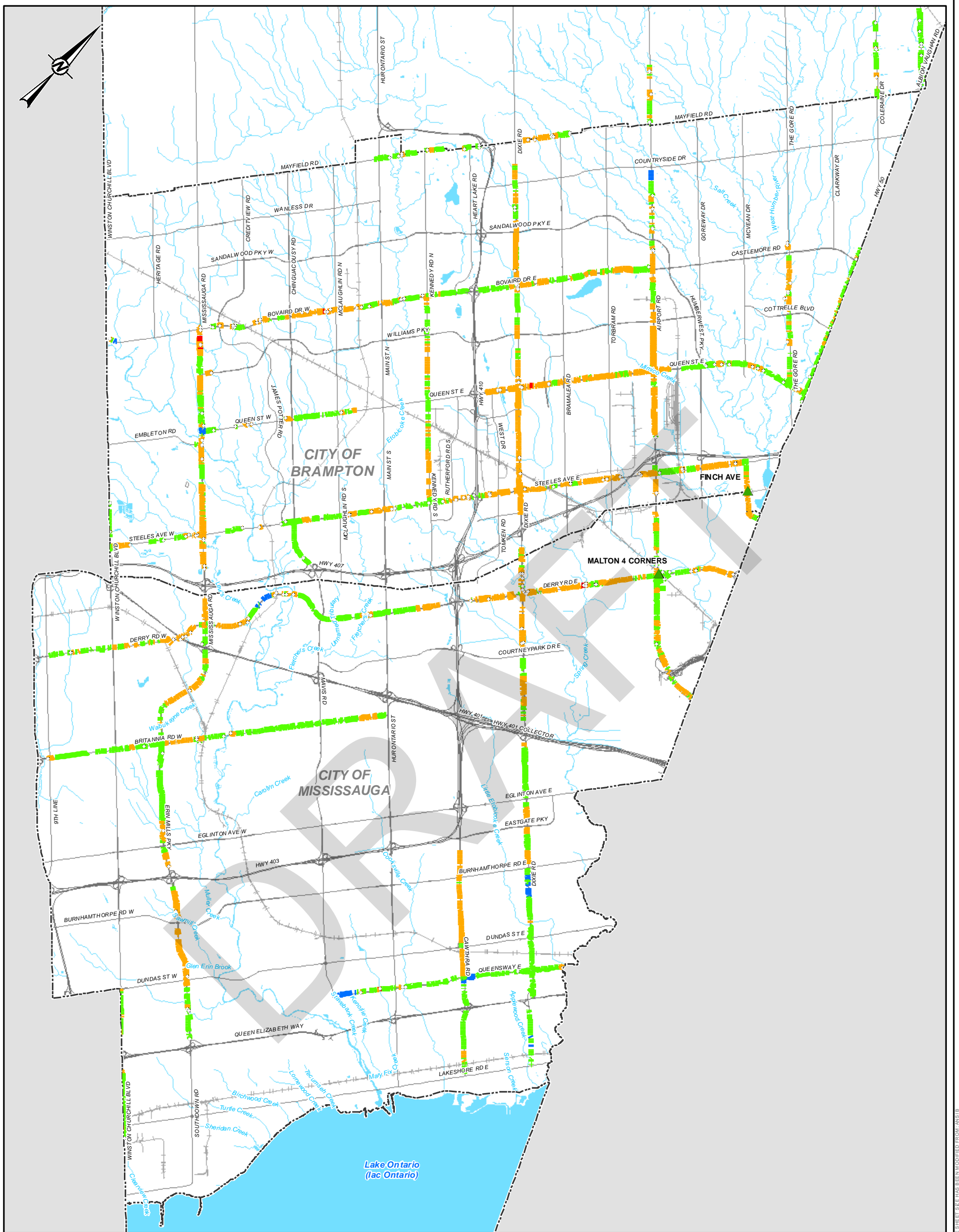
PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
INFILTRATION RATINGS

CONSULTANT	YYYY-MM-DD	2022-01-31
DESIGNED	PT	
PREPARED	STB	
REVIEWED	PT	
APPROVED	-	

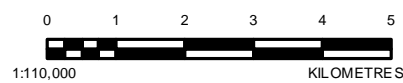


PROJECT NO. 19126124 CONTROL 0006 REV. A FIGURE 7A



- LEGEND**
- HIGHWAY
 - MAIN ROAD
 - RAILWAY TRACK
 - WATERCOURSE
 - WATERBODY
 - CITY / TOWN BOUNDARY
 - STORMWATER INFRASTRUCTURE**
 - STORM OUTFLOW
 - ▲ STORM PUMPING STATION

- STORM MAINS / INLET LEADS INFILTRATION RATING SCORE**
- 2
 - 3
 - 4
 - 5



- REFERENCE(S)**
1. BASE DATA - MNR F LIO, 2019.
 2. STORM WATER INFRASTRUCTURE PROVIDED BY GM BLUEPLAN AND REGION OF PEEL, MAY 2020
 3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT
GM BLUEPLAN ENGINEERING LIMITED

PROJECT
REGION OF PEEL STORMWATER SERVICING MASTER PLAN FOR REGIONAL ROADS

TITLE
INFILTRATION RATINGS

CONSULTANT	YYYY-MM-DD	2022-01-31
DESIGNED	PT	
PREPARED	STB	
REVIEWED	PT	
APPROVED	-	



DRAFT

APPENDIX A

**Important Information and
Limitations of this Report**

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder cannot be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client can not rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Ground Water Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

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APPENDIX B

Record of Borehole Sheets

RECORD OF BOREHOLE No BH-01 SHEET 1 OF 2 **METRIC**

PROJECT 09-1111-6069-02 LOCATION N 4829583.8 ; E 602372.9 ORIGINATED BY SB/AH/BR

G.W.P. _____ DIST HWY 401 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE June 1 to 4, 2010 CHECKED BY TZ/AM

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC NATURAL LIQUID LIMIT			UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80			100
171.2	GROUND SURFACE													
0.0	Clayey silt, some sand, trace gravel, containing organics (FILL) Very stiff Reddish brown Moist		1	SS	18									
169.8			2	SS	23									
1.4	CLAYEY SILT, trace gravel, trace sand Firm to stiff Brown Moist		3	SS	6									
			4	SS	11									
168.2			5	SS	15									
3.0	CLAYEY SILT, trace to some sand, trace gravel (TILL) Firm to stiff Brown to grey Moist		6	SS	8									
			7	SS	6									
165.7			8	SS	17									
5.5	CLAYEY SILT with SAND, trace to some gravel, containing shale fragments (TILL) Very stiff to hard Grey Moist		9	SS	73									
			10	SS	35									
			11	SS	22									
161.9			12	SS	53/0.15									
9.3	Weathered, SHALE (BEDROCK) Grey													
160.4			13	SS	80/23									
10.8	Shale (BEDROCK) Grey													
	Bedrock cored from depths of 11.1 m to 23.0 m For bedrock coring details, refer to Record of Drillhole BH-01		1	RC	REC 88%									RQD = 23%
			2	RC	REC 100%									RQD = 33%
			3	RC	REC 100%									RQD = 25%

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12_SIB

Continued Next Page

 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-01 SHEET 2 OF 2 **METRIC**

PROJECT 09-1111-6069-02 G.W.P. _____ LOCATION N 4829583.8 ; E 602372.9 ORIGINATED BY SB/AH/BR

DIST _____ HWY 401 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE June 1 to 4, 2010 CHECKED BY TZ/AM

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL																																																									
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40	60	80	100						20	40	60	80	100	10	20	30																																																	
148.2	Shale (BEDROCK) Grey Bedrock cored from depths of 11.1 m to 23.0 m For bedrock coring details, refer to Record of Drillhole BH-01	3	RC	REC 100%															RQD = 25%																																																						
23.0		4	RC	REC 100%																RQD = 93%																																																					
		5	RC	REC 93%																RQD = 48%																																																					
		6	RC	REC 100%																RQD = 91%																																																					
		7	RC	REC 100%																RQD = 90%																																																					
		8	RC	REC 100%																RQD = 82%																																																					
		END OF BOREHOLE																																																																							
		NOTES: 1. Borehole dry upon completion of drilling. 2. Water level measurements in Piezometer: <table border="1" style="font-size: small;"> <thead> <tr> <th>Date (m)</th> <th>Depth (m)</th> <th>Elev.</th> </tr> </thead> <tbody> <tr><td>07/05/10</td><td>11.3</td><td>159.7</td></tr> <tr><td>07/21/10</td><td>11.3</td><td>159.7</td></tr> <tr><td>07/30/10</td><td>11.2</td><td>159.8</td></tr> <tr><td>08/09/10</td><td>11.2</td><td>159.8</td></tr> <tr><td>08/23/10</td><td>11.2</td><td>159.8</td></tr> <tr><td>09/08/10</td><td>11.2</td><td>159.8</td></tr> <tr><td>10/06/10</td><td>11.1</td><td>159.9</td></tr> <tr><td>11/04/10</td><td>11.0</td><td>160.0</td></tr> <tr><td>12/15/10</td><td>11.0</td><td>160.0</td></tr> <tr><td>02/14/11</td><td>11.1</td><td>159.9</td></tr> <tr><td>03/25/11</td><td>11.1</td><td>159.9</td></tr> <tr><td>05/09/11</td><td>11.1</td><td>159.9</td></tr> <tr><td>06/20/11</td><td>11.1</td><td>159.9</td></tr> <tr><td>07/18/11</td><td>11.2</td><td>159.8</td></tr> <tr><td>08/28/11</td><td>11.2</td><td>159.8</td></tr> <tr><td>09/21/11</td><td>11.2</td><td>159.8</td></tr> <tr><td>10/27/11</td><td>10.9</td><td>160.1</td></tr> <tr><td>03/07/12</td><td>10.8</td><td>160.2</td></tr> </tbody> </table> 3. Soil samples Nos. 3 and 9 and rock samples from depths of 11.2 m and 22.3 m below the ground surface were collected and submitted for chemical analysis. 4. Refer to Record of Drillhole BH-01 for bedrock details.	Date (m)	Depth (m)	Elev.	07/05/10	11.3	159.7	07/21/10	11.3	159.7	07/30/10	11.2	159.8	08/09/10	11.2	159.8	08/23/10	11.2	159.8	09/08/10	11.2	159.8	10/06/10	11.1	159.9	11/04/10	11.0	160.0	12/15/10	11.0	160.0	02/14/11	11.1	159.9	03/25/11	11.1	159.9	05/09/11	11.1	159.9	06/20/11	11.1	159.9	07/18/11	11.2	159.8	08/28/11	11.2	159.8	09/21/11	11.2	159.8	10/27/11	10.9	160.1	03/07/12	10.8	160.2														
Date (m)	Depth (m)	Elev.																																																																							
07/05/10	11.3	159.7																																																																							
07/21/10	11.3	159.7																																																																							
07/30/10	11.2	159.8																																																																							
08/09/10	11.2	159.8																																																																							
08/23/10	11.2	159.8																																																																							
09/08/10	11.2	159.8																																																																							
10/06/10	11.1	159.9																																																																							
11/04/10	11.0	160.0																																																																							
12/15/10	11.0	160.0																																																																							
02/14/11	11.1	159.9																																																																							
03/25/11	11.1	159.9																																																																							
05/09/11	11.1	159.9																																																																							
06/20/11	11.1	159.9																																																																							
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08/28/11	11.2	159.8																																																																							
09/21/11	11.2	159.8																																																																							
10/27/11	10.9	160.1																																																																							
03/07/12	10.8	160.2																																																																							

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12 SIB

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-02 SHEET 1 OF 3 **METRIC**

PROJECT 09-1111-6069-02 G.W.P. _____ LOCATION N 4829551.4 ; E 602424.0 ORIGINATED BY MK

DIST _____ HWY 401 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE January 26 to 28 and 31, 2011 CHECKED BY AM/TZ/AH

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)												
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa						WATER CONTENT (%)											
						20	40	60	80	100	20	40	60	80	100	10	20	30		GR	SA	SI	CL		
166.9	GROUND SURFACE																								
0.0	CLAYEY SILT, trace to some sand, trace gravel, containing rootlets and organics		1	SS	12																				
166.0	Dark brown Wet		2	SS	18																				
0.9	CLAYEY SILT with SAND, trace to some gravel (TILL)		3	SS	10																				
	Stiff to hard		4	SS	20																				
	Grey Moist		5	SS	54																	9	36	39	16
162.8			6A	SS	43																				
4.1	Silty SAND and GRAVEL, trace clay (TILL)		6B	SS	43																				
	Dense to very dense		7	SS	50/08																				
	Grey Moist		8	SS	53																				
160.6			9	SS	54																				
6.3	CLAYEY SILT with SAND, some gravel, containing shale and limestone fragments (TILL)		10	SS	50/10																	21	22	37	20
159.9	Hard	11	SS	65/15																					
7.0	Grey																								
159.5	Moist																								
7.4	Weathered Shale (BEDROCK)																								
	Grey																								
	Shale (BEDROCK)																								
	Grey																								
	Bedrock cored from depths of 7.4 m to 35.4 m	1	RC	REC 83%																				RQD = 53%	
	For bedrock coring details, refer to Record of Drillhole BH-02																								
		2	RC	REC 93%																					RQD = 30%
		3	RC	REC 100%																					RQD = 96%
		4	RC	REC 99%																					RQD = 86%
		5	RC	REC 100%																					RQD = 85%

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MASS.GDT 3/23/12 SIB

Continued Next Page

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-02 SHEET 2 OF 3 **METRIC**

PROJECT 09-1111-6069-02 G.W.P. _____ LOCATION N 4829551.4 ; E 602424.0 ORIGINATED BY MK

DIST _____ HWY 401 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE January 26 to 28 and 31, 2011 CHECKED BY AM/TZ/AH

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
--- CONTINUED FROM PREVIOUS PAGE ---																
	Shale (BEDROCK) Grey	[Pattern]	5	RC	REC 100%											RQD = 85%
	Bedrock cored from depths of 7.4 m to 35.4 m	[Pattern]	6	RC	REC 100%											RQD = 93%
	For bedrock coring details, refer to Record of Drillhole BH-02	[Pattern]	7	RC	REC 99%											RQD = 92%
		[Pattern]	8	RC	REC 100%											RQD = 88%
		[Pattern]	9	RC	REC 100%											RQD = 93%
		[Pattern]	10	RC	REC 100%											RQD = 100%
		[Pattern]	11	RC	REC 99%											RQD = 94%
		[Pattern]	12	RC	REC 100%											RQD = 100%
		[Pattern]	13	RC	REC 100%											RQD = 98%
		[Pattern]	14	RC	REC 100%											RQD = 100%
		[Pattern]	15	RC	REC 100%											RQD = 99%

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12 SIB

Continued Next Page

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-02</u>	RECORD OF BOREHOLE No BH-02	SHEET 3 OF 3	METRIC
G.W.P. _____	LOCATION <u>N 4829551.4 ; E 602424.0</u>	ORIGINATED BY <u>MK</u>	
DIST <u>HWY 401</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>January 26 to 28 and 31, 2011</u>	CHECKED BY <u>AM/TZ/AH</u>	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL								
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80	100	W _p	W			W _L	20	40	60	80	100	10	20
131.5 35.4	Shale (BEDROCK) Grey Bedrock cored from depths of 7.4 m to 35.4 m For bedrock coring details, refer to Record of Drillhole BH-02	[Pattern]	15	RC	REC 100%																			RQD = 99%
			16	RC	REC 100%																			RQD = 100%
			17	RC	REC 91%																			RQD = 91%
			18	RC	REC 100%																			RQD = 100%
	END OF BOREHOLE NOTES: 1. Borehole dry upon completion of drilling. 2. Refer to Record of Drillhole BH-02 for bedrock details.																							

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12 SIB

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-03 SHEET 1 OF 3 **METRIC**

PROJECT 09-1111-6069-02 G.W.P. _____ LOCATION N 4829505.7 ; E 602459.7 ORIGINATED BY MK

DIST _____ HWY 401 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE February 3,4 and 7, 2011 CHECKED BY AM/TZ/AH

SOIL PROFILE		STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)									
ELEV DEPTH	DESCRIPTION		NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20	40	60	80	100	10
167.6	GROUND SURFACE																						
0.0	CLAYEY SILT, trace gravel, trace sand, containing rootlets and organics Firm		1	SS	5																		
166.9	Brown to grey Moist																						
0.7	CLAYEY SILT, trace gravel, trace sand (TILL) Firm to very stiff		2	SS	15																		
	Grey Moist																						
	Grey below a depth of 2.2 m		3	SS	16																		
			4	SS	7																		
164.6	CLAYEY SILT with SAND, trace to some gravel (TILL) Very stiff to hard		5	SS	23																		
3.0	Grey Moist																						
			6	SS	58																		7 32 38 23
162.0	Silty SAND and GRAVEL, trace clay (TILL) Very dense		7	SS	53 / .10																		38 32 27 3
5.6	Moist																						
160.9	CLAYEY SILT with SAND, trace gravel, containing shale and limestone fragments (TILL) Hard		8	SS	100																		
6.7	Grey Moist																						
159.6	Shale (BEDROCK) Grey		9	SS	69/0.28																		
8.0	Bedrock cored from depths of 8.0 m to 35.3 m For bedrock coring details, refer to Record of Drillhole BH-03		1	RC	REC 79%																		RQD = 12%
			2	RC	REC 97%																		RQD = 45%
			3	RC	REC 100%																		RQD = 68%
			4	RC	REC 100%																		RQD = 79%
			5	RC	REC 100%																		RQD = 93%

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12 SIB

Continued Next Page

 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-03 SHEET 2 OF 3 **METRIC**

PROJECT 09-1111-6069-02 G.W.P. _____ LOCATION N 4829505.7 ; E 602459.7 ORIGINATED BY MK

DIST _____ HWY 401 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE February 3,4 and 7, 2011 CHECKED BY AM/TZ/AH

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa									WATER CONTENT (%)					
						20	40	60	80	100	20	40	60	80	100	10	20	30				
	--- CONTINUED FROM PREVIOUS PAGE ---																					
	Shale (BEDROCK) Grey		5	RC	REC 100%																RQD = 93%	
	Bedrock cored from depths of 8.0 m to 35.3 m																					
	For bedrock coring details, refer to Record of Drillhole BH-03		6	RC	REC 100%																	RQD = 96%
			7	RC	REC 100%																	RQD = 100%
			8	RC	REC 97%																	RQD = 97%
			9	RC	REC 100%																	RQD = 100%
			10	RC	REC 100%																	RQD = 94%
			11	RC	REC 100%																	RQD = 100%
			12	RC	REC 100%																	RQD = 100%
			13	RC	REC 100%																	RQD = 100%
			14	RC	REC 100%																	RQD = 100%
			15	RC	REC 100%																	RQD = 99%

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MASS.GDT 3/23/12 SIB

Continued Next Page

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-03 SHEET 3 OF 3 **METRIC**

PROJECT 09-1111-6069-02 G.W.P. _____ LOCATION N 4829505.7 ; E 602459.7 ORIGINATED BY MK

DIST _____ HWY 401 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE February 3,4 and 7, 2011 CHECKED BY AM/TZ/AH

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL																														
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					W _p	W			W _L																													
	--- CONTINUED FROM PREVIOUS PAGE ---					20 40 60 80 100	○ UNCONFINED	+ FIELD VANE	● QUICK TRIAXIAL	× REMOULDED	WATER CONTENT (%)																																			
132.3	Shale (BEDROCK) Grey Bedrock cored from depths of 8.0 m to 35.3 m For bedrock coring details, refer to Record of Drillhole BH-03	[Pattern]	15	RC	REC 100%	[Hatched]											RQD = 99%																													
			16	RC	REC 100%												RQD = 100%																													
			17	RC	REC 100%												RQD = 100%																													
			18	RC	REC 100%												RQD = 100%																													
132.3	35.3																																													
	END OF BOREHOLE NOTES: 1. Water level measurements in Piezometer: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Date (m)</th> <th style="text-align: left;">Depth (m)</th> <th style="text-align: left;">Elev.</th> </tr> </thead> <tbody> <tr><td>02/14/11</td><td>2.5</td><td>165.6</td></tr> <tr><td>03/25/11</td><td>2.4</td><td>165.7</td></tr> <tr><td>05/09/11</td><td>2.3</td><td>165.8</td></tr> <tr><td>06/20/11</td><td>2.2</td><td>165.9</td></tr> <tr><td>07/18/11</td><td>2.2</td><td>165.9</td></tr> <tr><td>08/28/11</td><td>2.1</td><td>166.0</td></tr> <tr><td>09/21/11</td><td>2.3</td><td>165.8</td></tr> <tr><td>10/27/11</td><td>2.4</td><td>165.7</td></tr> <tr><td>03/07/12</td><td>2.1</td><td>166.0</td></tr> </tbody> </table> 2. Refer to Record of Drillhole BH-03 for bedrock details.																Date (m)	Depth (m)	Elev.	02/14/11	2.5	165.6	03/25/11	2.4	165.7	05/09/11	2.3	165.8	06/20/11	2.2	165.9	07/18/11	2.2	165.9	08/28/11	2.1	166.0	09/21/11	2.3	165.8	10/27/11	2.4	165.7	03/07/12	2.1	166.0
Date (m)	Depth (m)	Elev.																																												
02/14/11	2.5	165.6																																												
03/25/11	2.4	165.7																																												
05/09/11	2.3	165.8																																												
06/20/11	2.2	165.9																																												
07/18/11	2.2	165.9																																												
08/28/11	2.1	166.0																																												
09/21/11	2.3	165.8																																												
10/27/11	2.4	165.7																																												
03/07/12	2.1	166.0																																												

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MASS.GDT 3/23/12 SIB

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-02</u>	RECORD OF BOREHOLE No BH-04	SHEET 1 OF 3	METRIC
G.W.P. _____	LOCATION <u>N 4829268.9 ; E 602696.2</u>	ORIGINATED BY <u>SB</u>	
DIST _____ HWY <u>401</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>June 3, 2010</u>	CHECKED BY <u>TZ/HJ</u>	

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
			NUMBER	TYPE	"N" VALUES			20	40					
169.6	GROUND SURFACE													
0.0	TOPSOIL Clayey silt, trace gravel, trace sand, containing rootlets (Possible FILL) Stiff to very stiff Brown and grey Moist		1	SS	22									
			2	SS	25									
			3	SS	14									
			4	SS	8									
166.6	CLAYEY SILT, trace to some sand, trace gravel Stiff to very stiff Brown to grey Moist Grey below a depth of 4.27 m		5	SS	24									
			6	SS	14									
			7	SS	8									
			8	SS	6									
			9	SS	8									
162.7	CLAYEY SILT with SAND, trace to some gravel, containing rock fragments (TILL) Hard Grey Moist		10	SS	38									
			11	SS	48									
			12	SS	63									7 31 48 14
			13	SS	74									
			14	SS	50/0.03									9 40 38 13
			15	SS	50/0.15									
			16	SS	62									
155.9	Shale (BEDROCK)		17	SS	50/0.05									
13.7	Bedrock cored from depths of 13.7 m to 29.2 m For bedrock coring details, refer to Record of Drillhole BH-04		18	SS	50/0.15									
			1	RC	REC 31%									RQD = 0%

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12 SIB

Continued Next Page

 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-02</u>	RECORD OF BOREHOLE No BH-04	SHEET 2 OF 3	METRIC
G.W.P. _____	LOCATION <u>N 4829268.9 ; E 602696.2</u>	ORIGINATED BY <u>SB</u>	
DIST _____ HWY <u>401</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>June 3, 2010</u>	CHECKED BY <u>TZ/HJ</u>	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
	--- CONTINUED FROM PREVIOUS PAGE ---						20	40	60	80	100					
	Shale (BEDROCK) Bedrock cored from depths of 13.7 m to 29.2 m For bedrock coring details, refer to Record of Drillhole BH-04		1	RC	REC 31%											RQD = 0%
			2	RC	REC 16%											RQD = 0%
			3	RC	REC 38%											RQD = 0%
			4	RC	REC 84%											RQD = 0%
			5	RC	REC 100%											RQD = 23%
			6	RC	REC 100%											RQD = 26%
			7	RC	REC 88%											RQD = 30%
			8	RC	REC 85%											RQD = 15%
			9	RC	REC 100%											RQD = 42%
			10	RC	REC 92%											RQD = 14%
140.4																
29.2																

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MASS.GDT 3/23/12 SIB

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 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-02</u>	RECORD OF BOREHOLE No BH-04	SHEET 3 OF 3	METRIC
G.W.P. _____	LOCATION <u>N 4829268.9 ; E 602696.2</u>	ORIGINATED BY <u>SB</u>	
DIST _____ HWY <u>401</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>June 3, 2010</u>	CHECKED BY <u>TZ/HJ</u>	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)				
ELEV DEPTH	DESCRIPTION	STRAT PLOT NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L			10	20	30	GR
	END OF BOREHOLE																			
	NOTES: 1. Borehole dry upon completion of drilling. 2. Soil samples No. 3 and 6 and rock samples from depths of 18.7 m and 25.8 m were collected and submitted. 3. Refer to Record of Drillhole BH-04 for bedrock details.																			

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12 SIB

+³, X³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-02</u>	RECORD OF BOREHOLE No BH-04A	SHEET 1 OF 2	METRIC
G.W.P. _____	LOCATION <u>N 4829372.8 ; E 602575.7</u>	ORIGINATED BY <u>AH/MK/TZ</u>	
DIST _____ HWY <u>401</u>	BOREHOLE TYPE <u>108 mm I.D. Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>December 17, 2010</u>	CHECKED BY <u>TZ</u>	

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
							20 40 60 80 100	○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED									
							20 40 60 80 100	WATER CONTENT (%)					10 20 30				
169.5 0.0	GROUND SURFACE Clayey silt, trace gravel, trace sand, containing rootlets and organics (FILL) Stiff to hard Dark brown Moist		1	SS	11		169										
			2	SS	18												
			3	SS	11		168										
			4	SS	25		167										
	Rootlets and organics encountered between depths of 3.0 m and 3.7 m		5	SS	20		166										
			6	SS	30												
	Rootlets and organics encountered between depths of 4.6 m and 5.2 m		7	SS	17		165										
164.0 5.5	CLAYEY SILT with SAND, some gravel (TILL) Hard Grey Moist		8	SS	41		164										
			9	SS	71		163										
			10A	SS	50/13		162										
			10B	SS	50/13		161										
160.6 8.9	Shale and limestone fragments encountered at a depth of 8.9 m Silty SAND, trace to some gravel, containing shale and limestone fragments (TILL) Very dense Grey Moist		11	SS	104/25		160										
158.6 10.9	Shale (BEDROCK) Grey Bedrock cored from depths of 11.0 m to 14.0 m For bedrock coring details, refer to Record of Drillhole BH-04A		1	RC	REC 100%		159									RQD = 0%	
			2	RC	REC 100%		158									RQD = 70%	
			3	RC	REC 99%		157									RQD = 49%	
155.5 14.0	END OF BOREHOLE						156										

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MISS.GDT 3/23/12 SIB

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 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-02</u>	RECORD OF BOREHOLE No BH-04A	SHEET 2 OF 2	METRIC
G.W.P. _____	LOCATION <u>N 4829372.8 ; E 602575.7</u>	ORIGINATED BY <u>AH/MK/TZ</u>	
DIST _____ HWY <u>401</u>	BOREHOLE TYPE <u>108 mm I.D. Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>December 17, 2010</u>	CHECKED BY <u>TZ</u>	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT NUMBER	TYPE	"N" VALUES			20	40	60	80	100	W _p	W	W _L		
--- CONTINUED FROM PREVIOUS PAGE ---																
	NOTES: 1. Borehole dry upon completion of drilling. 2. Refer to Record of Drillhole BH-04A for bedrock details.															

GTA-MTO 001 09-1111-6069 (HWY 401 CROSSING).GPJ GAL-MASS.GDT 3/23/12 SIB

PROJECT: 09-1111-6069-02

RECORD OF DRILLHOLE: BH-01

SHEET 1 OF 2

LOCATION: N 4829583.8 ; E 602372.9

DRILLING DATE: JUNE 2 TO 4, 2010

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

Table with columns: DEPTH SCALE METRES, DRILLING RECORD, DESCRIPTION, SYMBOLIC LOG, ELEV., RUN No., FLUSH RETURN, RECOVERY, SOLID CORE %, R.Q.D. %, FRACT INDEX PER 0.25m, DIP w.r.t. CORE AXIS, DISCONTINUITY DATA, HYDRAULIC CONDUCTIVITY K, cm/sec, WEATHERING INDEX, FEATURES. Includes lithological descriptions and data for runs 1-7.

CONTINUED NEXT PAGE

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/AMK

DEPTH SCALE 1 : 50



LOGGED: SB/AH/BR CHECKED: AH

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec		WEATHERING INDEX						FEATURES	
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2	W3	W4	W5	W6			
		-- CONTINUED FROM PREVIOUS PAGE --																				
18		SST layers >2.5 cm 17.64 - 17.68 m 18.26 - 18.43 m Total SST in run#7: ~14%		149.23	7																	Mbc
				148.61																		
19		SST layers >2.5 cm 19 - 19.19 m Total SST in run#8: ~12%		147.87	8																	Br/Go
				147.68																		
20		SST layers >2.5 cm 20.78 - 20.88 m 20.45 - 20.69 m Total SST in run#9: ~18%		146.75	9																	
				146.42																		
				146.18																		
21		FOSS LST layers >2.5 cm 21.92 - 21.99 m Total FOSS LST in run#10: ~5%		145.22	10																	
				144.95																		
23		LST layers >2.5 cm 23.38 - 23.41 m 23.69 - 23.71 m 23.97 - 24.01 m Total LST in run#11: ~6%		143.69	11																	
				143.49																		
				143.18																		
24		FOSS LST layers >2.5 cm 24.55 - 24.58 m Total FOSS LST in run#11: ~2%		142.90	12																	Br/Go
				142.32																		
25		LST layers >2.5 cm 25.07 - 25.12 m Total LST in run#12: ~6.5%		141.80	13																	
				140.64																		
26		SST layers >2.5 cm 26.98 - 27.03 m Total SST in run#13: ~3%		139.89	13																	
		CONTINUED NEXT PAGE																				

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK



PROJECT: 09-1111-6069-02
LOCATION: N 4829505.7 ; E 602459.7
INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: BH-03

SHEET 2 OF 3
DATUM: NAD83

DRILLING DATE: FEBRUARY 4 TO 7, 2011
DRILL RIG: CME-75
DRILLING CONTRACTOR: All-Terrain Drilling

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W.R.T. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATH- ERING INDEX						FEATURES
							TOTAL CORE %	SOLID CORE %				Type	Surface Description	Jr	Ja	W1	W2	W3	W4	W5	W6		
-- CONTINUED FROM PREVIOUS PAGE --																							
18				149.16	7															Lc			
19					8																		
20		SST layers >2.5 cm 20 - 20.21 m Total SST in run#9: ~14% FOSS LST layers >2.5 cm 20.33 - 20.47 m Total FOSS LST in run#9: ~9%		147.63 147.36	9																MBc		
21				146.11																			
22		SST layers >2.5 cm 21.46 - 21.6 m 22.13 - 22.37 m Total SST in run#10: ~25% FOSS LST layers >2.5 cm 22.87 - 22.9 m Total FOSS LST in run#10: ~2%		145.44 145.20	10																		
23	HQ-3 Bit / HQ Rods Triple Tube Sampling	FOSS LST layers >2.5 cm 23.44 - 23.49 m Total FOSS LST in run#11: ~3%		144.70																			
24				144.13	11																		
25					12																		
26					13																		
27					14																MBc		
28		CONTINUED NEXT PAGE																					

GTA-PCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE
1 : 50



LOGGED: MK
CHECKED: AH

PROJECT: 09-1111-6069-02

RECORD OF DRILLHOLE: BH-03

SHEET 3 OF 3

LOCATION: N 4829505.7 ;E 602459.7

DRILLING DATE: FEBRUARY 4 TO 7, 2011

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES					
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec		WEATH- ERING INDEX								
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	W1	W2	W3		W4	W5	W6		
						용용용용용	용용용용용	용용용용용	용용용용용	DIP w.r.t. CORE AXIS		용용용용	용용용용	용용용용	용용용용	용용용용		용용용용	용용용용	용용용용		
28	--- CONTINUED FROM PREVIOUS PAGE ---																					
29	HQ-3 Bit / HQ Rods Triple Tube Sampling				14																	
30					15																	
31																						
32						16																
33						17																
34																						
35																						
		END OF DRILLHOLE			18																	
					132.24																	
36																						
37																						
38																						

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK



PROJECT: 09-1111-6069-02

RECORD OF DRILLHOLE: BH-04A

SHEET 1 OF 1

LOCATION: N 4829372.8 ; E 602575.7

DRILLING DATE: DECEMBER 17 TO 20, 2010

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			HYDRAULIC CONDUCTIVITY K, cm/sec		WEATH-ERING INDEX				
						TOTAL CORE %	SOLID CORE %		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2	W3		W4	W5	W6
11	HQ-3 Bit / HQ Rods Triple Tube Sampling	Continued from Record of Borehole BH-04A 10.93 - 11.86 m: Moderately to highly weathered, thinly laminated, grey, fine grained, non to faintly porous, extremely weak, SHALE of the GEORGIAN BAY FORMATION interbedded with LIMESTONE (LST), FOSSILIFEROUS LIMESTONE (FOSS LST) and SILTY CLAY layers	[Symbolic Log]	158.60	1	[Recovery]	[R.Q.D.]	[Fract. Index]	[DIP]	[Discontinuity]	[Hydraulic]	[Weathering]	Ci						
12		SILTY CLAY layers in Run#1 11.01 - 11.65 m 11.82 - 11.86 m	[Symbolic Log]	157.79 157.49 157.20	2	[Recovery]	[R.Q.D.]	[Fract. Index]	[DIP]	[Discontinuity]	[Hydraulic]	[Weathering]	Ci Bc Bc						
13		LST layers >2.5 cm 11.74 - 11.78 m Total LST in run#1: ~5%	[Symbolic Log]	156.58	3	[Recovery]	[R.Q.D.]	[Fract. Index]	[DIP]	[Discontinuity]	[Hydraulic]	[Weathering]	Bc						
14		FOSS LST layers >2.5 cm 12.04 - 12.06 m 12.33 - 12.35 m Total FOSS LST in run#2: ~10% 11.86 - 13.99 m: Fresh, thinly laminated, grey, fine grained, non to faintly porous, weak SHALE of the GEORGIAN BAY FORMATION interbedded with LIMESTONE (LST) and FOSSILIFEROUS LIMESTONE (FOSS LST) layers	[Symbolic Log]	155.65		[Recovery]	[R.Q.D.]	[Fract. Index]	[DIP]	[Discontinuity]	[Hydraulic]	[Weathering]							
15		FOSS LST layers >2.5 cm 13.06 - 13.19 m 13.32 - 13.44 m 13.56 - 13.69 m 13.88 - 13.93 m Total FOSS LST in run#3: ~30%	[Symbolic Log]			[Recovery]	[R.Q.D.]	[Fract. Index]	[DIP]	[Discontinuity]	[Hydraulic]	[Weathering]							
16		LST layers >2.5 cm 12.95 - 12.97 m 13.52 - 13.55 m Total LST in run#3: ~10% END OF DRILLHOLE	[Symbolic Log]			[Recovery]	[R.Q.D.]	[Fract. Index]	[DIP]	[Discontinuity]	[Hydraulic]	[Weathering]							
17																			
18																			
19																			
20																			

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE

1 : 50



LOGGED: AH/MK/TZ

CHECKED: TZ/AH

PROJECT: 1668740
 LOCATION: N 4832923.75; E 603972.72
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-15

SHEET 1 OF 7
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: April 25 to 27, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³			WATER CONTENT PERCENT Wp ----- W ----- WI
0		GROUND SURFACE		196.67						GR SA SI CL	
		ASPHALT (150 mm)		0.00						Concrete	
		FILL - (SP) Gravelly SAND; brown; non-cohesive, dry to moist		0.15						Sand	
1		FILL - (CL) SILTY CLAY, some sand, some gravel; grey; cohesive, w-PL, stiff		195.74	1A						
				0.93	1B	SS 13					
2						2	SS 13				
						3	SS 15				
3		FILL - (SP) Gravelly SAND; brown; non-cohesive, moist, dense		193.70							
				2.97	4	SS 38					
4		FILL - (Cl) Sandy SILTY CLAY, trace gravel; grey; cohesive, w-PL, stiff		192.56							
				4.11		5A	SS 9				
5					191.64	5B				4 28 46 22 Organic Content = 7.1%	
		(ML/SM) SILT and SAND, some gravel; brown (TILL); non-cohesive, moist, compact to very dense		191.03							
6				5.64	6	SS 19					
						7	SS 91/0.23			Non-Plastic 4 41 52 3	
9		- Sandy silty clay seam at a depth of 9.2 m.			8	SS 50/0.10					
10		CONTINUED NEXT PAGE									

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL/DERRY RD MISSISSAUGA\02 DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT_19-5-24

PROJECT: 1668740
 LOCATION: N 4832923.75; E 603972.72

RECORD OF BOREHOLE: S1-15

SHEET 2 OF 7

BORING DATE: April 25 to 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵				10 ⁻⁴
10	Power Auger	-- CONTINUED FROM PREVIOUS PAGE -- (ML/SM) SILT and SAND, some gravel; brown (TILL); non-cohesive, moist, compact to very dense															
11				185.34	9	SS	50/0.10										
12			Mixture of Soil (86%) and Rock (14%) SOIL: (CL) Gravelly Sandy SILTY CLAY; reddish brown, cohesive, w<PL ROCK: Grey to reddish brown, SHALE		11.33	11	SS	50/0.05									
13	Rotary Diamond Drill HC3 Core				12	SC	REC-100%										
14					13	SC	REC-51%										
15				181.43													
16		SHALE For rock coring details refer to Record of Drillhole S1-15.		15.24													
17																	
18																	
19																	
20																	

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\DATA\GINT\DERRID RD MISSISSAUGA\02 DATA\GINT\DERRID RD MISSISSAUGA.GPJ GAL-MIS.GDT_19-5-24

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-15

SHEET 3 OF 7

LOCATION: N 4832923.75 ;E 603972.72

DRILLING DATE: April 25 to 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES	PIEZOMETER	
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX				Diameter Point Load Index (MPa)
							TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2			
							용량유리	용량고리	용량유리	용량고리										용량유리
		Continued from Record of Borehole S1-15		181.43																
16		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 15.42 m-15.46 m, 15.55 m-15.59 m 15.85 m-15.90 m, 15.96 m-16.03 m 16.10 m-16.11 m, 16.24 m-16.32 m 16.34 m-16.38 m, 16.54 m-16.57 m 16.69 m-16.74 m, 16.86 m-16.88 m		15.24	1	NR														
17		Limestone/Siltstone Layers: 17.00 m-17.12 m, 17.20 m-17.23 m 17.33 m-17.36 m, 17.38 m-17.39 m 17.53 m-17.64 m, 17.79 m-17.85 m 17.87 m-17.88 m, 17.90 m-17.96 m 17.98 m-17.99 m, 18.04 m-18.07 m 18.09 m-18.21 m, 18.25 m-18.27 m 18.42 m-18.45 m			2	NR														
19		Limestone/Siltstone Layers: 19.16 m-19.17 m, 19.34 m-19.38 m 19.43 m-19.52 m, 19.54 m-19.55 m 19.56 m-20.13 m			3	NR														
21		Limestone/Siltstone Layers: 20.13 m-20.38 m, 20.47 m-20.59 m 20.60 m-20.65 m, 20.67 m-20.68 m 20.69 m-20.70 m, 20.73 m-20.75 m 20.79 m-20.84 m, 20.88 m-20.97 m 21.07 m-21.15 m, 21.17 m-21.29 m 21.30 m-21.31 m, 21.34 m-21.35 m 21.41 m-21.53 m, 21.54 m-21.58 m			4	NR														
22		Limestone/Siltstone Layers: 21.62 m-21.69 m, 21.80 m-21.87 m 21.93 m-21.94 m, 22.05 m-22.06 m 22.10 m-22.13 m, 22.40 m-22.41 m 22.58 m-22.61 m, 22.65 m-22.67 m 22.82 m-22.84 m, 22.90 m-22.94 m			5	NR														
24		Limestone/Siltstone Layers: 23.34 m-23.43 m, 23.50 m-23.74 m 23.76 m-23.91 m, 24.20 m-24.22 m 24.27 m-24.29 m, 24.34 m-24.37 m 24.54 m-24.55 m			6	NR														
25		Limestone/Siltstone Layers: 24.86 m-24.89 m, 25.25 m-25.26 m 25.56 m-25.61 m, 25.69 m-25.71 m 25.74 m-25.79 m			7	NR														
		CONTINUED NEXT PAGE																		

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY_RD_MISSISSAUGA\02_DATA\GINT\DERRY_RD_MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24 Rotary Diamond Drill HC3 Core

DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: AB/DAC

PROJECT: 1668740
 LOCATION: N 4832923.75 ; E 603972.72
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-15

SHEET 4 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: April 25 to 27, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA			WEATH- ERING INDEX	Diametral Point Load Index (MPa)			
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja					Jzon
		<i>--- CONTINUED FROM PREVIOUS PAGE ---</i>																
26		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			7	NR												(Axial)
27		Limestone/Siltstone Layers: 26.35 m-26.46 m, 26.52 m-26.60 m 26.64 m-26.65 m, 26.66 m-26.69 m 26.74 m-26.82 m, 27.11 m-27.12 m 27.15 m-27.18 m, 27.19 m-27.32 m 27.35 m-27.37 m, 27.41 m-27.44 m 27.46 m-27.50 m			8	NR												(Axial) (Axial)
28		Limestone/Siltstone Layers: 27.71 m-27.83 m, 27.95 m-28.01 m 28.05 m-28.18 m, 28.24 m-28.30 m 28.42 m-28.43 m, 28.44 m-28.45 m 28.46 m-28.48 m, 28.58 m-28.60 m 28.65 m-28.74 m, 28.77 m-28.82 m 28.86 m-28.92 m, 29.01 m-29.03 m 29.07 m-29.10 m, 29.18 m-29.24 m			9	NR												BC
29		Limestone/Siltstone Layers: 29.24 m-29.26 m, 29.34 m-29.35 m 29.36 m-29.37 m, 29.43 m-29.44 m 29.46 m-29.48 m, 29.53 m-30.21 m 30.25 m-30.26 m, 30.28 m-30.31 m 30.38 m-30.41 m, 30.43 m-30.57 m 30.62 m-30.64 m, 30.65 m-30.80 m			10	NR												
30		Limestone/Siltstone Layers: 30.80 m-31.14 m, 31.19 m-31.21 m 31.69 m-31.70 m			11	NR												(Axial)
31		Limestone/Siltstone Layers: 32.39 m-32.50 m, 32.67 m-32.68 m 33.09 m-33.12 m, 33.19 m-33.27 m 33.34 m-33.35 m, 33.37 m-33.38 m 33.46 m-33.49 m, 33.58 m-33.60 m 33.61 m-33.62 m, 33.66 m-33.71 m 33.75 m-33.78 m, 33.81 m-33.95 m			12	NR												(Axial)
32		Limestone/Siltstone Layers: 33.98 m-35.16 m			13	NR												BC
33																		
34																		
35																		Clay Seam
		<i>CONTINUED NEXT PAGE</i>																

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL/DERRY RD MISSISSAUGA\02 DATA\GINT/DERRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24



PROJECT: 1668740
 LOCATION: N 4832923.75 ;E 603972.72
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-15

SHEET 5 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: April 25 to 27, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA				WEATHERING INDEX			Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1				W2
		--- CONTINUED FROM PREVIOUS PAGE ---																	
36		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 35.64 m-35.71 m, 35.95 m-35.96 m 36.31 m-36.32 m, 36.55 m-36.59 m 36.63 m-36.75 m, 36.89 m-36.92 m 37.00 m-37.04 m			13	NR												Clay Seam (Axial)	
37		Limestone/Siltstone Layers: 37.09 m-37.17 m, 37.19 m-37.21 m 37.47 m-37.75 m, 38.03 m-38.09 m 38.12 m-38.18 m, 38.37 m-38.38 m 38.54 m-38.59 m			14	NR												(Axial)	
38		Limestone/Siltstone Layers: 38.65 m-38.69 m, 39.11 m-39.12 m 39.26 m-39.34 m, 39.50 m-39.52 m 39.54 m-39.66 m, 39.73 m-39.86 m 39.87 m-39.90 m, 39.94 m-39.95 m 40.04 m-40.12 m,			15	NR												(Axial)	
39		Limestone/Siltstone Layers: 40.12 m-40.14 m, 40.21 m-40.25 m 40.50 m-40.51 m, 40.55 m-40.61 m 40.72 m-40.77 m, 41.08 m-41.19 m 41.67 m-41.72 m			16	NR												(Axial)	
40		Limestone/Siltstone Layers: 42.11 m-42.12 m, 42.17 m-42.20 m 42.35 m-42.36 m, 42.55 m-42.60 m 42.74 m-42.77 m, 42.82 m-42.84 m 43.10 m-43.13 m, 43.21 m-43.23 m			17	NR												(Axial)	
41		Limestone/Siltstone Layers: 43.23 m-43.25 m, 43.34 m-43.36 m 43.69 m-43.70 m, 43.80 m-43.81 m 43.91 m-43.93 m, 44.00 m-44.04 m			18	NR												(Axial)	
42		Limestone/Siltstone Layers: 45.78 m-45.77 m, 46.01 m-46.02 m			19	NR												(Axial)	
43					20	NR												Sand	
44																			
45																			

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\GINT\DERRYS RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-15

SHEET 6 OF 7

LOCATION: N 4832923.75 ;E 603972.72

DRILLING DATE: April 25 to 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH- ERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION			Jr	Ja			
						용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량			용량용량
-- CONTINUED FROM PREVIOUS PAGE --																		
46		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) UCS=15.9 MPa Limestone/Siltstone Layers: 46.57 m-46.59 m, 46.61 m-46.63 m 46.64 m-46.65 m, 46.66 m-46.67 m 47.07 m-47.09 m, 47.45 m-47.48 m 47.53 m-47.57 m			NR												Sand (Axial)	
47					NR												Screen (Axial)	
48		Limestone/Siltstone Layers: 47.88 m-48.02 m, 48.10 m-48.15 m 48.18 m-48.20 m, 48.22 m-48.28 m 48.35 m-48.36 m, 48.42 m-48.43 m 48.46 m-48.47 m, 48.51 m-48.52 m 48.56 m-48.61 m, 48.68 m-48.73 m 48.91 m-48.96 m, 48.99 m-49.05 m			NR												BC Sand (Axial)	
49		Limestone/Siltstone Layers: 49.85 m-49.88 m			NR												Clay Seam (Axial)	
50	Rotary Diamond Drill HQ3 Core				NR													
51		Limestone/Siltstone Layers: 50.77 m-50.79 m, 51.08 m-51.09 m 51.13 m-51.16 m, 51.46 m-51.47 m 51.80 m-51.83 m			NR												Bentonite (Axial)	
52					NR												(Axial)	
53		Limestone/Siltstone Layers: 53.18 m-53.24 m			NR												BC BC	
54		Limestone/Siltstone Layers: 53.57 m-53.59 m, 54.12 m-54.15 m 54.19 m-54.21 m			NR												(Axial) (Axial)	
55		END OF DRILLHOLE		142.01 54.66														
		NOTES:																
		CONTINUED NEXT PAGE																

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DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: AB/DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-15

SHEET 7 OF 7

LOCATION: N 4832923.75 ;E 603972.72

DRILLING DATE: April 25 to 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount
DRILLING CONTRACTOR: Davis Driling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER																								
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/EL. CORE AXIS	DISCONTINUITY DATA			WEATH- ERING INDEX			Diametral Point Load Index (MPa)																										
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2				W3	W4	W5	W6																				
						FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN	FLUSH RETURN			FLUSH RETURN	FLUSH RETURN																						
		<p>--- CONTINUED FROM PREVIOUS PAGE ---</p> <p>1. NR - Not recorded</p> <p>2. Groundwater level measurements in monitoring well:</p> <table border="1"> <thead> <tr> <th>Date (mm/dd/yy)</th> <th>Depth (m)</th> <th>Elev. (m)</th> </tr> </thead> <tbody> <tr><td>05/16/2017</td><td>2.5</td><td>194.2</td></tr> <tr><td>06/06/2017</td><td>3.4</td><td>193.3</td></tr> <tr><td>06/16/2017</td><td>3.4</td><td>193.3</td></tr> <tr><td>07/27/2017</td><td>3.4</td><td>193.3</td></tr> <tr><td>09/22/2017</td><td>3.4</td><td>193.3</td></tr> <tr><td>12/19/2017</td><td>3.3</td><td>193.4</td></tr> <tr><td>02/16/2018</td><td>3.3</td><td>193.4</td></tr> <tr><td>07/27/2018</td><td>3.3</td><td>163.4</td></tr> </tbody> </table>	Date (mm/dd/yy)	Depth (m)	Elev. (m)	05/16/2017	2.5	194.2	06/06/2017	3.4	193.3	06/16/2017	3.4	193.3	07/27/2017	3.4	193.3	09/22/2017	3.4	193.3	12/19/2017	3.3	193.4	02/16/2018	3.3	193.4	07/27/2018	3.3	163.4														
Date (mm/dd/yy)	Depth (m)	Elev. (m)																																									
05/16/2017	2.5	194.2																																									
06/06/2017	3.4	193.3																																									
06/16/2017	3.4	193.3																																									
07/27/2017	3.4	193.3																																									
09/22/2017	3.4	193.3																																									
12/19/2017	3.3	193.4																																									
02/16/2018	3.3	193.4																																									
07/27/2018	3.3	163.4																																									

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DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: AB/DAC

PROJECT: 1668740

RECORD OF BOREHOLE: S2-14

SHEET 1 OF 6

LOCATION: N 4832827.80; E 603903.08

BORING DATE: November 1, 2, 3 and 6, 2017

DATUM: UTM NAD 83 (ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
							20	40	60	80	nat V. rem V. + ⊕ - ⊙	Q - U -	10 ⁻⁶				10 ⁻⁵
0		GROUND SURFACE		198.56													
		ASPHALT (150 mm)		0.00													
		FILL - (SP/GP) SAND and GRAVEL, trace to some silt, trace to some plastic fines; brown; non-cohesive, moist, dense to very dense	[Pattern]	0.15	1	SS	63										
1				197.19	2	SS	41										
		(CL) Sandy SILTY CLAY, some gravel; brown to grey (TILL); cohesive, w<PL, stiff to hard	[Pattern]	1.37	3	SS	19										
2				195.31	4	SS	14										
		(SM) SILTY SAND, trace to some gravel, trace to some plastic fines; brown to grey (TILL); non-cohesive, moist, dense to very dense	[Pattern]	3.25	5A	SS	31										
					5B	SS											
3					6	SS	50/0.07										
4					7	SS	50/0.07										
5					8	SS	50/0.10										
6					9	SS	50/0.07										
7				191.66													
		(ML) SILT, some sand, trace gravel; grey; non-cohesive, moist to wet, very dense	[Pattern]	6.90													
8																	
9																	
10				188.54													

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PROJECT: 1668740
 LOCATION: N 4832827.80; E 603903.08

RECORD OF BOREHOLE: S2-14

SHEET 2 OF 6

BORING DATE: November 1, 2, 3 and 6, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵				10 ⁻⁴
10	Mud Rotary Tritone	-- CONTINUED FROM PREVIOUS PAGE --		10.02												GR SA SI CL	
		(SM) SILTY SAND, some gravel, trace plastic fines; brown (TILL); non-cohesive, moist, very dense															
11					10	SS	50/0.10										
12					11	SS	50/0.10										
13				12	SS	50/0.10											
14				13	SS	98/0.28											
15		Grey to red, SHALE		183.32 15.24													
16		- Sulphur odour at a depth of 15.9 m.															
17		SHALE		181.59 16.97													
18		For rock coring details refer to Record of Drillhole S2-14.															
19																	
20																	

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PROJECT: 1668740

RECORD OF DRILLHOLE: S2-14

SHEET 3 OF 6

LOCATION: N 4832827.80 ;E 603903.08

DRILLING DATE: November 1, 2, 3 and 6, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diameter Point Load Index (MPa)
							TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION			Jr	Ja			
							용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량			용량용량
17		Continued from Record of Borehole S2-14		181.59															
		Moderately weathered, thinly bedded, reddish brownish grey to grey, fine to very fine grained, faintly porous, very weak to weak SHALE with interbeds of strong to very strong LIMESTONE or SILTSTONE (Queenston Formation) Limestone/Siltstone Layers: 17.42 m-17.47 m, 17.57 m-17.65 m, 17.86 m-17.92 m		16.97	1	NR													BC
		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 18.47 m-18.66 m, 18.73 m-18.85 m		181.18															Clay Seam
		Limestone/Siltstone Layers: 19.98 m-20.10 m, 20.17 m-20.21 m, 20.27 m-20.30 m, 20.35 m-20.39 m, 20.49 m-20.66 m, 20.70 m-20.73 m, 20.77 m-20.82 m, 20.85 m-20.87 m, 21.17 m-21.20 m, 21.32 m-21.37 m		17.38															Clay Seam
		Limestone/Siltstone Layers: 21.6 m-21.69 m, 21.72 m-22.66 m, 22.67 m-22.76 m, 22.86 m-22.98 m			2	NR													BC
		Limestone/Siltstone Layers: 22.98 m-23.03 m, 23.06 m-23.09 m, 23.12 m-23.16 m, 23.27 m-23.33 m, 23.41 m-23.56 m, 23.66 m-23.94 m, 23.97 m-24.00 m, 24.13 m-24.20 m, 24.28 m-24.30 m, 24.38 m-24.41 m																	BC
		Limestone/Siltstone Layers: 24.54 m-24.58 m, 24.60 m-24.67 m, 24.78 m-24.82 m, 24.86 m-24.92 m, 25.06 m-25.09 m, 25.27 m-25.29 m, 25.53 m-25.55 m, 25.63m-25.92 m			3	NR													LC
		Limestone/Siltstone Layers: 25.98 m-26.10 m, 26.22 m-26.30 m, 26.37 m-26.43 m, 26.66 m-26.70 m, 26.75 m-26.80 m, 27.06 m-27.12 m, 27.14 m-27.20 m, 27.24 m-27.27 m, 27.47 m-27.50 m																	BC
					4	NR													Clay Seam
																			BC
					5	NR													BC
																			LC
					6	NR													BC
					7	NR													LC

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DEPTH SCALE

1 : 50



LOGGED: MPL/EN

CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4832827.80 ;E 603903.08
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-14

SHEET 4 OF 6
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: November 1, 2, 3 and 6, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX						Diameter Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jsn	W1	W2	W3	W4	W5			
Rotary Diamond Drill HQ3 Core		--- CONTINUED FROM PREVIOUS PAGE ---																			
27		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			7																
28		Limestone/Siltstone Layers: 27.54 m-27.59 m, 27.62 m-27.64 m, 27.79 m-27.84 m, 28.37 m-28.44 m, 28.58 m-28.61 m, 28.66 m-28.73 m, 28.74 m-28.79 m, 28.85 m-28.91 m, 28.96 m-28.98 m			8																
29		Limestone/Siltstone Layers: 29.02 m-29.06 m, 29.09 m-29.15 m, 29.18 m-29.22 m, 29.31 m-29.40 m, 30.13 m-30.21 m, 30.26 m-30.29 m, 30.43 m-30.52 m			9					BD, PL, SM, CC, CL BD, UN, SM, CC, CL BD, UN, SM, IN, CL	1 4 12 2 4 16 1 8 0										
30		Limestone/Siltstone Layers: 30.74 m-30.84 m, 30.90 m-30.97 m, 31.01 m-31.11 m, 31.22 m-31.48 m, 31.49 m-31.54 m, 31.86 m-31.93 m, 31.96 m-32.17 m			10					BD, UN, SM, IN, CL BD, UN, SM, SA BD, CU, SM, CC, CL BD, PL, SM, IN, GO BD, PL, SM, PC, CL BD, UN, RO, IN, GO	2 4 16 2 1 20										
31		Limestone/Siltstone Layers: 32.23 m-32.50 m, 32.64 m-32.82 m, 32.88 m-33.20 m, 33.24 m-33.40 m, 33.46 m-33.48 m			11					BD, UN, SM, PC, CL BD, UN, SM, CI	1 4 12										
32		Limestone/Siltstone Layers: 34.67 m-34.75 m, 34.94 m-34.97 m, 35.13 m-35.16 m			12					BD, PL, SM, CC, GV											
33		Limestone/Siltstone Layers: 35.23 m-35.34 m, 35.48 m-35.50 m, 35.82 m-35.87 m, 36.03 m-36.22 m			13																
34		Limestone/Siltstone Layers:			14																
		CONTINUED NEXT PAGE																			

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DEPTH SCALE

1 : 50



LOGGED: MPL/EN

CHECKED: DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S2-14

SHEET 5 OF 6

LOCATION: N 4832827.80 ;E 603903.08

DRILLING DATE: November 1, 2, 3 and 6, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Jr	Jz	W1	W2				
						용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량			용량용량
--- CONTINUED FROM PREVIOUS PAGE ---																		
37		36.98 m-37.10 m, 37.84 m-37.87 m, 38.08 m-38.25 m Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			14	NR												
38		Limestone/Siltstone Layers: 38.25 m-38.34 m, 38.39 m-38.43 m, 38.53 m-38.65 m, 38.71 m-38.75 m, 38.80 m-38.92 m, 39.01 m-39.09 m, 39.14 m-39.17 m, 39.47 m-39.75 m			15	NR												
39		Limestone/Siltstone Layers: 39.98 m-40.02 m, 40.42 m-40.48 m, 40.53 m-40.56 m, 41.17 m-41.28 m			16	NR												
40		Limestone/Siltstone Layers: 41.40 m-41.47 m, 41.48 m-41.51 m, 41.54 m-41.56 m, 41.57 m-41.59 m, 41.60 m-41.63 m, 41.65 m-41.67 m, 41.76 m-41.80 m, 41.84 m-41.86 m, 41.90 m-41.93 m, 41.96 m-41.99 m, 42.06 m-42.08 m, 42.13 m-42.21 m, 42.50 m-42.55 m			17	NR												
41		Limestone/Siltstone Layers: 42.99 m-43.02 m, 43.06 m-43.11 m, 43.61 m-43.64 m, 44.04 m-44.06 m, 44.22 m-44.26 m			18	NR												
42		Limestone/Siltstone Layers: 44.39 m-44.47 m, 44.59 m-44.63 m, 45.00 m-45.08 m, 45.18 m-45.21 m, 45.28 m-45.53 m			19	NR												
43		UCS=40.5 MPa																
44		Limestone/Siltstone Layers: 46.48 m-46.51 m			20	NR												
45																		
46																		
		CONTINUED NEXT PAGE																

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PROJECT: 1668740

RECORD OF DRILLHOLE: S2-14

SHEET 6 OF 6

LOCATION: N 4832827.80 ; E 603903.08

DRILLING DATE: November 1, 2, 3 and 6, 2017

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

Table with columns: DEPTH SCALE METRES, DRILLING RECORD, DESCRIPTION, SYMBOLIC LOG, ELEV. DEPTH (m), RUN No., FLUSH RETURN, RECOVERY (TOTAL CORE %, SOLID CORE %), R.Q.D. %, FRACT. INDEX PER 0.25m, DIP W/FL CORE AXIS, DISCONTINUITY DATA (TYPE AND SURFACE DESCRIPTION, Jr, Ja, Jzon), WEATH-ERING INDEX (W1-W6), Diametral Point Load Index (MPa), PIEZOMETER. Data rows include descriptions of shale and limestone layers with specific depth ranges and discontinuity data.

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DEPTH SCALE 1 : 50



LOGGED: MPL/EN CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4832724.58; E 603815.42

RECORD OF BOREHOLE: S2-15

SHEET 1 OF 6

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: November 13, 14 and 15, 2017

DATUM: UTM NAD 83 (ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴			
0		GROUND SURFACE		200.01												GR SA SI CL
		ASPHALT (150 mm)		0.00												
		FILL - (SW/GW) SAND and GRAVEL; brown, trace organics; non-cohesive, moist, compact to dense		0.15	1	SS	39									
1	Power Auger 150 mm O.D. Solid Stem Augers			198.94	2A	SS	15									
		FILL - (CL) Sandy SILTY CLAY, some gravel; brown, trace organics; cohesive, w<PL, firm to stiff		1.07	2B											
2				197.80	3	SS	8									
3	Mud Rotary Tricone	(CL-ML) Sandy SILTY CLAY-CLAYEY SILT, some gravel; brown, becoming grey below a depth of 4.6 m (TILL); non-cohesive, moist, compact to very dense - Sand seam at a depth of 2.6 m		2.21	4	SS	16									
					5	SS	19									6 32 50 12
4					6	SS	15									
5					7	SS	26									
6					8	SS	50/ 0.13									6 35 54 5
7					9	SS	55/ 0.13									
8																
9																
10																

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DEPTH SCALE

1 : 50



LOGGED: MPL/EN

CHECKED: MCK

PROJECT: 1668740
 LOCATION: N 4832724.58; E 603815.42

RECORD OF BOREHOLE: S2-15

SHEET 2 OF 6

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: November 13, 14 and 15, 2017

DATUM: UTM NAD 83
 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	WATER CONTENT PERCENT		
10	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (CL-ML) Sandy SILTY CLAY-CLAYEY SILT, some gravel; brown, becoming grey below a depth of 4.6 m (TILL); non-cohesive, moist, compact to very dense									GR SA SI CL
11				10	SS	50/ 0.07					
12				11	SS	100/ 0.10					
13				12	SS	50/ 0.13					
14				185.64 14.37							
15		(CL) Sandy SILTY CLAY, some gravel; grey to red (TILL); cohesive, w<PL, hard									
16			13	SS	50/ 0.10						
17		- Containing shale fragments below a depth of 16.8 m.									
18		Red, SHALE	182.32 17.69								
19		SHALE For rock coring details refer to Record of Drillhole S2-15.	181.68 18.33	15	SS	100/ 0.05					
20											

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\DERRY_RD_MISSISSAUGA02_DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT_19-5-24

PROJECT: 1668740

RECORD OF DRILLHOLE: S2-15

SHEET 5 OF 6

LOCATION: N 4832724.58 ;E 603815.42

DRILLING DATE: November 13, 14 and 15, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATH- ERING INDEX					Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Jr	Ja	Jzon	W1	W2				W3
						FLUSH RETURN	LOG	LOG	LOG	LOG	LOG	LOG	LOG	LOG	LOG			LOG	LOG
--- CONTINUED FROM PREVIOUS PAGE ---																			
39		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 39.82 m-39.86 m			14	NR													
40		Limestone/Siltstone Layers: 40.14 m-40.21 m, 40.24 m-40.30 m, 40.47 m-40.50 m, 40.55 m-40.73 m, 40.83 m-40.87 m, 41.08 m-41.14 m			15	NR													
41																			
42		Limestone/Siltstone Layers: 42.14 m-42.16 m			16	NR											Clay Seam BC		
43		Limestone/Siltstone Layers: 43.30 m-43.33 m, 43.50 m-43.60 m, 43.74 m-43.77 m, 43.78 m-43.85 m, 43.86 m-43.97 m, 44.08 m-44.10 m, 44.14 m-44.16 m, 44.28 m-44.33 m			17	NR											BC		
44																			
45		Limestone/Siltstone Layers: 45.24 m-45.31 m			18	NR													
46		Limestone/Siltstone Layers: 46.53 m-46.56 m, 46.94 m-46.98 m UCS=28.1 MPa			19	NR													
47																			
48		Limestone/Siltstone Layers: 47.54 m-47.56 m			20	NR													
CONTINUED NEXT PAGE																			

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL/DERR Y RD MISSISSAUGA\02 DATA\GINT/DERR Y RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: EN

CHECKED: DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S2-15

SHEET 6 OF 6

LOCATION: N 4832724.58 ;E 603815.42

DRILLING DATE: November 13, 14 and 15, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER			
						RECOVERY			FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %	R.Q.D. %		TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2				W3	
						00000000	00000000	00000000												2
		--- CONTINUED FROM PREVIOUS PAGE ---																		
49		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			20	NR														
50					21	NR														
51		Limestone/Siltstone Layers: 51.20 m-51.22 m, 51.47 m-51.49 m, 51.71 m-51.74 m, 51.90 m-52.11 m			22	NR														
52	Rotary Diamond Drill HQ3 Core	Limestone/Siltstone Layers: 52.12 m-52.14 m, 52.17 m-52.21 m, 52.32 m-52.35 m, 52.41 m-52.44 m, 52.74 m-52.78 m			23	NR														
54					24	NR														
55		END OF DRILLHOLE		144.79 55.22																
56		NOTE: 1. NR - Not recorded																		
57																				
58																				

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INT\DERRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: EN
CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4832694.53; E 603788.68

RECORD OF BOREHOLE: S1-16A

SHEET 1 OF 2

BORING DATE: April 26, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	WATER CONTENT PERCENT Wp WI				
0		GROUND SURFACE		200.20								GR SA SI CL
		ASPHALT (150 mm)		0.00								
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, compact to very dense		0.15	1 SS	55						
1	Power Auger 150 mm O.D. Solid Stem Augers	FILL - (CL) Sandy gravelly SILTY CLAY; mottled brown to grey; cohesive, w~PL, firm		199.13	2A SS	20						
				1.07	2B							
						3 SS	6					
2												
		FILL - (SM) Gravelly SILTY SAND; brown; non-cohesive, moist to wet, very loose to compact		197.61	4A SS	26						
				2.59	4B							
3					5 SS	16						21 64 12 3
4												
5					6 SS	11						
6												
7	Mud Rotary Tricone				7 SS	2						
		(SC) Gravelly CLAYEY SAND; grey to reddish grey (TILL); non-cohesive, moist to wet, compact to very dense		193.04								
				7.16	8 SS	28						14 40 38 8
8												
9					9 SS	50/ 0.07						
10												

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DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: MCK/ARV

PROJECT: 1668740
 LOCATION: N 4832694.53; E 603788.68

RECORD OF BOREHOLE: S1-16A

SHEET 2 OF 2

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: April 26, 2017

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		WATER CONTENT PERCENT			
								20	40	60	80	10 ⁻⁶	10 ⁻⁵		
10	Mud Rotary Tricone	-- CONTINUED FROM PREVIOUS PAGE --													
11		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, very dense		10	SS	50/0.07									
12				11	SS	50/0.03									12 49 36 3
13				12	SS	50/0.10									
14		END OF BOREHOLE		13.82											
15				186.38											
16															
17															
18															
19															
20															

DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: MCK/ARV

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PROJECT: 1668740

RECORD OF BOREHOLE: S1-16

SHEET 1 OF 7

LOCATION: N 4832641.87; E 603706.96

BORING DATE: August 17 and 18, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	WATER CONTENT PERCENT Wp, Wi			
0		GROUND SURFACE		199.96							
		ASPHALT (280 mm)		0.00							Concrete
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, dense		199.68	1 SS 45						
1		FILL - (CL) Sandy SILTY CLAY, some gravel; brown; cohesive, w-PL, firm		0.28	2 SS 5						
				199.20	3 SS 5						
2				0.76	4 SS 13						
		(CL) Sandy SILTY CLAY, some gravel to gravelly; brown becoming grey below a depth of 6.1 m, some shale fragments to a depth of 4.0 m (TILL); cohesive, w<PL, stiff to hard		197.75	5 SS 17						
3				2.21	6 SS 28						
4					7 SS 13						
5					8 SS 40						
6					9 SS 42						
7											
8											
9											
10											

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PROJECT: 1668740

RECORD OF BOREHOLE: S1-16

SHEET 2 OF 7

LOCATION: N 4832641.87; E 603706.96

BORING DATE: August 17 and 18, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT				
10		-- CONTINUED FROM PREVIOUS PAGE --														GR SA SI CL
		(CL) Sandy SILTY CLAY, some gravel to gravelly; brown becoming grey below a depth of 6.1 m, some shale fragments to a depth of 4.0 m (TILL); cohesive, w<PL, stiff to hard														
11		(ML/SM) SILT and SAND, some gravel; grey to red (TILL); non-cohesive, moist, very dense		189.16 10.80	10A 10B	SS	50/0.10									
12	Power Auger 178 mm O.D., 83 mm I.D. Hollow Stem Augers	- Auger grinding between depths of 12.2 m and 13.7 m.														Bentonite
13		(CL) Sandy Gravelly SILTY CLAY; grey to red, some shale fragments (TILL); cohesive, w<PL, hard		186.85 13.11												8 41 47 4
14		Red, SHALE		185.94 14.02		12	SS 50/0.10									
15		SHALE		185.20 14.76		13	SS 50/0.13									
16		For rock coring details refer to Record of Drillhole S1-16.														
17																
18																
19																
20																

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PROJECT: 1668740
 LOCATION: N 4832501.28; E 603646.81

RECORD OF BOREHOLE: S3-15

SHEET 1 OF 3

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: October 11, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 55 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³		
0		GROUND SURFACE		200.21							GR SA SI CL
		ASPHALT (180 mm)		200.00 200.03							
		FILL - (SW/GW) SAND and GRAVEL, some fines; brown; non-cohesive, moist, dense		0.18	1	SS	41				
1		FILL - (CL) Sandy SILTY CLAY, some gravel; grey, wood pieces and trace organics, hydrocarbon odour; cohesive, w<PL, stiff		199.45 0.76	2	SS	15				11 29 40 20
2		(CL) Sandy SILTY CLAY, some gravel; brown becoming grey below a depth of 4.5 m (TILL); cohesive, w<PL, stiff to hard		198.76 1.45	3	SS	16				
					4	SS	22				6 22 51 21
					5	SS	19				
4					6	SS	28				
5					7	SS	21				
6					8	SS	10				
7					9	SS	9				6 29 49 16
9		- Reddish brown below a depth of 8.7 m			10	SS	23				

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4832501.28; E 603646.81

RECORD OF BOREHOLE: S3-15

SHEET 2 OF 3

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: October 11, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 55 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵				10 ⁻⁴
10	Power Auger 178 mm O.D., 83 mm I.D. Hollow Stem Augers	-- CONTINUED FROM PREVIOUS PAGE -- (CL) Sandy SILTY CLAY, some gravel; brown becoming grey below a depth of 4.5 m (TILL); cohesive, w<PL to w-PL, stiff to hard - Containing shale fragments below a depth of 10.2 m.														GR SA SI CL	
11				11	SS	77											
12		(SM) Gravelly SILTY SAND; reddish brown, containing shale fragments (TILL); non-cohesive, moist, very dense		188.47 11.74	12	SS	77/ 0.26										24 38 26 12
13		Red, SHALE		187.41 12.80 187.20	13	SS	50/ 0.05										
13		SHALE		13.01													
14		For rock coring details refer to Record of Drillhole S3-15.															
15																	
16																	
17																	
18																	
19																	
20																	

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PROJECT: 1668740
 LOCATION: N 4832339.96; E 603540.67

RECORD OF BOREHOLE: S1-17

SHEET 1 OF 7

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: August 14 to 16, 2017

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60			80
0		GROUND SURFACE		198.74								
		ASPHALT (150 mm)		0.00								
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, compact to very dense		0.15	1	SS	55					
1					2	SS	24					
		FILL - (CL) Sandy SILTY CLAY, some gravel, trace organics; grey; cohesive, w~PL, stiff		197.37								
				1.37	3	SS	11					
2												
		(CL) Sandy SILTY CLAY, some gravel to gravelly; brown becoming grey below a depth of 6.1 m (TILL); cohesive, w<PL to w~PL, very stiff to hard		196.61								
				2.13	4	SS	22					
3												
					5	SS	28					
4												
		- Some shale fragments below a depth of 4.6 m.			6	SS	28					
5												
					7	SS	21					
6												
					8A	SS	38					
7												
					8B							
8		- Auger grinding from a depth of 8.0 m.										
		Red, SHALE		190.21								
				8.53								
9					9	SS	90/0.23					
10												

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DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: MCK

PROJECT: 1668740
 LOCATION: N 4832225.72; E 603416.31

RECORD OF BOREHOLE: S1-18

SHEET 1 OF 7

BORING DATE: June 22, 23, 26 and 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			
0		GROUND SURFACE		197.73												
		ASPHALT (150 mm)		0.00												
		FILL - (SP/GP) SAND and GRAVEL, some fines; brown; non-cohesive, moist, dense		0.15	1	SS	32									
1		FILL - (CL) SILTY CLAY, some sand to sandy, trace gravel; mottled brown and grey, trace organics and rootlets; cohesive, w<PL, stiff		0.76	2	SS	12									
2				196.97												
		(CL) Sandy SILTY CLAY, some gravel; brown becoming grey below a depth of 5.3 m (TILL); cohesive, w<PL, very stiff to hard		2.21	3	SS	9									
				195.52												
3					4	SS	16									
					5	SS	22									
4					6	SS	42									
					7	SS	24									
5					8	SS	50/0.10									5 26 50 19
6					9	SS	50/0.13									
7																
8																
9																2 39 48 11
10		Moderately weathered, SHALE		187.98												
				9.75												
		CONTINUED NEXT PAGE														

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PROJECT: 1668740
 LOCATION: N 4832225.72; E 603416.31

RECORD OF BOREHOLE: S1-18

SHEET 2 OF 7

BORING DATE: June 22, 23, 26 and 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		Wp				
10	Tritone	-- CONTINUED FROM PREVIOUS PAGE --													GR SA SI CL	
		Moderately weathered, SHALE		187.40	10	SS	50/0.10									
		SHALE (BEDROCK)		10.33												
		For rock coring details refer to Record of Drillhole S1-18.														

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PROJECT: 1668740
 LOCATION: N 4832225.72 ;E 603416.31
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-18

SHEET 4 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: June 22, 23, 26 and 27, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX		Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jzon	W1	W2			
						용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량		
--- CONTINUED FROM PREVIOUS PAGE ---																			
21		20.13 m-20.26 m, 20.33 m-20.36 m 20.42 m-20.46 m, 20.53 m-20.64 m 20.74 m-20.78 m, 20.82 m-20.85 m 20.98 m-21.01 m, 21.18 m-21.27 m 21.40 m-21.44 m, 21.45 m-21.50 m 21.58 m-21.62 m Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)	[Symbolic Log]		8	NR												(Axial)	
22		Limestone/Siltstone Layers: 21.71 m-21.79 m, 22.01 m-22.10 m 22.44 m-22.49 m, 22.94 m-22.96 m 23.05 m-23.13 m			9	NR												(Axial)	
23		Limestone/Siltstone Layers: 23.13 m-23.17 m, 24.35 m-24.37 m 24.49 m-24.52 m			10	NR												(Axial)	
24		Limestone/Siltstone Layers: 24.61 m-24.79 m, 24.85 m-24.90 m 24.95 m-25.01 m, 25.10 m-25.13 m 25.18 m-25.26 m, 25.28 m-25.31 m 25.60 m-25.64 m, 25.78 m-25.80 m 26.05 m-26.09 m			11	NR												(Axial)	
25		Limestone/Siltstone Layers: 26.13 m-26.16 m, 26.19 m-26.26 m 26.43 m-26.46 m, 26.67 m-26.70 m 26.72 m-26.77 m, 26.79 m-27.22 m 27.58 m-27.65 m			12	NR												(Axial)	
26		Limestone/Siltstone Layers: 27.65 m-27.70 m, 27.86 m-27.89 m 27.91 m-27.99 m, 28.02 m-28.07 m 28.23 m-28.27 m, 28.43 m-28.50 m 28.76 m-28.83 m, 28.90 m-28.96 m			13	NR												(Axial)	
27		Limestone/Siltstone Layers: 29.42 m-29.46 m, 29.57 m-29.61 m 29.67 m-29.70 m, 29.84 m-29.87 m 29.89 m-29.94 m, 30.04 m-30.06 m 30.12 m-30.15 m, 30.16 m-30.22 m 30.27 m-30.30 m, 30.39 m-30.43 m 30.48 m-30.51 m, 30.53 m-30.60 m 30.70 m-30.78 m			14	NR												(Axial)	
28		CONTINUED NEXT PAGE																	

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINT\DERRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-18

SHEET 5 OF 7

LOCATION: N 4832225.72 ; E 603416.31

DRILLING DATE: June 22, 23, 26 and 27, 2017

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX					Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2			
--- CONTINUED FROM PREVIOUS PAGE ---																		
31		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 30.95 m-30.98 m, 31.18 m-31.21 m 31.22 m-31.25 m, 31.26 m-31.38 m 31.43 m-31.50 m, 31.52 m-31.69 m 31.76 m-31.85 m, 31.99 m-32.02 m 32.03 m-32.09 m, 32.12 m-32.15 m 32.25 m-32.31 m			14	NR											(Axial)	
32		Limestone/Siltstone Layers: 32.38 m-32.42 m, 32.44 m-32.46 m 32.48 m-32.51 m, 32.63 m-32.65 m 32.80 m-32.84 m, 32.86 m-32.97 m 33.03 m-33.68 m			15	NR			BD, PL, SM, CI		1	1	16				(Axial)	
33		Limestone/Siltstone Layers: 33.83 m-33.88 m, 33.94 m-34.00 m 34.03 m-34.17 m, 34.22 m-34.26 m 34.42 m-34.45 m, 34.69 m-34.72 m			16	NR											(Axial)	
34		Limestone/Siltstone Layers: 35.47 m-35.52 m, 35.78 m-35.97 m 35.99 m-36.02 m, 36.04 m-36.17 m 36.39 m-36.41 m, 36.54 m-36.58 m 36.66 m-36.71 m			17	NR			BD, PL, SM, CI		1	1	16				(Axial)	
35		Limestone/Siltstone Layers: 36.96 m-36.98 m, 37.18 m-37.49 m 37.93 m-37.97 m, 38.23 m-38.28 m			18	NR											(Axial)	
36		Limestone/Siltstone Layers: 38.64 m-38.69 m, 38.96 m-39.00 m 39.47 m-39.53 m, 39.84 m-39.92 m			19	NR			BD, UN, SM, CI		2	1	23				(Axial)	
37		Limestone/Siltstone Layers: 40.12 m-40.15 m, 40.30 m-40.37 m 40.57 m-40.85 m, 41.16 m-41.25 m			20	NR			BD, UN, SM, SA		2	2	23				(Axial)	
38					21	NR											(Axial)	
39																		
40																		
		CONTINUED NEXT PAGE																

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DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4832089.00; E 603282.92

RECORD OF BOREHOLE: S2-17

SHEET 1 OF 7

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: September 5 and 6, 2017

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
0		GROUND SURFACE		196.83												GR SA SI CL
		ASPHALT (150 mm)		0.00												
		FILL - (SW) Gravelly SAND, trace fines; brown; non-cohesive, moist, dense		0.15	1A											Bentonite
		FILL - (GC) Sandy CLAYEY GRAVEL, containing plastic fines; brown to red to grey; non-cohesive, moist to wet, very loose to compact		196.32	1B	36										
1				0.51												
					2	12										
					3	7										
2					4	5										
					5	6										
					6	2										
					7A	50/										
		Red, SHALE		192.26	7B	0.08										
5		SHALE		4.57												
				4.70												
		For rock coring details refer to Record of Drillhole S2-17.														
6																
7																
8																
9																
10																

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PROJECT: 1668740

RECORD OF DRILLHOLE: S2-17

SHEET 3 OF 7

LOCATION: N 4832089.00 ;E 603282.92

DRILLING DATE: September 5 and 6, 2017

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX				Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %		DIP W/CL CORE AXIS	Jr	Ja	Jzon	W1	W2	W3	W4				W5
						<small>총량</small>	<small>고형물</small>	<small>무결</small>	<small>절리</small>	<small>층리</small>	<small>층리</small>	<small>층리</small>	<small>층리</small>	<small>층리</small>	<small>층리</small>	<small>층리</small>			<small>층리</small>	<small>층리</small>
-- CONTINUED FROM PREVIOUS PAGE --																				
15									BD, UN, SM, IN, CL, SI											
16									BD, UN, SM, CL BD, UN, SM, IN, CL, SI											
17									BD, UN, SM, PC, CL BD, UN, SM, PC, CL											
18			179.22 17.61						BD, UN, SM, IN, GO BD, UN, SM, IN, CL BD, UN, SM, SA BD, PL, SM, PC, CL BD, UN, SM, IN, GO											
19									BD, UN, RO, PC, CL, SI BD, UN, SM, SA BD, UN, SM, SA											
20									BD, UN, SM, IN, SI, SA									Bentonite		
21																				
22									BD, PL, SM, IN, GO BD, UN, RO, PC, SI, SA BD, UN, SM, CL BD, CU, SM, PC, SI, SA											
23																				
24																				

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Rotary Diamond Drill HQ3 Core



PROJECT: 1668740

RECORD OF DRILLHOLE: S2-17

SHEET 4 OF 7

LOCATION: N 4832089.00 ;E 603282.92

DRILLING DATE: September 5 and 6, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2			
-- CONTINUED FROM PREVIOUS PAGE --																		
25		Limestone/Siltstone Layers: 24.62 m-24.68 m, 24.82 m-24.92 m, 25.10 m-25.16 m, 25.22 m-25.27 m, 25.33 m-25.36 m, 25.77 m-25.79 m, 25.84 m-25.88 m, 25.99 m-26.03 m Slightly weathered to fresh, thinly to thickly bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			14	10												
26		Limestone/Siltstone Layers: 26.08 m-26.10 m, 26.15 m-26.19 m, 26.48 m-26.78 m, 26.85 m-27.05 m, 27.19 m-27.24 m, 27.29 m-27.33 m, 27.35 m-27.39 m, 27.48 m-27.51 m			15	10											Clay Seam	
27																		
28		Limestone/Siltstone Layers: 27.61 m-27.63 m, 27.87 m-27.95 m, 28.12 m-28.14 m, 28.41 m-28.45 m, 28.56 m-28.61 m			16	10												
29																		
30	Rotary Diamond Drill HC3 Core	Limestone/Siltstone Layers: 29.14 m-29.16 m, 29.32 m-29.38 m, 29.55X m-29.63 m, 29.79 m-29.82 m, 29.90 m-29.69 m, 29.98 m-30.06 m, 30.11 m-30.14 m, 30.18 m-30.20 m, 30.22 m-30.27 m, 30.40 m-30.43 m, 30.47 m-30.53 m			17	NR											Bentonite	
31		Limestone/Siltstone Layers: 30.61 m-30.63 m, 30.79 m-30.81 m, 30.90 m-30.94 m, 30.95 m-31.13 m, 31.26 m-31.31 m, 31.32 m-31.47 m, 31.78 m-31.86 m, 32.05 m-32.12 m			18	NR												
32																		
33		Limestone/Siltstone Layers: 32.26 m-32.32 m, 32.36 m-32.38 m, 32.69 m-32.86 m, 32.88 m-33.01 m, 33.02 m-33.21 m, 33.23 m-33.29 m, 33.32 m-33.39 m, 33.45 m-33.60 m, 33.61 m-33.64 m			19	NR												
34		Limestone/Siltstone Layers: 33.70 m-33.85 m, 34.04 m-34.06 m, 34.37 m-34.41 m, 34.93 m-34.98 m			20	NR												
CONTINUED NEXT PAGE																		

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PROJECT: 1668740

RECORD OF DRILLHOLE: S2-17

SHEET 5 OF 7

LOCATION: N 4832089.00 ; E 603282.92

DRILLING DATE: September 5 and 6, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH- ERING INDEX				Diameter Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2			
		-- CONTINUED FROM PREVIOUS PAGE --																
35		Slightly weathered to fresh, thinly to thickly bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 35.19 m-35.24 m, 35.51 m-35.70 m, 35.82 m-35.85 m, 36.34 m-36.36 m, 36.43 m-36.49 m			20	NR												
36					21	NR												
37		Limestone/Siltstone Layers: 36.72 m-36.82 m, 36.96 m-37.07 m, 37.33 m-37.37 m, 37.88 m-38.02 m			22	NR				BD, PL, SM, CI	1	1	16					
38					23	NR				BD, UN, SM, PC, CL	2	4	16					
39		Limestone/Siltstone Layers: 38.96 m-38.99 m, 39.05 m-39.18 m, 39.63 m-39.65 m, 39.68 m-39.73 m			24	NR												
40		Limestone/Siltstone Layers: 39.77 m-39.83 m, 39.88 m-39.98 m, 40.23 m-40.52 m, 40.76 m-40.78 m, 40.89 m-40.93 m, 41.24 m-41.26 m			25	NR												
41					26	NR												
42		Limestone/Siltstone Layers: 41.98 m-42.05 m, 42.24 m-42.29 m, 42.32 m-42.50 m, 42.58 m-42.61 m, 42.78 m-42.81 m			27	NR				BD, PL, SM, PC, CL	1	4	12					
43		Limestone/Siltstone Layers: 43.52 m-43.61 m, 43.75 m-43.84 m			28	NR												
44		Limestone/Siltstone Layers: 45.02 m-45.04 m, 45.30 m-45.33 m			29	NR												
		CONTINUED NEXT PAGE																

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PROJECT: 1668740
 LOCATION: N 4832089.00 ;E 603282.92
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-17

DRILLING DATE: September 5 and 6, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 6 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														PIEZOMETER								
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA							WEATHERING INDEX				Diametral Point Load Index (MPa)							
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2	W3	W4	W5			W6						
						총중량(%)	고체중량(%)	°	면상												파괴		저각	중간	지향	강도1	강도2	강도3
		--- CONTINUED FROM PREVIOUS PAGE ---																										
45		45.56 m-45.61 m, 45.64 m-45.67 m, 45.75 m-45.84 m Slightly weathered to fresh, thinly to thickly bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			27	NR																						
46		Limestone/Siltstone Layers: 45.84 m-45.95 m, 46.02 m-46.10 m, 46.14 m-46.18 m, 46.20 m-46.24 m			28	NR																						Bentonite
47																												
48		Limestone/Siltstone Layers: 48.67 m-48.72 m UCS=29.9 MPa			29	NR																						Sand
49	Rotary Diamond Drill HQ3 Core	Limestone/Siltstone Layers: 49.23 m-49.28 m, 49.74 m-49.77 m, 49.89 m-49.94 m, 50.20 m-50.25 m, 50.35 m-50.38 m			30	NR																						Screen
50																												Sand
51		Limestone/Siltstone Layers: 50.48 m-50.54 m, 50.63 m-50.66 m, 50.71 m-50.73 m, 50.75 m-50.83 m, 50.89 m-50.93 m, 51.20 m-51.26 m, 51.28 m-51.30 m, 51.34 m-51.37 m			31	NR																						
52		Limestone/Siltstone Layers: 52.03 m-52.05 m, 52.08 m-52.10 m			32	NR																						Bentonite
53																												
54		Limestone/Siltstone Layers: 54.06 m-54.08 m, 54.47 m-54.50 m, 54.53 m-54.55 m, 54.82 m-54.86 m			33	NR																						
		CONTINUED NEXT PAGE																										

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\GINTDERRYS RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4832089.00 ; E 603282.92
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-17

SHEET 7 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: September 5 and 6, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER																				
						RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/EL. CORE AXIS	DISCONTINUITY DATA			WEATH- ERING INDEX																									
											TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2	W3			W4	W5	W6	Diametral Point Load Index (MPa)																
-- CONTINUED FROM PREVIOUS PAGE --				141.97	33	NR																		Bentonite															
55		END OF DRILLHOLE		54.86																																			
		NOTES: 1. NR - Not recorded 2. Groundwater level measurements in monitoring well: <table style="margin-left: 20px;"> <tr> <td>Date (mm/dd/yy)</td> <td>Depth (m)</td> <td>Elev. (m)</td> </tr> <tr> <td>12/19/2017</td> <td>4.7</td> <td>192.1</td> </tr> <tr> <td>10/26/2018</td> <td>10.2</td> <td>186.5</td> </tr> <tr> <td>11/02/2018</td> <td>10.7</td> <td>186.1</td> </tr> <tr> <td>05/03/2019</td> <td>4.2</td> <td>192.6</td> </tr> </table>	Date (mm/dd/yy)	Depth (m)	Elev. (m)	12/19/2017	4.7	192.1	10/26/2018	10.2	186.5	11/02/2018	10.7	186.1	05/03/2019	4.2	192.6																						
Date (mm/dd/yy)	Depth (m)	Elev. (m)																																					
12/19/2017	4.7	192.1																																					
10/26/2018	10.2	186.5																																					
11/02/2018	10.7	186.1																																					
05/03/2019	4.2	192.6																																					
56																																							
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PROJECT: 1668740
 LOCATION: N 4831953.02; E 603161.61

RECORD OF BOREHOLE: S1-19

SHEET 1 OF 6

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: June 19 and 20, 2017

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60			80
0		GROUND SURFACE		193.45								
		ASPHALT (150 mm)		0.00								
		FILL - (SP/GP) SAND and GRAVEL, some fines; brown; non-cohesive, moist, dense		0.15	1	SS	34					
1		FILL - (CL) Sandy SILTY CLAY, some gravel; brown; cohesive, w<PL, hard		192.69	2	SS	45					
		(ML) SILT, some sand; brown to grey; non-cohesive, moist to wet, compact to dense		0.76	3	SS	34					
2				192.08	4	SS	30					
				1.37	5A	SS	24					
3		(CL) Sandy SILTY CLAY, some gravel; reddish brown (TILL); cohesive, w<PL, hard		189.94	5B	SS	24					
4		- Auger grinding at a depth of 3.7 m		3.51								
5					6	SS	52					
6					7	SS	77					
7		Mixture of Soil (92%) and Rock (8%)		186.74	8	SC	REC 77%					
		SOIL: (CL) Gravelly Sandy SILTY CLAY; reddish brown; cohesive, w<PL		6.71								
		ROCK: Grey to reddish brown, SHALE			9	SC	REC 43%					
8												
9		SHALE		184.03								
10		For rock coring details refer to Record of Drillhole S1-19.		9.42								

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DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: MCK/ARV

PROJECT: 1668740
 LOCATION: N 4831953.02 ;E 603161.61
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-19

DRILLING DATE: June 19 and 20, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 6
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1			
Rotary Diamond Drill HG3 Core		--- CONTINUED FROM PREVIOUS PAGE ---																
30		29.23 m-29.28 m, 29.47 m-29.61 m 29.65 m-29.70 m, 29.84 m-29.90 m 29.96 m-30.18 m, 30.19 m-30.25 m 30.29 m-30.60 m Slightly weathered to fresh, laminated to thickly bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			14	NR											(Axial)	
31		Limestone/Siltstone Layers: 30.80 m-30.96 m, 30.98 m-31.02 m 31.13 m-31.15 m, 31.25 m-31.31 m 31.36 m-31.38 m, 31.63 m-31.66 m 31.69 m-31.71 m, 32.09 m-32.14 m			15	NR											(Axial)	
32		Limestone/Siltstone Layers: 32.41 m-32.45 m, 32.67 m-32.76 m 33.28 m-33.31 m, 33.34 m-33.39 m 33.43 m-33.46 m, 33.51 m-33.55 m			16	NR											(Axial)	
33		Limestone/Siltstone Layers: 33.65 m-33.67 m, 33.79 m-33.82 m 33.84 m-33.93 m, 33.96 m-34.07 m 34.15 m-34.37 m, 34.99 m-35.04 m			17	NR											Bentonite	
34		Limestone/Siltstone Layers: 35.15 m-35.27 m, 35.55 m-35.67 m 36.20 m-36.25 m, 36.33 m-36.45 m 36.63 m-36.66 m			18	NR											(Axial)	
35		Limestone/Siltstone Layers: 36.66 m-36.79 m, 36.81 m-36.90 m 37.01 m-37.04 m, 37.06 m-37.10 m 37.15 m-37.17 m, 37.29 m-37.34 m 37.62 m-37.84 m, 37.92 m-37.95 m 38.02 m-38.08 m			19	NR											(Axial)	
36		Limestone/Siltstone Layers: 38.54 m-38.59 m, 39.25 m-39.44 m 39.59 m-39.72 m			20	NR											(Axial) BC (Axial)	
		CONTINUED NEXT PAGE																

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PROJECT: 1668740

RECORD OF DRILLHOLE: S1-19

SHEET 5 OF 6

LOCATION: N 4831953.02 ;E 603161.61

DRILLING DATE: June 19 and 20, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX					Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Jr	Ja	Jzon	W1	W2				W3
						FLUSH RETURN													
-- CONTINUED FROM PREVIOUS PAGE --																			
40		Slightly weathered to fresh, laminated to thickly bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 39.87 m-39.90 m, 40.05 m-40.09 m 40.26 m-40.29 m, 40.77 m-40.86 m 41.06 m-41.20 m		20	NR														
41		Limestone/Siltstone Layers: 42.08 m-42.10 m, 42.42 m-42.45 m 42.57 m-42.59 m, 42.64 m-42.67 m 42.83 m-42.90 m		21	NR												(Axial)		
42		Limestone/Siltstone Layers: 42.92 m-42.98 m, 43.00 m-43.05 m 43.14 m-43.22 m, 43.34 m-43.40 m 43.47 m-43.57 m, 43.69 m-43.71 m		22	NR												Bentonite (Axial)		
43		Limestone/Siltstone Layers: 44.52 m-44.55 m, 45.00 m-45.04 m 45.80 m-45.85 m, 45.99 m-46.02 m		23	NR												(Axial)		
44		UCS=18.2 MPa		24	NR												Sand		
45		Limestone/Siltstone Layers: 47.01 m-47.03 m, 47.15 m-47.20 m 47.30 m-47.33 m		25	NR												Screen (Axial)		
46		Limestone/Siltstone Layers: 47.89 m-48.05 m, 48.07 m-48.10 m 48.11 m-48.16 m, 48.19 m-48.26 m 48.30 m-48.38 m, 48.42 m-48.44 m 48.47 m-48.51 m, 48.59 m-48.74 m		26	NR												(Axial)		
47				27	NR												Bentonite		
48																			
49																			
CONTINUED NEXT PAGE																			

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DEPTH SCALE

1 : 50



LOGGED: MPL/EN

CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4834382.95; E 605113.89
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-10

SHEET 1 OF 6
 DATUM: UTM NAD 83
 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: May 2, 4 and 8, 2017
 DRILL RIG: CME 75 Truck

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH				WATER CONTENT PERCENT						
							Cu, kPa		nat V. rem V.		Q - U		Wp				W
0		GROUND SURFACE		194.06												GR SA SI CL	
		ASPHALT (150 mm)		0.00													
		FILL - (SM) Gravelly SILTY SAND; brown; non-cohesive, moist, compact		0.15	1A	AS	-										
1	Power Auger 150 mm O.D. Solid Stem Augers				1	SS	17										
		(CL) Sandy SILTY CLAY, some gravel; brown to grey (TILL); cohesive, w<PL, very stiff to hard		192.61 1.45	2	SS	22										
2					3	SS	31									5 29 50 16	
3					4	SS	39										
4					5	SS	32										
5					6	SS	47										
6	Mud Rotary Tricone				7	SS	36									8 35 46 11	
7		(CL-ML) SILTY CLAY - CLAYEY SILT and SAND, some gravel; grey (TILL); cohesive, w<PL, hard		186.90 7.16	8	SS	42										
8																	
9																	
10																	

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DEPTH SCALE
 1 : 50



LOGGED: KG
 CHECKED: MCK/ARV

PROJECT: 1668740
 LOCATION: N 4834382.95; E 605113.89
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-10

SHEET 3 OF 6
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: May 2, 4 and 8, 2017
 DRILL RIG: CME 75 Truck

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								Cu, kPa		nat V. rem V.	+ ⊕	Q - U	● ○	Wp				W
20	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, moist, very dense			15	SS	65											
21					16	SS	50/ 0.10											14 45 36 5
22			Containing shale fragments below a depth of 22.9 m.															
23		SHALE For rock coring details refer to Record of Drillhole S1-10.		171.02 23.04														
24																		
25																		
26																		
27																		
28																		
29																		
30																		

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PROJECT: 1668740

RECORD OF DRILLHOLE: S1-10

SHEET 4 OF 6

LOCATION: N 4834382.95 ;E 605113.89

DRILLING DATE: May 4 and 8, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Jr	Ja	Jzon	W1	W2			
						용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량			용량용량
		Continued from Record of Borehole S1-10		171.02 23.04														
24		Highly weathered to fresh, laminated to medium bedded, reddish brownish grey to grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 23.45 m-23.49 m, 23.58 m-23.71 m 23.92 m-24.00 m Limestone/Siltstone Layers: 24.43 m-24.45 m			1	NR											LC BC BC BC	
25		Limestone/Siltstone Layers: 24.99 m-25.03 m, 25.42 m-25.44 m 25.51 m-25.54 m, 25.59 m-25.60 m 25.62 m-25.63 m, 25.66 m-25.67 m 25.80 m-25.83 m, 26.04 m-26.06 m			2	NR											BC Clay Seam BC Clay Seam	
26		Limestone/Siltstone Layers: 26.06 m-26.24 m, 26.30 m-26.40 m 26.72 m-26.90 m, 27.13 m-27.15 m 27.50 m-27.51 m			3	NR											BC Clay Seam Clay Seam Clay Seam Clay Seam (Axial)	
27		Limestone/Siltstone Layers: 27.62 m-27.67 m, 28.13 m-28.15 m 28.40 m-28.42 m, 28.79 m-28.87 m 29.05 m-29.13 m			4	NR											BC BC BC	
28		Limestone/Siltstone Layers: 29.15 m-29.17 m, 29.20 m-29.22 m 29.32 m-29.34 m, 29.40 m-29.42 m 29.51 m-29.53 m, 29.57 m-29.60 m 29.65 m-29.69 m, 29.85 m-30.17 m 30.23 m-30.25 m, 30.50 m-30.54 m			5	NR											(Axial) Clay Seam	
29		Limestone/Siltstone Layers: 30.71 m-30.74 m, 30.85 m-30.86 m 31.18 m-31.21 m, 31.43 m-31.44 m 31.62 m-31.63 m, 31.91 m-31.92 m 32.00 m-32.03 m			6	NR											(Axial) Clay Seam Clay Seam	
30		Limestone/Siltstone Layers: 32.11 m-32.31 m, 32.32 m-32.34 m 32.36 m-32.39 m, 32.42 m-32.44 m 32.54 m-32.56 m, 32.65 m-32.82 m 32.87 m-32.88 m, 33.22 m-33.33 m 33.42 m-33.44 m, 33.64 m-33.69 m			7	NR											(Axial)	
31					8	NR											(Axial)	
32																		
33																		

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DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: AB/DAC

PROJECT: 1668740
 LOCATION: N 4834170.58; E 604978.82
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-09

SHEET 1 OF 6
 BORING DATE: October 13, 16, 17 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: October 13, 16, 17 and 18, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT				
							20	40	60				80
0	Power Auger 150 mm O.D. Solid Stem Augers	GROUND SURFACE		196.42								GR SA SI CL	
		ASPHALT (170 mm)		0.00									
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, dense to very dense		0.17	1	SS	92						
1					2	SS	41						
		FILL - (CL) SILTY CLAY, some sand, trace gravel; grey; cohesive, w<PL, stiff		195.05	1.37	3	SS	11					
2	Mud Rotary Tricone	(CL) Sandy SILTY CLAY, some gravel; brown to red to grey (TILL); cohesive, w<PL, very stiff to hard		194.29	2.13	4	SS	19					
					5	SS	26					5 26 51 18	
3					6	SS	50/0.03						
4					7	SS	99/0.28						
5				8	SS	50/0.10							
6													
7													
8													
9		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, compact to very dense		187.89	8.53	9	SS	50/0.13					
10													

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PROJECT: 1668740
 LOCATION: N 4834170.58; E 604978.82
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-09

SHEET 2 OF 6
 BORING DATE: October 13, 16, 17 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: October 13, 16, 17 and 18, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT				
								20	40	60				80
10	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, compact to very dense											GR SA SI CL	
11				10	SS	50/0.07								
12														
13					11	SS	94							
14														
15					12	SS	50/0.13							
16														
17				13	SS	65							8 42 40 10	
18														
19				14	SS	63								
20														
				15	SS	40								
				16	SS	20								

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DEPTH SCALE
1 : 50



LOGGED: EN
CHECKED: MCK

PROJECT: 1668740
 LOCATION: N 4834170.58; E 604978.82
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-09

SHEET 3 OF 6
 BORING DATE: October 13, 16, 17 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: October 13, 16, 17 and 18, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT						
								20	40	60	80	10 ⁻⁶				10 ⁻⁵
20	Mud Rotary Tircone	--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, compact to very dense		16	SS	20									GR SA SI CL	11 40 43 6
21				17	SS	50/0.10										
22				18	SS	50/0.10										
23				172.34 24.08	19	SS	50/0.07									
24		Grey, SHALE														
25																
26		SHALE For rock coring details refer to Record of Drillhole S2-09.														
27																
28																
29																
30																

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PROJECT: 1668740
 LOCATION: N 4834170.58 ; E 604978.82
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-09

DRILLING DATE: October 13, 16, 17 and 18, 2017

DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 6
 DATUM: UTM NAD 83 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY			R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX	Diametral Point Load Index (MPa)	FEATURES	PIEZOMETER		
							TOTAL CORE %	SOLID CORE %	RECOVERED			Jr	Jm	Js	Jt						
26	Rotary Diamond Drill HG3 Core	Continued from Record of Borehole S2-09		170.53 25.89	1	NR					BD,UN,RO,CI BD,UN,SM,CI BD,UN,RO,SA BD,UN,RO,SA BD,UN,RO,SA BD,PL,SM,PC,CL BD,UN,SM,PC,CL BD,UN,SM,PC,CL							BC Clay Seam			
27		2		NR				BD,PL,SM,CC,CL BD,UN,SM,PC,CL BD,UN,SM,SA BD,PL,SM,SA ..,IN,CL ..,IN,CL BD,UN,SM,CC,CL BD,UN,RO,PC,CL ..,IN,CL BD,PL,SM,CC,CL BD,PL,SM,CC,CL BD,PL,RO,SA BD,UN,SM,SA BD,UN,SM,PC,CL BD,UN,RO,PC,CL BD,PL,SM,SA BD,PL,SM,PC,CL BD,UN,SM,SA BD,PL,SM,CI						BC Clay Seam BC Clay Seam Clay Seam Clay Seam Clay Seam							
28		3		NR					BD,UN,SM,SA BD,UN,SM,CI BD,PL,SM,PC,CL BD,UN,RO,PC,CL										BC BC		
29		4		NR					..,IN,CL BD,PL,SM,CC,CL BD,UN,SM,PC,CL BD,PL,SM,SA											Clay Seam	
30		5		NR					..,IN,CL BD,UN,SM,SA BD,PL,RO,SA											Clay Seam	
31		6		NR					BD,PL,SM,SA BD,UN,RO,SA BD,UN,SM,SA BD,UN,RO,SA BD,PL,RO,SA BD,PL,SM,PC,CL BD,UN,SM,SA BD,PL,SM,SA BD,UN,RO,CI BD,PL,SM,SA BD,PL,SM,SA										Clay Seam Clay Seam		
32		7		NR					BD,UN,RO,SA BD,PL,RO,SA ..,IN,CL BD,PL,SM,CC,CL BD,PL,SM,SA											Clay Seam	
33		8		NR					BD,UN,SM,PC,CL ..,IN,CL BD,PL,SM,CC,CL BD,PL,SM,PC,CL BD,UN,RO,CC,CL BD,UN,RO,SA											Clay Seam	
34	9	NR					BD,UN,SM,CC,CL											BC			
35	10	NR					BD,PL,SM,IN,CL BD,PL,SM,IN,CL ..,IN,CL BD,UN,RO,SA BD,UN,RO,PC,CL											Clay Seam			
36	11	NR					BD,PL,SM,IN,CL BD,UN,SM,CC,CL BD,UN,SM,SA BD,UN,SM,SA											BC			
37	12	NR					BD,UN,RO,SA														
38	13	NR					BD,PL,SM,SA														
39	14	NR					BD,PL,RO,SA														

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GTA-RCK 046 S:\CLIENTS\REGION OF PEEL/DERRY RD_MISSISSAUGA/GPJ GAL-MISS GDT 19-5-24

DEPTH SCALE
1 : 50



LOGGED: EN
CHECKED: DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S2-09

SHEET 5 OF 6

LOCATION: N 4834170.58 ;E 604978.82

DRILLING DATE: October 13, 16, 17 and 18, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount
DRILLING CONTRACTOR: Davis Drilling

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	DISCONTINUITY DATA												FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION			WEATH- ERING INDEX			Diametral Point Load Index (MPa)			
						TOTAL CORE %	SOLID CORE %				Jr	Ja	Jsm	W1	W2	W3				W4
--- CONTINUED FROM PREVIOUS PAGE ---																				
36	Rotary Diamond Drill HG3 Core	Limestone/Siltstone Layers: 35.80 m-35.83 m, 36.20 m-36.22 m, 36.25 m-36.29 m, 36.40 m-36.54 m, 36.68 m-36.72 m Moderately weathered to fresh, laminated to thickly bedded, grey to reddish brownish grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		8	NR					BD,UN,SM,SA BD,PL,SM,PC,CL BD,UN,RO,SA										
37		Limestone/Siltstone Layers: 37.19 m-37.29 m, 37.39 m-37.45 m, 37.51 m-37.62 m, 38.54 m-38.57 m, 38.62 m-38.68 m																		
38																				BC
39		Limestone/Siltstone Layers: 39.03 m-39.06 m, 39.81 m-39.87 m, 39.96 m-40.13 m																		
40																				
41		Limestone/Siltstone Layers: 41.26 m-41.31 m, 41.41 m-41.48 m																		
42																				
43		Limestone/Siltstone Layers: 42.36 m-42.41 m, 42.45 m-42.47 m, 42.59 m-42.63 m, 43.29 m-43.31 m																		
44																				Clay Seam
45		Limestone/Siltstone Layers: 43.74 m-43.80 m, 44.08 m-44.25 m, 44.53 m-44.56 m, 44.57 m-44.61 m, 44.78 m-44.86 m																		
46																				
47		Limestone/Siltstone Layers: 45.12 m-45.22 m, 45.32 m-45.44 m, 45.90 m-45.92 m, 46.13 m-46.17 m																		
CONTINUED NEXT PAGE																				

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY_RD_MISSISSAUGA\02_DATA\GINT\DERRY_RD_MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24



PROJECT: 1668740
 LOCATION: N 4834096.77; E 604851.29
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-11

SHEET 1 OF 7
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: May 9 to 11, 2017
 DRILL RIG: CME 75 Truck

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60				80
0	Power Auger 150 mm O.D. Solid Stem Augers	GROUND SURFACE		198.05								GR SA SI CL	
		ASPHALT (150 mm)		0.00								Concrete	
		FILL - (SP) Gravelly SAND; brown; non-cohesive, moist		0.15	1A	AS	-					Sand	
1		FILL - (CL) SILTY CLAY, some sand, some gravel; brown; cohesive, w<PL, firm		197.36 0.69	1	SS	8						
2	Mud Rotary Tricone	(SC) Gravelly CLAYEY SAND, with plastic fines; brown becoming grey below a depth of 4.1 m (TILL); moist to wet, compact to very dense		196.60 1.45	2	SS	20						
3					3	SS	31						
4					4	SS	34						
5					5	SS	33						
6					6	SS	35						
7					7	SS	50/ 0.10						16 36 40 8
9					8	SS	100/ 0.23						
10													

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GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINT\DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

PROJECT: 1668740
 LOCATION: N 4834096.77; E 604851.29

RECORD OF BOREHOLE: S1-11

SHEET 2 OF 7

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: May 9 to 11, 2017

DATUM: UTM NAD 83 (ZONE 17N)

DRILL RIG: CME 75 Truck

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH					WATER CONTENT PERCENT	
								20	40				60	80
10		--- CONTINUED FROM PREVIOUS PAGE ---										GR SA SI CL		
10.5		(SC) Gravelly CLAYEY SAND, with plastic fines; brown becoming grey below a depth of 4.1 m (TILL); moist to wet, compact to very dense			9	SS	41					12 55 28 5		
11.27				186.78										
11.27		(SM) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist to wet, dense to very dense			10	SS	50/0.08							
12														
13														
13.5					11	SS	87							
14														
15	Mud Rotary Tricone				12	SS	52					Bentonite		
16														
16.5					13	SS	60					10 46 38 6		
17														
18					14	SS	59							
18.4		- Red shale fragments at a depth of 18.4 m.												
19														
19.5					15	SS	32							
20														

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GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINTO\DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT 05/24/19

PROJECT: 1668740
 LOCATION: N 4834096.77; E 604851.29
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-11

SHEET 3 OF 7

BORING DATE: May 9 to 11, 2017
 DRILL RIG: CME 75 Truck

DATUM: UTM NAD 83
 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. rem V. + ⊕ - ⊙	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³			
20		--- CONTINUED FROM PREVIOUS PAGE ---										GR SA SI CL
21		(SM) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist to wet, dense to very dense			16	SS	100/0.15					
22					17	SS	79					
23					18	SS	51					
24					19	SS	50/0.13					
25	Mud Rotary Tricone				171.69 26.36							
26		- Tricone grinding between depths of 25.6 m and 25.9 m.										
27		(ML/SM) SILT and SAND, trace gravel; grey; non-cohesive, wet, very dense			20	SS	50/0.07					
28		(SC) Gravelly CLAYEY SAND, containing plastic fines; grey (TILL); non-cohesive, moist to wet, very dense			170.20 27.85							
29					21	SS	95/0.28					
30		CONTINUED NEXT PAGE										

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINTO\DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

PROJECT: 1668740
 LOCATION: N 4834096.77; E 604851.29
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-11

SHEET 4 OF 7
 BORING DATE: May 9 to 11, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: May 9 to 11, 2017
 DRILL RIG: CME 75 Truck

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
30	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (SC) Gravelly CLAYEY SAND, containing plastic fines; grey (TILL); non-cohesive, moist to wet, very dense			22	SS	100/0.15										GR SA SI CL 31 34 26 9
31					23	SS	100/0.03										
33		- Shale fragments below a depth of 33.0 m.			164.95 33.10	24	SS	100/0.07									
34		SHALE For rock coring details refer to Record of Drillhole S1-11.															
35																	
36																	
37																	
38																	
39																	
40																	

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DRILLHOLES\DATA\GINTO\DRY RD MISSISSAUGA\02 DATA\GINTO\DRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-11

SHEET 6 OF 7

LOCATION: N 4834096.77 ; E 604851.29

DRILLING DATE: May 10 and 11, 2017

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX						Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jzon	W1	W2	W3			
						FLUSH RETURN														
--- CONTINUED FROM PREVIOUS PAGE ---																				
44		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			8	NR												(Axial)		
45		Limestone/Siltstone Layers: 44.28 m-44.29 m, 44.49 m-44.50 m 44.94 m-45.01 m, 45.38 m-45.39 m 45.51 m-45.60 m, 45.81 m-45.89 m			9	NR													(Axial)	Bentonite
46		Limestone/Siltstone Layers: 45.92 m-45.98 m, 46.18 m-46.32 m 46.34 m-46.35 m, 46.39 m-46.41 m 46.63 m-46.65 m, 46.68 m-46.69 m 46.72 m-46.73 m, 46.87 m-46.91 m			10	NR													(Axial)	Sand
47		UCS=22.9 MPa			11	NR													(Axial)	
48		Limestone/Siltstone Layers: 47.92 m-47.93 m, 48.49 m-48.53 m			12	NR													(Axial)	
49		Limestone/Siltstone Layers: 49.38 m-49.41 m, 49.62 m-49.64 m			13	NR													(Axial)	Bentonite
50		Limestone/Siltstone Layers: 50.83 m-50.84 m, 51.16 m-51.21 m 51.45 m-51.47 m, 51.80 m-51.84 m			146.08														(Axial)	
51				51.97														(Axial)		
52		END OF DRILLHOLE																(Axial)		
53		NOTES: 1. NR - Not recorded 2. Groundwater level measurements in monitoring well:																(Axial)		
		CONTINUED NEXT PAGE																		

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLING\RD_MISSISSAUGA\02_DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: AB/DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-11

SHEET 7 OF 7

LOCATION: N 4834096.77 ;E 604851.29

DRILLING DATE: May 10 and 11, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY													FEATURES	PIEZOMETER	
							RECOVERY			FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH. INDEX			Diameter Point Load Index (MPa)				
							TOTAL CORE %	SOLID CORE %	R.Q.D. %		TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2	W3	W4	W5			W6
							00000000	00000000	00000000													
--- CONTINUED FROM PREVIOUS PAGE ---																						
		Date (mm/dd/yy)	Depth (m)	Elev. (m)																		
		05/16/2017	2.5	195.6																		
		06/06/2017	3.4	194.7																		
		06/16/2017	3.4	194.7																		
54		07/27/2017	3.3	194.8																		
		09/22/2017	3.1	195.0																		
		12/19/2017	3.2	194.9																		
		02/15/2018	3.3	194.8																		
		08/18/2018	3.0	199.1																		
		05/05/2018	3.1	195.0																		
55																						
56																						
57																						
58																						
59																						
60																						
61																						
62																						
63																						

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\GINT\DERRYS RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: AB/DAC

PROJECT: 1668740
 LOCATION: N 4833926.94; E 604793.19
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-10

SHEET 1 OF 7
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: August 25, 28 and 29, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
0		GROUND SURFACE		200.85												GR SA SI CL
		ASPHALT (200 mm)		0.00 200.65												
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, compact to very dense		0.20	1	SS	58									
1					2	SS	28									
		FILL - (CL) SILTY CLAY, some sand, trace gravel; brown and grey; cohesive, w<PL, stiff		199.48 1.37	3A											
2		(CL) Sandy SILTY CLAY, some gravel; brown becoming grey at a depth of 5.0 m (TILL); cohesive, w<PL, very stiff to hard		199.02 1.83	3B	SS	14									
					4	SS	26									
3					5	SS	31									
4					6	SS	55									
5					7	SS	32									8 35 42 15
6					8	SS	32									
7																
8					9	SS	32									
9																
		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, compact to dense		192.24 8.61	10	SS	58									
10																

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PROJECT: 1668740
 LOCATION: N 4833926.94; E 604793.19
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-10

SHEET 2 OF 7
 BORING DATE: August 25, 28 and 29, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: August 25, 28 and 29, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT						
								20	40	60	80	nat V. + rem V. ⊕				Q - U - ⊙
10		--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, compact to dense													GR SA SI CL	
11				11	SS	86										
12				12	SS	50/0.10										
13				13	SS	91										
14				14	SS	80										
15	Mud Rotary Tricone			15	SS	50/0.13										
16		- Tricone grinding between depths of 15.9 m and 16.8 m.														
17				16	SS	93									11 44 39 6	
18				17	SS	44										
19																
20																

CONTINUED NEXT PAGE

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINTO\DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

DEPTH SCALE
1 : 50



LOGGED: MPL
CHECKED: MCK

PROJECT: 1668740
 LOCATION: N 4833926.94; E 604793.19

RECORD OF BOREHOLE: S2-10

SHEET 3 OF 7

BORING DATE: August 25, 28 and 29, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								Cu, kPa		nat V. rem V.		Q - U		Wp				W
20	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, compact to dense			17	SS	44											
21					18	SS	21											
22																		
23						19	SS	64										
24																		
25						20	SS	50/ 0.13										
26						21	SS	72										
27																		
28					22	SS	93											
29																		
30					23	SS	68											
		- Tricone grinding at a depth of 28.3 m.																
		CONTINUED NEXT PAGE																

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02_DATA\GINTO\DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

PROJECT: 1668740
 LOCATION: N 4833926.94; E 604793.19
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-10

SHEET 4 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: August 25, 28 and 29, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
								20 40 60 80		nat V. + Q - rem V. ⊕ U - ⊙		10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³				Wp ----- W ----- WI	
30	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE ---													GR SA SI CL		
31		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, compact to dense															
32				24	SS	96							○				
33		(ML) SILT, some sand; grey; non-cohesive, wet, very dense		169.38													
32	25			SS	50/ 0.13							○		1 9 83 7			
33	Grey, SHALE		167.63														
34			26	SS	50/ 0.03												
34	SHALE For rock coring details refer to Record of Drillhole S2-10. * - No recovery		167.33														
35			27	SS	50/ 0.03												
35	SHALE		167.33														
36			28	SS	50/ 0.03												
36	SHALE		167.33														
37			29	SS	50/ 0.03												
37	SHALE		167.33														
38			30	SS	50/ 0.03												
38	SHALE		167.33														
39			31	SS	50/ 0.03												
39	SHALE		167.33														
40			32	SS	50/ 0.03												

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINTO\DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

PROJECT: 1668740
 LOCATION: N 4833926.94 ;E 604793.19
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-10

DRILLING DATE: August 25, 28 and 29, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 5 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX						Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jzon	W1	W2	W3			
						용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량			용량용량
		Continued from Record of Borehole S2-10		167.33																
34		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 33.95 m-34.09 m, 34.14 m-34.16 m, 34.25 m-34.31 m, 34.34 m-34.40 m, 34.47 m-34.61 m, 34.68 m-34.77 m, 34.79 m-35.00 m		33.52	1	NR														
					2	NR														
35		Limestone/Siltstone Layers: 35.92 m-35.97 m Limestone/Siltstone Layers: 35.87 m-35.92 m, 36.49 m-36.54 m															BC			
36					3	NR											Clay Seam			
37		Limestone/Siltstone Layers: 37.08 m-37.11 m, 37.21 m-37.24 m, 37.33 m-37.36 m, 37.40 m-37.47 m, 37.63 m-37.69 m, 37.75 m-37.79 m, 37.86 m-37.89 m, 38.05 m-38.34 m																		
38					4	NR														
39		Limestone/Siltstone Layers: 38.66 m-38.72 m Limestone/Siltstone Layers: 38.57 m-38.66 m, 38.93 m-38.95 m, 39.43 m-39.48 m															Clay Seam			
40																				
41		Limestone/Siltstone Layers: 40.09 m-40.16 m, 40.18 m-40.20 m, 40.26 m-40.32 m, 40.33 m-40.46 m, 40.50 m-40.70 m, 40.75 m-40.84 m, 40.91 m-41.05 m, 41.38 m-41.41 m																		
42					6	NR														
43		Limestone/Siltstone Layers: 41.41 m-41.51 m, 41.52 m-41.60 m, 41.63 m-41.69 m, 41.75 m-41.82 m, 41.83 m-42.18 m, 42.19 m-42.25 m																		
					7	NR														
		Limestone/Siltstone Layers: 43.12 m-43.14 m, 43.47 m-43.51 m, 43.66 m-43.68 m, 43.72 m-43.74 m, 44.06 m-44.10 m																		
					8	NR														
		CONTINUED NEXT PAGE																		

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLING RD MISSISSAUGA\02 DATA\GINT\DRILLING RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4833926.94 ;E 604793.19
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-10

SHEET 7 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: August 25, 28 and 29, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES	PIEZOMETER									
						RECOVERY			FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA			WEATH- ERING INDEX	Diametral Point Load Index (MPa)												
						TOTAL CORE %	SOLID CORE %	R.Q.D. %			Jr	Ja	Jzon			W1			W2	W3	W4	W5	W6				
						FLUSH RETURN						TYPE AND SURFACE DESCRIPTION															
54		-- CONTINUED FROM PREVIOUS PAGE -- Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 53.98 m-54.01 m, 54.25 m-54.34 m, 55.10 m-55.13 m Limestone/Siltstone Layers: 55.15 m-55.22 m, 55.77 m-55.80 m, 56.02 m-56.04 m, 56.40 m-56.43 m		14																							
55	Rotary Diamond Drill HQ3 Core			15	NR																						
56				16	NR											BD, PL, SM, IN, CL	1	15	0								
57		END OF DRILLHOLE		144.20 56.65																							
58		NOTE: 1. NR - Not recorded																									
59																											
60																											
61																											
62																											
63																											

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLING\RD MISSISSAUGA\02 DATA\GINT\DRILL RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4833796.28; E 604698.45
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-12

SHEET 1 OF 7
 BORING DATE: November 13 to 15, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: November 13 to 15, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴			
0		GROUND SURFACE		202.29												GR SA SI CL
		ASPHALT (150 mm)		0.00												
		FILL - (SW/GW) SAND and GRAVEL; brown to grey; non-cohesive, dry, loose to dense		0.15	1	SS	35									
1					2A	SS	10									
		FILL - (CL) Sandy SILTY CLAY; brown; cohesive, w-PL, stiff		201.02												
				1.27												
					2B											
2					3	SS	9									
		(CL) Sandy SILTY CLAY, trace to some gravel, brown becoming grey below a depth of 6.1 m (TILL); cohesive, w<PL, very stiff to hard		200.08												
				2.21												
					4	SS	20									
3	Power Auger 150 mm O.D. Solid Stem Augers															
					5	SS	24									
4																
		- Auger grinding at a depth of 4.3 m.														
5					6	SS	46									
6																
					7	SS	18									8 32 42 18
7																
8	Mud Rotary Tricone				8A	SS	32									
				194.21												
		(SM) SILTY SAND, trace gravel; grey (TILL); non-cohesive, moist, compact		8.08												
9																
					9A	SS	25									
				192.71												
		(CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL		9.58												
10					9B											

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PROJECT: 1668740
 LOCATION: N 4833796.28; E 604698.45
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-12

SHEET 2 OF 7
 BORING DATE: November 13 to 15, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: November 13 to 15, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. rem V. + ⊕ - ⊙	WATER CONTENT PERCENT Wp W Wi			
10		--- CONTINUED FROM PREVIOUS PAGE --- (CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL (SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, moist, compact to very dense		192.08 10.21								GR SA SI CL
11					10	SS	27					
12												
13					11	SS	54					
14		- Resistance to tricone at a depth of 13.4 m.			12	SS	50/ 0.10					15 40 37 8
15	Mud Rotary Tricone	(CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL, hard - Resistance to tricone at a depth of 14.6 m.		187.76 14.53								
16					13	SS	98					
17		- Sand layers between depths of 16.8 m and 17.4 m.			14A 14B	SS	47					
18		- Resistance to tricone at a depth of 17.7 m.			15	SS	96/ 0.23					
19												
20		(ML) Sandy SILT; grey; non-cohesive, wet, very dense		183.05 19.24	16	SS	53/ 0.13					

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PROJECT: 1668740
 LOCATION: N 4833796.28; E 604698.45
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-12

SHEET 3 OF 7
 BORING DATE: November 13 to 15, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: November 13 to 15, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			
20		--- CONTINUED FROM PREVIOUS PAGE --- (ML) Sandy SILT; grey; non-cohesive, wet, very dense														GR SA SI CL
21					17	SS	50/0.07									1 33 61 5
22				180.04 22.25												
23		(CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL, hard			18	SS	51/0.05									
24					19	SS	50/0.10									
25	Mud Rotary Tricone				20	SS	53/0.07									
26					21	SS	52/0.10									
27																
28																
29		Grey, SHALE		173.33 28.96	22	SS	50/0.00									
30																

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PROJECT: 1668740
 LOCATION: N 4833796.28; E 604698.45
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-12

SHEET 4 OF 7
 BORING DATE: November 13 to 15, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: November 13 to 15, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								Cu, kPa		nat V. rem V.		+ Q - U					Wp	
30	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- Grey, SHALE														GR SA SI CL		
31		SHALE For rock coring details refer to Record of Drillhole S1-12. NOTE: 1. Groundwater level in open borehole was measured at a depth of 4.5 m below ground surface (Elev. 197.8 m) prior to bedrock coring.		171.66 30.63	23	SS	59/ 0.00											
32																		
33																		
34																		
35																		
36																		
37																		
38																		
39																		
40																		

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PROJECT: 1668740

RECORD OF DRILLHOLE: S1-12

SHEET 5 OF 7

LOCATION: N 4833796.28 ;E 604698.45

DRILLING DATE: November 13 to 15, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Driling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
							TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2			
		Continued from Record of Borehole S1-12		171.66															
31		Slightly weathered to fresh, thinly to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		30.63	1	NR											LC		
		Limestone/Siltstone Layers: 30.68 m-30.75 m, 30.8 m-30.93 m			2	NR											LC		
		Limestone/Siltstone Layers: 31.17 m-31.32 m, 31.45 m-31.58 m 31.59 m-31.63 m, 31.77 m-31.82 m 32.28 m-32.36 m															BC		
		Limestone/Siltstone Layers: 32.46 m-32.65 m, 32.90 m-33.06 m 33.19 m-33.34 m			3	NR													
32		Limestone/Siltstone Layers: 33.99 m-34.36 m, 34.42 m-34.52 m 34.54 m-34.95 m, 35.12 m-35.14 m 35.20 m-35.23 m, 35.29 m-35.34 m 35.36 m-35.39 m			4	NR													
33		Limestone/Siltstone Layers: 35.55 m-35.63 m, 36.00 m-36.18 m 36.90 m-37.00 m			5	NR													
34		Limestone/Siltstone Layers: 37.46 m-37.48 m, 37.67 m-37.70 m 38.10 m-38.16 m, 38.30 m-38.33 m 38.44 m-38.55 m			6	NR											LC		
35		Limestone/Siltstone Layers: 38.69 m-38.74 m, 38.84 m-38.96 m 39.01 m-39.40 m, 39.80 m-39.93 m			7	NR											BC		
36		Limestone/Siltstone Layers: 40.21 m-40.24 m, 40.31 m-40.37 m 40.72 m-40.75 m, 41.08 m-41.18 m 41.31 m-41.45 m			8	NR											LC		
37																	Clay Seam		
38																			
39																			
40																			

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DEPTH SCALE

1 : 50



LOGGED: DH

CHECKED: DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-12

SHEET 7 OF 7

LOCATION: N 4833796.28 ; E 604698.45

DRILLING DATE: November 13 to 15, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER							
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA			WEATHERING INDEX	Diametral Point Load Index (MPa)													
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja		Jzon	W1	W2	W3	W4			W5	W6					
FLUSH RETURN	회전 상 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상	회전 상 상										
51	Rotary Diamond Drill HQ3 Core	-- CONTINUED FROM PREVIOUS PAGE -- Slightly weathered to fresh, thinly to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 51.22 m-51.25 m, 51.35 m-51.38 m	●		14																							
					15	NR																						
52		Limestone/Siltstone Layers: 52.87 m-52.90 m, 53.76 m-53.79 m	●		16	NR																						
53			●		17	NR																						
54		Limestone/Siltstone Layers: 55.33 m-55.41 m	●		18	NR																						
55		Limestone/Siltstone Layers: 56.22 m-56.36 m	●																									
56			●																									
57		END OF DRILLHOLE NOTE: 1. NR - Not recorded		145.40 56.89																								

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DEPTH SCALE

1 : 50



GOLDER

LOGGED: DH

CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4833702.25; E 604521.94
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-11

SHEET 1 OF 7
 BORING DATE: September 14, 15 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 14, 15 and 18, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60			
0		GROUND SURFACE		203.60								GR SA SI CL
		ASPHALT (150 mm)		0.00								
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, compact		0.15	1	SS	29					
1				202.48	2A	SS	14					
		(CL) SILTY CLAY, some sand, trace to some gravel; brown-red; cohesive, w<PL, stiff to very stiff		1.12	2B							
2	Power Auger 150 mm O.D. Solid Stem Augers				3	SS	18					
					4	SS	23					
3				200.63								
		(CL) Sandy SILTY CLAY, some gravel; grey (TILL), cohesive, w<PL, very stiff to hard		2.97	5	SS	70					
4												
5					6	SS	21					7 33 42 18
6												
7	Mud Rotary Tricone				7	SS	21					
8					8	SS	20					
9					9	SS	25					
10												

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PROJECT: 1668740
 LOCATION: N 4833702.25; E 604521.94
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-11

SHEET 2 OF 7
 BORING DATE: September 14, 15 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 14, 15 and 18, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								Cu, kPa		nat V. rem V.		Q - U		Wp				W
10	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (CL) Sandy SILTY CLAY, some gravel; grey (TILL), cohesive, w<PL, very stiff to hard (ML/SM) SILT and SAND, some gravel; grey (TILL); non-cohesive, moist, compact to very dense		193.39 10.21													GR SA SI CL	
11					10	SS	24											
12																		
13						11	SS	38									6 38 46 10	
14						12	SS	38										
15						13	SS	64										
16																		
17			(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist to wet, very dense		187.37 16.23													
18						14	SS	50/ 0.13										
19			- Resistance to tricone between depths of 18.9 m and 19.2 m.															
20			- Rock fragments below a depth of 19.8 m.			16	SS	83/ 0.23									8 42 43 7	
		CONTINUED NEXT PAGE																

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PROJECT: 1668740
 LOCATION: N 4833702.25; E 604521.94
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-11

SHEET 3 OF 7
 BORING DATE: September 14, 15 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 14, 15 and 18, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH		WATER CONTENT PERCENT						
								Cu, kPa	nat V. rem V. + ⊕ - ⊙	Wp	W	WI				WI
20		--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist to wet, very dense													GR SA SI CL	
21																
22																
23																
24																
25	Mud Rotary Tricone														Non - Plastic	
26															12 46 36 6	
27																
28																
29																
30																

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GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINTO\DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

PROJECT: 1668740
 LOCATION: N 4833702.25; E 604521.94
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-11

SHEET 4 OF 7
 BORING DATE: September 14, 15 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 14, 15 and 18, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		WATER CONTENT PERCENT				
								20	40	60	80	10 ⁻⁶	10 ⁻⁵			
30	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist to wet, very dense														GR SA SI CL
31				23	SS	100/0.13										
32		Grey, SHALE SHALE For rock coring details refer to Record of Drillhole S2-11.		171.62 32.01	24	SS	100/0.03									
33																
34																
35																
36																
37																
38																
39																
40																

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PROJECT: 1668740

RECORD OF DRILLHOLE: S2-11

SHEET 5 OF 7

LOCATION: N 4833702.25 ;E 604521.94

DRILLING DATE: September 14, 15 and 18, 2017

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY																		FEATURES	PIEZOMETER		
				ELEV.		RUN No.	RECOVERY			FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX				Diametral Point Load Index (MPa)					
				DEPTH (m)	FLUSH RETURN		TOTAL CORE %	SOLID CORE %	R.Q.D. %		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jso	W1	W2	W3		W4			W5	W6
							FLUSH RETURN	TOTAL CORE %	SOLID CORE %			R.Q.D. %	TYPE AND SURFACE DESCRIPTION												
		Continued from Record of Borehole S2-11		171.59																					
32.01		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			1	NR																			
33		Limestone/Siltstone Layers: 32.62 m-32.65 m, 33.08 m-33.12 m, 33.39 m-33.43 m			2	NR																BC			
34		Limestone/Siltstone Layers: 33.67 m-33.73 m, 33.98 m-34.06 m, 34.24 m-34.31 m, 34.67 m-34.71 m																							
		- Calcareous zones contain vugs			3	NR																			
35		Limestone/Siltstone Layers: 35.93 m-35.97 m, 36.22 m-36.28 m, 36.51 m-36.55 m																							
36					4	NR																			
37		Limestone/Siltstone Layers: 39.90 m-36.94 m, 36.96 m-37.11 m, 37.44 m-37.63 m, 38.24 m-38.28 m																							
38					5	NR																			
39		Limestone/Siltstone Layers: 38.69 m-38.80 m, 39.24 m-39.26 m																							
40					6	NR																			
41		Limestone/Siltstone Layers: 40.09 m-40.25 m, 40.29 m-40.32 m, 40.50 m-40.57 m, 40.69 m-40.78 m, 40.83 m-41.21 m																							
42		Limestone/Siltstone Layers: 41.94 m-41.96 m, 42.01 m-42.12 m, 42.36 m-42.41 m, 42.86 m-42.89 m																							
		CONTINUED NEXT PAGE																							

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PROJECT: 1668740
 LOCATION: N 4833702.25 ; E 604521.94
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-11

SHEET 6 OF 7
 DRILLING DATE: September 14, 15 and 18, 2017
 DATUM: UTM NAD 83 (ZONE 17N)

DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											PIEZOMETER									
						RECOVERY			DISCONTINUITY DATA			WEATHERING INDEX		Diameter Point Load Index (MPa)												
						TOTAL CORE %	SOLID CORE %	R.Q.D. %	TYPE AND SURFACE DESCRIPTION	Jr	Ja	J30m	W1	W2	W3	W4		W5	W6	W7						
						؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄		؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄	؄؄؄؄؄؄					
		-- CONTINUED FROM PREVIOUS PAGE --																								
43		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 43.44 m-43.63 m, 43.71 m-43.84 m, 44.26 m-44.28 m			8	NR																				
44					9	NR																				
45		Limestone/Siltstone Layers: 44.41 m-44.45 m, 44.61 m-44.65 m, 44.75 m-44.85 m, 44.90 m-44.99 m, 45.39 m-45.43 m, 45.89 m-45.92 m			10	NR																				
46		Limestone/Siltstone Layers: 46.16 m-46.19 m, 46.51 m-46.54 m, 47.16 m-47.37 m			11	NR																				
47		Calcareous zone			12	NR																				
48		Limestone/Siltstone Layers: 48.75 m-48.78 m			13	NR																				
49		Limestone/Siltstone Layers: 49.71 m-49.74 m UCS=22.4 MPa			14	NR																				
50																										
51		Limestone/Siltstone Layers: 51.17 m-51.23 m, 51.64 m-51.68 m, 51.75 m-51.79 m			15	NR																				
52		CONTINUED NEXT PAGE																								

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PROJECT: 1668740

RECORD OF DRILLHOLE: S2-11

SHEET 7 OF 7

LOCATION: N 4833702.25 ;E 604521.94

DRILLING DATE: September 14, 15 and 18, 2017

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER								
						RECOVERY			FRACT. INDEX PER 0.25m	DISCONTINUITY DATA	WEATHERING INDEX							Diametral Point Load Index (MPa)							
						TOTAL CORE %	SOLID CORE %	R.Q.D. %			Jr	Ja	Jzon	W1	W2				W3	W4	W5	W6			
						FLUSH RETURN			DIP W/RT CORE AXIS	TYPE AND SURFACE DESCRIPTION															
-- CONTINUED FROM PREVIOUS PAGE --																									
53		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous to occasionally vuggy, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 52.40 m-52.43 m, 52.67 m-52.69 m		15	NR																				
54		Limestone/Siltstone Layers: 53.57 m-53.62 m		16	NR																				
55	Rotary Diamond Drill HG3 Core																								
56				17	NR																				
57		Limestone/Siltstone Layers: 56.74 m-56.85 m, 57.44 m-57.46 m		18	NR																				
58		END OF DRILLHOLE NOTE: 1. NR - Not recorded		146.08 57.52																					

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PROJECT: 1668740
 LOCATION: N 4833563.38; E 604512.89
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-13

SHEET 1 OF 8
 DATUM: UTM NAD 83
 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 6 to 8, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT				
							20	40	60				80
0		GROUND SURFACE		203.58								GR SA SI CL	
		ASPHALT (200 mm)		0.00									
				203.38									
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, loose to very dense		0.20	1	SS	50						
1					2	SS	7						
				202.36									
		(CL) Sandy SILTY CLAY, some gravel to gravelly; grey (TILL); cohesive, w<PL to w~PL, stiff to hard		1.22	3	SS	17						
2					4	SS	22						
3					5	SS	30						
4					6	SS	40						
5					7	SS	17						
6					8	SS	20						
7					9	SS	14						
8													
9													
10													

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PROJECT: 1668740
 LOCATION: N 4833563.38; E 604512.89
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-13

SHEET 2 OF 8
 BORING DATE: September 6 to 8, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 6 to 8, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. rem V. + - Q - U - ● ○	WATER CONTENT PERCENT Wp W Wi			
10		--- CONTINUED FROM PREVIOUS PAGE --- (CL) Sandy SILTY CLAY, some gravel to gravelly; grey (TILL); cohesive, w<PL to w~PL, stiff to hard										GR SA SI CL
11				10	SS	16						
12		(SC) Gravelly CLAYEY SAND, with plastic fines, grey (TILL); moist to wet, dense to very dense		191.92 11.66								
13				11	SS	41						
14				12	SS	70						27 35 32 6
15	Mud Rotary Tricone	- Resistance to tricone between depths of 14.3 m and 15.3 m.										Bentonite
16				13	SS	57						
17		- Sand seams at a depth of 15.5 m.										
18				14	SS	50/ 0.15						
19				185.90 17.68								
20		(ML/SM) SILT and SAND, trace gravel; grey (TILL); non-cohesive, moist to wet, very dense		15	SS	84						
				16	SS	50/ 0.08						
CONTINUED NEXT PAGE												

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PROJECT: 1668740
 LOCATION: N 4833563.38; E 604512.89
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-13

SHEET 3 OF 8
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 6 to 8, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	WATER CONTENT PERCENT Wp W Wi			
20		--- CONTINUED FROM PREVIOUS PAGE --- (ML/SM) SILT and SAND, trace gravel; grey (TILL); non-cohesive, moist to wet, very dense										GR SA SI CL
21				17	SS	50/0.13						05/10/2018
22												
23				18	SS	50/0.10						
24												
25	Mud Rotary Tricone			19	SS	50/0.10					3 45 44 8	Bentonite
26				20	SS	50/0.13						
27				21	SS	50/0.07					16 34 36 14	
28												
29				22	SS	50/0.07						
30												

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PROJECT: 1668740
 LOCATION: N 4833563.38; E 604512.89

RECORD OF BOREHOLE: S1-13

SHEET 4 OF 8

BORING DATE: September 6 to 8, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT					
20	40						60	80	Wp		Wi			
30		--- CONTINUED FROM PREVIOUS PAGE ---											GR SA SI CL	
				173.45 30.13										
		SHALE												
		For rock coring details refer to Record of Drillhole S1-13.												
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														

DEPTH SCALE
1 : 50



LOGGED: MPL/MCK/EN
CHECKED: MCK

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PROJECT: 1668740
 LOCATION: N 4833563.38 ;E 604512.89
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-13

SHEET 5 OF 8
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: September 7 and 8, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA			WEATHERING INDEX			Diametral Point Load Index (MPa)				
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzo	W1	W2				W3	W4
						충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충			충충충충충	충충충충충
		Continued from Record of Borehole S1-13		173.45																	
31		Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 30.57 m-30.61 m Limestone/Siltstone Layers: 30.93 m-30.97 m, 31.25 m-31.29 m, 31.43 m-31.46 m, 31.52 m-31.55 m, 32.18 m-32.21 m		30.13	1	NR															BC
32		Limestone/Siltstone Layers: 32.27 m-32.34 m, 32.83 m-32.99 m, 33.13 m-33.17 m, 33.46 m-33.49 m			2	NR															BC
33					3	NR															Clay Seam
34		Limestone/Siltstone Layers: 34.20 m-34.24 m, 34.45 m-34.50 m, 35.07 m-35.11 m			4	NR															BC
35		Limestone/Siltstone Layers: 35.37 m-35.41 m, 35.70 m-35.74 m			5	NR															Bentonite
36					6	NR															Clay Seam BC
37		Limestone/Siltstone Layers: 37.38 m-37.42 m, 37.95 m-38.10 m			7	NR															
38		Limestone/Siltstone Layers: 38.40 m-38.48 m			8	NR															Clay Seam
39																					
40		Limestone/Siltstone Layers:																			

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PROJECT: 1668740
 LOCATION: N 4833563.38 ;E 604512.89
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-13

SHEET 6 OF 8
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: September 7 and 8, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES	PIEZOMETER			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX					Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %		DIP W/L CORE AXIS	Jr	Ja	Jzon	W1	W2	W3	W4			W5	W6	2
--- CONTINUED FROM PREVIOUS PAGE ---																					
41		39.91 m-39.94 m, 40.30 m-40.42 m, 40.61 m-40.64 m, 40.73 m-40.75 m Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			8	NR															
42		Limestone/Siltstone Layers: 41.34 m-41.61 m, 42.30 m-42.55 m, 42.61 m-42.66 m																			
43		Limestone/Siltstone Layers: 43.08 m-43.31 m, 43.36 m-43.46 m, 43.50 m-43.54 m, 43.90 m-43.95 m, 43.99 m-44.06 m, 44.12 m-44.25 m, 44.30 m-44.32 m																			
44																					
45	Rotary Diamond Drill HC3 Core	Limestone/Siltstone Layers: 44.65 m-44.68 m, 45.17 m-45.28 m, 45.32 m-45.38 m																			Bentonite
46		Limestone/Siltstone Layers: 46.10 m-46.16 m, 46.85 m-46.87 m, 47.01 m-47.08 m																			LC
47																					
48		Limestone/Siltstone Layers: 47.96 m-48.02 m, 48.03 m-48.15 m																			
49																					BC
50		Limestone/Siltstone Layers: 49.35 m-49.37 m, 49.49 m-49.52 m, 50.52 m-50.57 m UCS=18.9 MPa																			Sand
		CONTINUED NEXT PAGE																			

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PROJECT: 1668740
 LOCATION: N 4833563.38 ;E 604512.89
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-13

SHEET 7 OF 8
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: September 7 and 8, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES	PIEZOMETER																	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX		Diameter Point Load Index (MPa)																			
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2																				
-- CONTINUED FROM PREVIOUS PAGE --																																			
51	Rotary Diamond Drill HQ3 Core	Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 51.50 m-51.52 m, 51.73 m-51.90 m, 51.97 m-52.02 m, 52.19 m-52.21 m	[Symbolic Log Pattern]	14	NR															Sand															
52		Limestone/Siltstone Layers: 52.43 m-52.63 m, 52.62 m-52.64m, 52.82 m-52.85 m, 52.92 m-52.97 m, 53.48 m-53.50 m	[Symbolic Log Pattern]	15	NR															Screen															
53		Limestone/Siltstone Layers: 52.43 m-52.63 m, 52.62 m-52.64m, 52.82 m-52.85 m, 52.92 m-52.97 m, 53.48 m-53.50 m	[Symbolic Log Pattern]	16	NR																														
54		Limestone/Siltstone Layers: 54.02 m-54.04 m, 54.91 m-54.98 m	[Symbolic Log Pattern]	17	NR																														
55			[Symbolic Log Pattern]	18	NR																														
56			[Symbolic Log Pattern]	19	NR																														
58		END OF DRILLHOLE	[Symbolic Log Pattern]	145.47 58.11																															
59		NOTES: 1. NR - Not recorded 2. Groundwater level measurements in monitoring well: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Date (mm/dd/yy)</th> <th>Depth (m)</th> <th>Elev. (m)</th> </tr> </thead> <tbody> <tr><td>09/08/2017</td><td>1.3</td><td>202.3</td></tr> <tr><td>10/18/2017</td><td>1.6</td><td>202.0</td></tr> <tr><td>12/19/2017</td><td>41.8</td><td>161.8</td></tr> <tr><td>02/16/2018</td><td>37.9</td><td>165.7</td></tr> </tbody> </table>	Date (mm/dd/yy)	Depth (m)	Elev. (m)	09/08/2017	1.3	202.3	10/18/2017	1.6	202.0	12/19/2017	41.8	161.8	02/16/2018	37.9	165.7																		
Date (mm/dd/yy)	Depth (m)	Elev. (m)																																	
09/08/2017	1.3	202.3																																	
10/18/2017	1.6	202.0																																	
12/19/2017	41.8	161.8																																	
02/16/2018	37.9	165.7																																	
60		CONTINUED NEXT PAGE																																	

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL/DERRY RD MISSISSAUGA\02 DATA\INT\DRILLING RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24



PROJECT: 1668740

RECORD OF DRILLHOLE: S1-13

SHEET 8 OF 8

LOCATION: N 4833563.38 ;E 604512.89

DRILLING DATE: September 7 and 8, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Driling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER	
							RECOVERY			R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/CL. CORE AXIS	DISCONTINUITY DATA				WEATH. INDEX	Diametral Point Load Index (MPa)					
							TOTAL CORE %	SOLID CORE %	%				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon		W1	W2	W3			W4
							05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09	05/05/09			05/05/09
		--- CONTINUED FROM PREVIOUS PAGE --- 05/10/2018 20.9 182.7																					
61																							
62																							
63																							
64																							
65																							
66																							
67																							
68																							
69																							
70																							

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYP RD MISSISSAUGA\02 DATA\GINT\DERRYP RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4833430.73; E 604313.78
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-12

SHEET 1 OF 7
 BORING DATE: October 24 to 27, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: October 24 to 27, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT				
0		GROUND SURFACE		203.35												GR SA SI CL
		ASPHALT (150 mm)		0.00												
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, compact to very dense		0.15	1	SS	93									
1					2A	SS	20									
		FILL - (CL) SILTY CLAY, some sand, some gravel; brown-red; cohesive, w<PL		202.23	2B											
				1.12												
				201.98												
				1.37												
2	Power Auger 150 mm O.D. Solid Stem Augers	(CL) Sandy SILTY CLAY, trace gravel to gravelly; reddish brown, becoming grey below a depth of 4.0 m (TILL); cohesive, w~PL to w>PL, stiff to hard			3	SS	17									
					4	SS	21									
3					5	SS	29									
4					6	SS	25									
5					7	SS	11									
6					8	SS	17									
7	Mud Rotary Tricone				9	SS	11									
8																
9																
10																
																5 31 45 19

CONTINUED NEXT PAGE

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PROJECT: 1668740
 LOCATION: N 4833430.73; E 604313.78

RECORD OF BOREHOLE: S2-12

SHEET 2 OF 7

BORING DATE: October 24 to 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION			
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. + rem V. ⊕ ⊙	Q - U - ⊙			WATER CONTENT PERCENT Wp W Wi		
10	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (CL) Sandy SILTY CLAY, trace gravel to gravelly; reddish brown, becoming grey below a depth of 4.0 m (TILL); cohesive, w~PL to w>PL, stiff to hard		10	SS	11								
11				11	SS	35								
12														
13														
14														
15					(SM) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist to wet, very dense	188.64 14.71	12	SS	58					
16														
17														
18														
19														
20														
											12 45 40 3			

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DEPTH SCALE
1 : 50



LOGGED: EN
CHECKED: MCK/ARV

PROJECT: 1668740
 LOCATION: N 4833430.73; E 604313.78
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-12

SHEET 3 OF 7
 BORING DATE: October 24 to 27, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: October 24 to 27, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
								20	40	60	80	nat V. + rem V. ⊕	Q - U - ⊙				Wp	W
20		--- CONTINUED FROM PREVIOUS PAGE ---														GR SA SI CL		
		(SM) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist to wet, very dense																
				182.62														
		(SP) SAND, some silt, trace gravel; grey; non-cohesive, wet, very dense																
				20.73														
					17	SS	50/0.10											
		- Resistance to tricone at a depth of 21.9 m.																
				181.10														
		(SM) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist to wet, very dense																
				22.25														
					18	SS	50/0.07											
				178.13														
		Grey, SHALE																
				25.22														
					20	SS	50/0.10											
				176.48														
		SHALE																
				26.87														
		For rock coring details refer to Record of Drillhole S2-12.																
					21	SS	50/0.05											

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PROJECT: 1668740

RECORD OF DRILLHOLE: S2-12

SHEET 4 OF 7

LOCATION: N 4833430.73 ;E 604313.78

DRILLING DATE: October 24 to 27, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jz01	W1			
						용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량			용량용량
27		Continued from Record of Borehole S2-12 No Recovery		176.48 26.87	1	NR											LC	
28		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 27.65 m-27.71 m, 27.76 m-27.88 m, 27.99 m-28.07 m, 28.16 m-28.22 m, 28.27 m-28.56 m, 28.74 m-28.80 m, 28.88 m-28.98 m Isolated thin interbeds with vuggy porosity from depth 27.45 m to 31.0 m. Limestone/Siltstone Layers: 29.28 m-29.39 m, 29.38 m-29.63 m, 29.84 m-29.86 m, 30.05 m-30.07 m, 30.16 m-30.22 m, 30.27 m-30.43 m,		175.90 27.45	2	NR											LC Clay Seam BC BC BC	
29					3	NR											Clay Seam BC BC	
30					4	NR											Clay Seam	
31		Limestone/Siltstone Layers: 30.92 m-30.95 m, 31.05 m-31.13 m, 31.19 m-31.29 m, 31.37 m-31.53 m, 31.66 m-31.69 m, 31.75 m-31.92 m, 32.04 m-32.07 m			5	NR											BC	
32		Limestone/Siltstone Layers: 32.07 m-32.11 m, 32.21 m-32.31 m, 32.59 m-32.75 m, 32.84 m-32.96 m, 33.08 m-33.18 m			6	NR											BC	
33		Limestone/Siltstone Layers: 33.65 m-33.74 m, 33.76 m-33.91 m, 34.01 m-34.10 m, 34.37 m-34.43 m, 34.44 m-34.65 m, 34.67 m-35.00 m, 35.04 m-35.17 m,			7	NR											Clay Seam	
34		Limestone/Siltstone Layers: 35.18 m-35.22 m, 35.24 m-35.36 m, 35.41 m-35.47 m, 35.59 m-35.61 m, 35.70 m-35.74 m, 36.00 m-36.04 m, 36.29 m-36.32 m,			8	NR												
35		Limestone/Siltstone Layers:																
36																		

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DEPTH SCALE

1 : 50



LOGGED: EN
CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4833430.73 ; E 604313.78
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-12

SHEET 6 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: October 24 to 27, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA						WEATH- ERING INDEX						
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS		TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jzon	W1			W2	W3	W4
																	Diametral Point Load Index (MPa)					
																	1			2	3	4
		-- CONTINUED FROM PREVIOUS PAGE --																				
47		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 47.53 m-47.66 m, 47.86 m-47.91 m, 48.07 m-48.20 m		14	NR																	
48				15	NR																	
48		Limestone/Siltstone Layers: 49.67 m-49.70 m		16	NR																	
49																						
50																						
51		Limestone/Siltstone Layers: 50.23 m-50.26 m, 50.45 m-50.49 m, 50.58 m-50.62 m		17	NR																	
51		UCS=25.3 MPa																				
52		Limestone/Siltstone Layers: 52.34 m-52.44 m, 52.60 m-52.65 m, 62.74 m-52.81 m, 52.91 m-52.94 m, 53.00 m-53.09 m, 53.11 m-53.16 m		18	NR																	
53		Limestone/Siltstone Layers: 54.28 m-54.33 m		19	NR																	
54																						
55		Limestone/Siltstone Layers: 55.48 m-55.50 m, 55.54 m-55.56 m, 55.80 m-55.84 m, 55.90 m-55.94 m		20	NR																	
56		Limestone/Siltstone Layers: 56.67 m-56.70 m, 56.97 m-57.00 m,		21	NR																	
		CONTINUED NEXT PAGE																				

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DEPTH SCALE
 1 : 50



LOGGED: EN
 CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4833430.73 ; E 604313.78
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-12

SHEET 7 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: October 24 to 27, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH- ERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %	DIP W/EL CORE AXIS	TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jzon	W1	W2			
						සමස්ත කැබලි %	කඳු කැබලි %		අක්ෂ අක්ෂ අක්ෂ	ආවේණික වර්ග ආවේණික				සමස්ත සමස්ත සමස්ත	ආවේණික ආවේණික ආවේණික			ආවේණික ආවේණික ආවේණික
57	Rotary Diamond Drill HQ3 Core	-- CONTINUED FROM PREVIOUS PAGE --		145.30	22													
58		57.61 m-57.66 m Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)	[Symbolic Log Pattern]	58.05	NR													
59		END OF DRILLHOLE																
60		NOTE: 1. NR - Not recorded																
61																		
62																		
63																		
64																		
65																		
66																		

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PROJECT: 1668740
 LOCATION: N 4833266.70; E 604280.19
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-14

SHEET 1 OF 7
 DATUM: UTM NAD 83 (ZONE 17N)
 BORING DATE: August 22 to 24, 2017
 DRILL RIG: CME 75 Truck
 HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
0		GROUND SURFACE		202.47												GR SA SI CL	
		ASPHALT (150 mm)		0.00													
		FILL - (SP) Gravelly SAND; brown; non-cohesive, moist, loose to dense		0.15	1	SS	36										
1	Power Auger 150 mm O.D. Solid Stem Augers	(CL) Sandy SILTY CLAY, trace to some gravel; brown becoming grey below a depth of 4.1 m (TILL); cohesive, w<PL to w-PL, stiff to hard		201.35	2A	SS	8										
				1.12	2B												
					3	SS	19										
					4	SS	25										
					5	SS	37										
2	Mud Rotary Tricone				6	SS	39										
					7	SS	28										
					8	SS	18										
					9	SS	14										
					10	SS	67										
3		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, wet, very dense		193.78												7 34 44 15	
				8.69													
4																	
5																	
6																	
7																	
8																	
9																	
10																	

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PROJECT: 1668740
 LOCATION: N 4833266.70; E 604280.19
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-14

SHEET 2 OF 7
 BORING DATE: August 22 to 24, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: August 22 to 24, 2017
 DRILL RIG: CME 75 Truck

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH				WATER CONTENT PERCENT						
							Cu, kPa		nat V. rem V.		Q - U		Wp				W
--- CONTINUED FROM PREVIOUS PAGE ---																GR SA SI CL	
10		(CL-ML) Sandy SILTY CLAY - CLAYEY SILT, some gravel; grey (TILL); cohesive, w<PL to w~PL, hard	[Strata Plot]	192.26													
				10.21													
11					11	SS	62										
12																	
					12	SS	65									13 29 47 11	
13		(SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, wet, very dense	[Strata Plot]	189.21													
				13.26													
14					13	SS	50/ 0.13										
15	Mud Rotary Tricone																
					14	SS	50/ 0.07									17 47 33 3	
16																	
					15	SS	50/ 0.10										
17																	
					16	SS	50/ 0.10									16 71 12 1	
18																	
					17	SS	50/ 0.07										
19																	
20																	

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PROJECT: 1668740
 LOCATION: N 4833266.70; E 604280.19
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S1-14

SHEET 3 OF 7
 BORING DATE: August 22 to 24, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: August 22 to 24, 2017
 DRILL RIG: CME 75 Truck

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH				WATER CONTENT PERCENT						
							Cu, kPa		nat V. rem V.		Q - U		Wp				W
20		--- CONTINUED FROM PREVIOUS PAGE --- (SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, wet, very dense				20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	10 ⁻³		GR SA SI CL		
21					18	SS	50/0.10										
22																	
23					19	SS	50/0.07										
24					20	SS	50/0.07										
25	Mud Rotary Tricone			177.32 25.15													
26			Grey, SHALE		21	SS	50/0.07										
27			SHALE For rock coring details refer to Record of Drillhole S1-14.	175.68 26.79													
28																	
29																	
30																	

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL/DERRY RD MISSISSAUGA\02 DATA\GINTO/DERRY RD MISSISSAUGA.GPJ_GAL-MIS.GDT_05/24/19

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-14

SHEET 4 OF 7

LOCATION: N 4833266.70 ; E 604280.19

DRILLING DATE: August 22 to 24, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY																		PIEZOMETER
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA					WEATHERING INDEX		Diametral Point Load Index (MPa)	FEATURES					
							TOTAL CORE %	SOLID CORE %		TYPE AND SURFACE DESCRIPTION					Ir	Ja	J20								
							윤공율 (%)	고윤공율 (%)	윤공율 (%)	1r		2r	3r	4r	5r	1j	2j	3j			120	220	320		
Continued from Record of Borehole S1-14				175.68																					
27		Highly weathered to fresh, thinly to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 26.87 m-26.90 m Limestone/Siltstone Layers: 27.56 m-27.66 m, 27.80 m-28.05 m, 28.09 m-28.13 m, 28.25 m-28.31 m, 28.41 m-28.45 m, 28.59 m-28.62 m, 28.84 m-28.88 m		26.79	1	NR																			
28					2	NR																			
29		Limestone/Siltstone Layers: 29.35 m-29.63 m, 29.78 m-29.81 m, 29.89 m-29.91 m, 30.13 m-30.16 m, 30.36 m-30.40 m			3	NR																			
30					3	NR																			
31		Limestone/Siltstone Layers: 30.59 m-30.67 m, 30.72 m-30.85 m, 30.90 m-30.98 m, 31.04 m-31.09 m, 31.17 m-31.20 m, 31.51 m-31.55 m, 31.60 m-31.64 m			4	NR																			
32		Limestone/Siltstone Layers: 32.02 m-32.08 m, 32.10 m-32.18 m, 32.20 m-32.24 m, 32.33 m-32.39 m, 32.42 m-32.51 m, 32.65 m-32.70 m, 32.78 m-33.00 m, 33.12 m-33.14 m, 33.16 m-33.20 m, 33.24 m-33.27 m, 33.30 m-33.33 m, 33.35 m-33.49 m			5	NR																			
33					5	NR																			
34		Limestone/Siltstone Layers: 33.53 m-33.57 m, 33.67 m-33.81 m, 33.93 m-33.95 m, 33.99 m-34.02 m, 34.05 m-34.11 m, 34.15 m-34.24 m, 34.36 m-34.57 m, 34.59 m-34.68 m, 34.70 m-34.75 m			6	NR																			
35					6	NR																			
36		Limestone/Siltstone Layers: 35.16 m-35.20 m, 35.97 m-35.99 m, 36.26 m-36.29 m, 36.30 m-36.38 m, 36.48 m-36.55 m			7	NR																			
37		Limestone/Siltstone Layers: (Continued from previous page)			8	NR																			

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PROJECT: 1668740
 LOCATION: N 4833266.70 ;E 604280.19
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-14

SHEET 5 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: August 22 to 24, 2017
 DRILL RIG: CME 75 Truck
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX					Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2				W3	W4
		-- CONTINUED FROM PREVIOUS PAGE --																		
37		36.58 m-36.76 m, 36.83 m-36.98 m, 37.19 m-37.21 m, 37.23 m-37.31 m, 37.35 m-37.37 m, 37.46 m-37.49 m, 37.65 m-37.74 m, 37.76 m-37.80 m, 37.83 m-37.89 m, 37.91 m-38.07 m Highly weathered to fresh, thinly to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 38.58 m-38.62 m, 38.64 m-38.70 m, 38.75 m-38.79 m			8	NR														
38																				
39																				
40		Limestone/Siltstone Layers: 40.08 m-40.21 m, 40.25 m-40.30 m, 40.45 m-40.57 m, 40.73 m-40.77 m, 40.78 m-40.83 m, 40.85 m-40.94 m																		
41																				
42	Relay Diamond Drill HG3 Core	Limestone/Siltstone Layers: 41.30 m-41.35 m, 42.22 m-42.53 m																		
43		Limestone/Siltstone Layers: 42.75 m-42.77 m, 43.04 m-43.09 m, 43.18 m-43.20 m, 43.28 m-43.30 m, 43.42 m-43.45 m, 43.49 m-43.52 m, 43.59 m-43.64 m, 44.10 m-44.13 m, 44.18 m-44.21 m																		
44																				
45		Limestone/Siltstone Layers: 44.23 m-44.31 m, 44.73 m-44.75 m, 44.89 m-44.95 m																		
46		Limestone/Siltstone Layers: 46.52 m-46.62 m																		
		CONTINUED NEXT PAGE																		

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PROJECT: 1668740

RECORD OF DRILLHOLE: S1-14

SHEET 6 OF 7

LOCATION: N 4833266.70 ;E 604280.19

DRILLING DATE: August 22 to 24, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %		DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2					
-- CONTINUED FROM PREVIOUS PAGE --																				
47		Highly weathered to fresh, thinly to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			14	NR														
48		Limestone/Siltstone Layers: 47.46 m-47.49 m, 47.70 m-47.72 m, 47.77 m-47.80 m																		
		UCS=27.6 MPa																		
49		Limestone/Siltstone Layers: 49.04 m-49.11 m, 49.80 m-49.85 m, 50.05 m-50.07 m																		
50		Limestone/Siltstone Layers: 50.67 m-50.71 m, 51.15 m-51.17 m																		
51																				
52		Limestone/Siltstone Layers: 51.92 m-52.02 m, 52.07 m-52.20 m, 52.38 m-52.45 m, 52.55 m-52.63 m, 52.71 m-52.74 m, 52.80 m-52.86 m, 53.01 m-53.07 m																		
53																				
54																				
55		Limestone/Siltstone Layers: 55.63 m-55.81 m, 55.87 m-55.90 m																		
56																				
		END OF DRILLHOLE		146.15																
		NOTE:		56.32																
		CONTINUED NEXT PAGE																		

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DEPTH SCALE

1 : 50



LOGGED: EN
CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4833266.70 ; E 604280.19
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-14

DRILLING DATE: August 22 to 24, 2017
 DRILL RIG: CME 75 Truck
 DRILLING CONTRACTOR: Davis Drilling

SHEET 7 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER		
						FLUSH RETURN			RECOVERY				R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/EL. CORE AXIS	DISCONTINUITY DATA						WEATH. ERING INDEX	Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %	LUBRICANT	RECOVERED	RECYCLED	WASHED	TYPE AND SURFACE DESCRIPTION				Jr	Ja	Jzon	W1				
						R	S	L	R	R	W	T	T	T	T	T	T	T	T			T	T
57	-- CONTINUED FROM PREVIOUS PAGE -- 1. NR - Not recorded																						
58																							
59																							
60																							
61																							
62																							
63																							
64																							
65																							
66																							

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DEPTH SCALE
1 : 50



LOGGED: EN
CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4833172.02; E 604200.94
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-13

SHEET 1 OF 7
 BORING DATE: September 29, October 2 and 3, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: September 29, October 2 and 3, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60			80
0		GROUND SURFACE		201.88								
		ASPHALT (150 mm)		0.00								
		FILL - (SW/GP) SAND and GRAVEL, some fines; brown; non-cohesive, moist, loose to dense		0.15	1	SS	48					
1	Power Auger 150 mm O.D. Solid Stem Augers	(CL) Sandy SILTY CLAY, some gravel; mottled brown and grey (TILL); cohesive, w<PL, stiff to hard		200.71	2A	SS	9					
				1.17	2B							
2					3	SS	11					
3					4	SS	17					
4					5	SS	30					
5					6	SS	25					
6					7	SS	22					
7	Mud Rotary Tricone			193.27	8	SS	14					
				8.61								
9		(SM) SILTY SAND, some gravel to gravelly; grey, becoming reddish brown below a depth of 18.3 m (TILL); non-cohesive, moist, dense to very dense			9	SS	47					
10												

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DEPTH SCALE
1 : 50



LOGGED: EN
CHECKED: MCK

PROJECT: 1668740

RECORD OF BOREHOLE: S2-13

SHEET 2 OF 7

LOCATION: N 4833172.02; E 604200.94

BORING DATE: September 29, October 2 and 3, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. rem V. + -				Q - U -
10	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE ---										GR SA SI CL	
11		(SM) SILTY SAND, some gravel to gravelly; grey, becoming reddish brown below a depth of 18.3 m (TILL); non-cohesive, moist, dense to very dense			10	SS	50/0.13						
12					11	SS	50/0.13						
13													
14					12	SS	50/0.10						
15					13	SS	55						Bentonite 10 48 38 4
16													
17				14	SS	50/0.13							
18													
19				15	SS	50/0.10							
20				16	SS	50/0.10							
		- Reddish brown below a depth of 18.3 m.											
CONTINUED NEXT PAGE													

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DEPTH SCALE

1 : 50



LOGGED: EN
CHECKED: MCK

PROJECT: 1668740

RECORD OF BOREHOLE: S2-13

SHEET 3 OF 7

LOCATION: N 4833172.02; E 604200.94

BORING DATE: September 29, October 2 and 3, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH		WATER CONTENT PERCENT		HYDRAULIC CONDUCTIVITY					
								nat V. + rem V. ⊕	Q - ● U - ○	Wp	W	WI	WI				
20	Mud Rotary Tricone	--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel to gravelly; grey, becoming reddish brown below a depth of 18.3 m (TILL); non-cohesive, moist, dense to very dense															
21																	
22																	
23																	
24																	
25		SHALE For rock coring details refer to Record of Drillhole S2-13.															
26																	
27																	
28																	
29																	
30																	

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PROJECT: 1668740
 LOCATION: N 4833172.02 ; E 604200.94
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-13

DRILLING DATE: September 29, October 2 and 3, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 6 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH- ERING INDEX						Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Jr	Ja	Jzon	W1	W2	W3	W4			
						충충충충	충충충충	충충충충	충충충충	충충충충	충충충충	충충충충	충충충충	충충충충	충충충충	충충충충	충충충충			충충충충
--- CONTINUED FROM PREVIOUS PAGE ---																				
45		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 45.15 m-45.21 m, 45.26 m-45.33 m, 46.34 m-46.39 m			14	NR														
46		Limestone/Siltstone Layers: 46.87 m-46.88 m, 47.45 m-47.46 m, 47.78 m-47.82 m, 47.83 m-47.95 m			15	NR														
47		Limestone/Siltstone Layers: 48.92 m-48.93 m, 48.34 m-48.35 m, 48.51 m-48.52 m			16	NR												Bentonite		
48		Limestone/Siltstone Layers: 49.73 m-49.76 m, 50.75 m-50.85 m UCS=16.0 MPa			17	NR														
49		Limestone/Siltstone Layers: 51.31 m-51.34 m, 51.75 m-51.80 m, 52.13 m-52.17 m, 52.24 m-52.25 m, 52.53 m-52.69 m			18	NR												Sand		
50		Limestone/Siltstone Layers: 52.69 m-52.71 m, 52.79 m-52.84 m, 52.95 m-52.98 m, 53.04 m-53.08 m, 53.22 m-53.24 m, 53.27 m-53.31 m, 53.63 m-53.67 m			19	NR												Screen		
51		Limestone/Siltstone Layers: 52.69 m-52.71 m, 52.79 m-52.84 m, 52.95 m-52.98 m, 53.04 m-53.08 m, 53.22 m-53.24 m, 53.27 m-53.31 m, 53.63 m-53.67 m			20	NR												Sand		
52		Limestone/Siltstone Layers: 52.69 m-52.71 m, 52.79 m-52.84 m, 52.95 m-52.98 m, 53.04 m-53.08 m, 53.22 m-53.24 m, 53.27 m-53.31 m, 53.63 m-53.67 m			21	NR												Bentonite		
53		CONTINUED NEXT PAGE																		

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PROJECT: 1668740
 LOCATION: N 4833124.82; E 604108.50
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: MH4-1

SHEET 1 OF 7
 DATUM: UTM NAD 83
 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: July 13 to 25, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	ND = Not Detected		
						50 100 150 200			GR SA SI CL
0		GROUND SURFACE		200.92					
		TOPSOIL		0.00 0.07					
		FILL - (CL) Sandy SILTY CLAY, some gravel; mottled brown and grey; cohesive, w~PL, stiff			1 SS 12	ND			M&I PHC BTEX PAH
1		(CL/SC) SILTY CLAY and SAND, some gravel; brown becoming grey below a depth of 3.0 m with oxidation staining to a depth of 3.7 m (TILL); cohesive, w<PL, stiff to very stiff		200.23 0.69					
	Power Auger 150 mm O.D. Solid Stem Augers				2 SS 18	ND			
2					3 SS 14	ND			9 39 38 14
					4 SS 22	ND			
3					5 SS 27	ND			
					6 SS 18	ND			M&I PHC BTEX PAH
4					7 SS 14	ND			
5									Bentonite
									09/22/2017
6					8 SS 14	ND			
	Mud Rotary Tricone								10 35 43 12
7									
8					9 SS 29	ND			
9		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, very dense		192.23 8.69					
		- Tricone grinding between depths of 9.1 m and 10.7 m.			10 SS 88	ND			12 42 37 9
10									

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DEPTH SCALE
 1 : 50



LOGGED: MPL
 CHECKED: ARV

PROJECT: 1668740
 LOCATION: N 4833124.82; E 604108.50

RECORD OF BOREHOLE: MH4-1

SHEET 2 OF 7

BORING DATE: July 13 to 25, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PILOT	ELEV. DEPTH (m)	NUMBER	TYPE	ND = Not Detected		
						ND = Not Detected			
						ND = Not Detected			
10		--- CONTINUED FROM PREVIOUS PAGE --- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, very dense							GR SA SI CL
11				11	SS	50/0.10 ND			
12				12	SS	50/0.05 ND			6 46 44 4
13				13	SS	50/0.10 ND			
14				14	SS	50/0.10 ND			
15	Mud Rotary Tricone			14	SS	50/0.10 ND			Bentonite
16		(ML) SILT of slight plasticity, some sand, containing silty clay seams; grey; non-cohesive, moist, very dense		184.83 16.09					
17				15	SS	50/0.10 ND			M&I PHC BTEX PAH
18				16A	SS	90 ND			
19		- Containing silty sand seams at a depth of 18.3 m.		16B	SS	90 ND			0 8 80 12
20		(ML/SM) SILT and SAND, trace gravel; (TILL); non-cohesive, moist, very dense		181.27 19.65					
		CONTINUED NEXT PAGE		17	SS	50/0.13 ND			

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DEPTH SCALE
1 : 50



LOGGED: MPL
CHECKED: ARV

PROJECT: 1668740
 LOCATION: N 4833124.82; E 604108.50
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: MH4-1

SHEET 3 OF 7
 BORING DATE: July 13 to 25, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: July 13 to 25, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	ND = Not Detected		
							HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □	WATER CONTENT PERCENT		
							ND = Not Detected	Wp ----- W ----- WI	GRAIN SIZE DISTRIBUTION (%)	
							50 100 150 200	10 20 30 40	GR SA SI CL	
20	Mud Rotary Tritone	--- CONTINUED FROM PREVIOUS PAGE --- (ML/SM) SILT and SAND, trace gravel; (TILL); non-cohesive, moist, very dense					ND			
21							ND			
22										
23					18	SS	50/0.10	ND		
24		Mixture of Soil and Rock SOIL: (CL) Gravelly Sandy SILTY CLAY; grey; cohesive, w-PL, hard ROCK: Red to grey, SHALE fragments	177.18 23.74							3 46 45 6
25				19	SS	50/0.10				
26		SHALE (BEDROCK) For rock coring details refer to Record of Drillhole MH4-1. * - No recovery	175.01 25.91							Bentonite
27				20	SS	50/0.02				
28				21	SS	50/0.07				
29										
30										

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PROJECT: 1668740

RECORD OF DRILLHOLE: MH4-1

SHEET 5 OF 7

LOCATION: N 4833124.82 ;E 604108.50

DRILLING DATE: July 13 to 25, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount
DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER					
						RECOVERY			FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH- ERING INDEX				Diametral Point Load Index (MPa)								
						TOTAL CORE %	SOLID CORE %	R.Q.D. %		TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	I	W1	W2	W3		W4			W5				
						00000000	00000000	00000000																		
36	Rotary Diamond Drill HQ3 Core	[Symbolic Log]	8	NR	[Flush Return]	---														[Piezometer]						
37						Rotary Diamond Drill HQ3 Core	[Symbolic Log]	9	NR	[Flush Return]	BD, PL, SM, CI														[Piezometer]	
38											Limestone/Siltstone Layers: 36.98 m-37.00 m, 37.08 m-37.15 m 37.46 m-37.55 m, 38.23 m-38.25 m															
39	Rotary Diamond Drill USBM Overcore Testing	[Symbolic Log]	9	NR	[Flush Return]	Limestone/Siltstone Layers: 38.31 m-38.33 m, 38.43 m-38.47m Overcore In Situ Stress Testing 38.31 m to 41.25 m Limestone/Siltstone Layers: 38.90 m-38.93 m														[Piezometer]						
40						Limestone/Siltstone Layers: 38.31 m-38.33 m, 38.43 m-38.47m Overcore In Situ Stress Testing 38.31 m to 41.25 m Limestone/Siltstone Layers: 38.90 m-38.93 m																				
41	Rotary Diamond Drill HQ3 Core	[Symbolic Log]	10	NR	[Flush Return]	Bentonite														[Piezometer]						
42						Rotary Diamond Drill HQ3 Core	[Symbolic Log]	11	NR	[Flush Return]	BD, IR, RO, CI														[Piezometer]	
43											BD, UN, SM, CI															
44	Rotary Diamond Drill HQ3 Core	[Symbolic Log]	11	NR	[Flush Return]	BD, UN, SM, CI														[Piezometer]						
45						[Symbolic Log]																				
45	CONTINUED NEXT PAGE																									

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLING RD MISSISSAUGA\02 DATA\GINT\DERR Y RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4833122.78; E 604108.59
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: MH4-2 (PQ)

SHEET 1 OF 3
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: July 6 and 7, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	ND = Not Detected		
						50 100 150 200	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³		GR SA SI CL
0		GROUND SURFACE		200.93					
		TOPSOIL		0.00					
		FILL - (CL) Sandy SILTY CLAY, some gravel; brown; cohesive, w<PL, stiff		0.15	1	SS	15	ND	Concrete
				200.24					
		(CL) Sandy SILTY CLAY, some gravel; brown becoming grey below a depth of 3.4 m, with oxidation staining from 1.5 m to 3.7 m (TILL); cohesive, w<PL		0.69	2	SS	18	ND	
1	Power Auger 150 mm O.D. Solid Stem Augers								
					3	SS	19	ND	
2									
					4	SS	18	ND	
3									Bentonite
					5	SS	24	ND	
4									
					R1	PQ	REC 70%	ND	
5		Cobbles were encountered: Size (mm) Type Depth (m) Elev. (m) 100 Limestone 4.9 196.0 100 Limestone 5.8 195.1							
					R2	PQ	REC 43%	ND	
6									Sand 09/22/2017
					R3	PQ	REC 90%	ND	CU 6 31 46 17
7	Soil Core PQ								
									Screen
8		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist		193.01 7.92					
		Cobbles were encountered: Size (mm) Type Depth (m) Elev. (m) 110 Limestone 8.8 192.1 90 Limestone 10.4 190.5 80 Limestone 10.8 190.1							
					R4	PQ	REC 43%	ND	
9									
					R5	PQ	REC 42%	ND	Sand
10									

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PROJECT: 1668740
 LOCATION: N 4833122.78; E 604108.59
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: MH4-2 (PQ)

SHEET 2 OF 3
 BORING DATE: July 6 and 7, 2017
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: July 6 and 7, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	ND = Not Detected			10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³
						HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □	WATER CONTENT PERCENT	GRAIN SIZE DISTRIBUTION (%)		
						ND = Not Detected	Wp ----- W ----- WI	GR SA SI CL		
						50 100 150 200	10 20 30 40			
10	Soil Core PQ	--- CONTINUED FROM PREVIOUS PAGE ---							GR SA SI CL	
		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist			R5 PQ	REC 42%				Sand
11						ND				
12					R6 PQ	REC 20%				
				188.73						
				12.20			ND			
			(ML) SILT, some sand, some gravel; brownish red, laminated with silty clay layers; non-cohesive, moist							
13			Cobbles were encountered:							
			Size (mm) Type Depth (m) Elev. (m)							
			90 Limestone 12.3 188.6		R7 PQ	REC 50%				
14							ND			
15				R8 PQ	REC 0%					
			185.39			ND			Bentonite	
			15.54							
16		(SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, moist								
		- Containing a 0.25 m silty clay and silt varved layer at a depth of 16.2 m.		R9 PQ	REC 67%					
17						ND				
		- Containing silty clay layers between depths of 17.1 m and 18.6 m.								
18				R10 PQ	REC 100%					
						ND				
19										
				R11 PQ	REC 65%					
20						ND				
CONTINUED NEXT PAGE										

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PROJECT: 1668740
 LOCATION: N 4833122.78; E 604108.59
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: MH4-2 (PQ)

SHEET 3 OF 3
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: July 6 and 7, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	ND = Not Detected	WATER CONTENT PERCENT						
							50 100 150 200	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	Wp I — W — WI				GRAIN SIZE DISTRIBUTION (%)		
							50 100 150 200	10 20 30 40					GR SA SI CL		
20	Soil Core PQ	--- CONTINUED FROM PREVIOUS PAGE ---													
		(SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, moist													
		Cobbles were encountered:													
		Size (mm) Type Depth (m) Elev. (m)													
21		70 Limestone 20.6 180.3		R11	PQ	ND									
		80 Limestone 22.6 178.3													
		85 Granite 22.9 178.0		R12	PQ	REC 75%									
		150 Limestone 23.0 177.9													
22															
23															
		Mixture of Soil (8%) and Rock (92%)	177.77												
		SOIL: (CL) Gravelly Sandy SILTY CLAY; grey, cohesive, w<PL	23.16		R13	PQ	REC 65%							Bentonite	
		ROCK: Grey, SHALE with interbeds of LIMESTONE													
24															
25		END OF BOREHOLE	176.24												
		NOTE:	24.69												
		1. Groundwater level measurements in monitoring well:													
		Date (mm/dd/yy)	Depth (m)	Elev. (m)											
26		07/27/2017	5.6	195.3											
		08/04/2017	5.6	195.3											
		09/22/2017	6.0	194.9											
27															
28															
29															
30															

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PROJECT: 1668740
 LOCATION: N 4833091.87; E 604078.16

RECORD OF BOREHOLE: MH4-3

SHEET 2 OF 2

BORING DATE: August 4, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	ND = Not Detected		
							HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □	WATER CONTENT PERCENT	GRAIN SIZE DISTRIBUTION (%)	
							ND = Not Detected	Wp ----- W ----- Wl	GR SA SI CL	
							50 100 150 200	10 20 30 40		
10	Power Auger	--- CONTINUED FROM PREVIOUS PAGE ---								GR SA SI CL
		(SM) SILTY SAND, some gravel; grey, becoming brownish red below a depth of 8.1 m (TILL); non-cohesive, moist, dense to very dense								
				189.31	11	SS	50/6-10			Cuttings
		END OF BOREHOLE		10.77			ND			
11		NOTE:								
		1. Groundwater level measurements in monitoring well:								
		Date (mm/dd/yy)	Depth (m)	Elev. (m)						
12		08/08/2017	4.2	195.9						
		10/20/2017	5.2	194.9						
13										
14										
15										
16										
17										
18										
19										
20										

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PROJECT: 1668740

LOCATION: N 4833089.39; E 604065.36

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: MH4-4

BORING DATE: August 8, 2017

DRILL RIG: CME 75 Truck Mount

SHEET 1 OF 2

DATUM: UTM NAD 83 (ZONE 17N)

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	ND = Not Detected			ND = Not Detected
							50 100 150 200	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³		GR SA SI CL	
							50 100 150 200	Wp I — W — WI			
0	Power Auger 184 mm O.D. 83 mm I.D. Hollow Stem	GROUND SURFACE		199.87							
		TOPSOIL			0.00						Concrete
		FILL - (CL) SILTY CLAY, some sand to sandy, some gravel, trace organics; mottled brown to brown; cohesive, w<PL to w~PL, very stiff to hard			0.15	1	SS	23 ⊕ ND	○		
1						2	SS	18 ⊕ ND	○		
2						3	SS	19 □ ⊕ ND	○	M&I PHC BTEX PAH	
						4	SS	17 □ ⊕ ND	○		
3						5	SS	15 □ ⊕ ND	○		
4						6	SS	32 □ ⊕ ND	○		
5			(CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w~PL, very stiff to hard		195.37 4.50	7	SS	20 ⊕ ND	○	M&I PHC BTEX PAH	10/20/2017
6						8	SS	32 ⊕ ND	○		
7		(SM) SILTY SAND, trace to some gravel; grey, containing silt seams below a depth of 10.7 m (TILL); non-cohesive, moist, dense to very dense		192.71 7.16	9	SS	49 ⊕ ND	○			
8					10	SS	69 ⊕ ND	○	M&I PHC BTEX PAH	9 17 66 8	
9		- Rock fragments between depths of 6.1 m and 9.1 m.								Screen	
10											

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DEPTH SCALE

1:50



GOLDER

LOGGED: EN

CHECKED: MCK/ARV

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PROJECT: 1668740
 LOCATION: N 4833089.39; E 604065.36
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: MH4-4

SHEET 2 OF 2
 DATUM: UTM NAD 83 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

BORING DATE: August 8, 2017
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] \oplus	HYDRAULIC CONDUCTIVITY, k, cm/s	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	ND = Not Detected		
							HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] \square	WATER CONTENT PERCENT	GRAIN SIZE DISTRIBUTION (%)	
							ND = Not Detected	Wp ----- W ----- WI	GR SA SI CL	
							50 100 150 200	10 20 30 40		
10	Power Auger	--- CONTINUED FROM PREVIOUS PAGE ---								GR SA SI CL
		(SM) SILTY SAND, trace to some gravel; grey, containing silt seams below a depth of 10.7 m (TILL); non-cohesive, moist, dense to very dense								
11		END OF BOREHOLE		188.80	11	SS	74/0.25 ND			Cuttings
12	NOTE:									
	1. Groundwater level measurement in monitoring well:									
	Date	Depth	Elev.							
	(mm/dd/yy)	(m)	(m)							
	10/20/2017	5.0	194.9							
13										
14										
15										
16										
17										
18										
19										
20										

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PROJECT: 1668740
 LOCATION: N 4833012.11; E 604052.42

RECORD OF BOREHOLE: S4-10

SHEET 1 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

BORING DATE: November 13 and 15, 2019
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. + rem V. ⊕	Q - U - ●	WATER CONTENT PERCENT Wp ----- W ----- WI				
0		GROUND SURFACE		198.02										GR SA SI CL	
		Borehole was advanced from ground surface to approximate top of bedrock without sampling.		0.00											
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

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PROJECT: 1668740
 LOCATION: N 4833012.11; E 604052.42

RECORD OF BOREHOLE: S4-10

SHEET 2 OF 4

BORING DATE: November 13 and 15, 2019

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		Wp					Wi	
								nat V. +	rem V. ⊕	Q - ●	U - ○	10 ⁻⁶	10 ⁻⁵				10 ⁻⁴	10 ⁻³
10		--- CONTINUED FROM PREVIOUS PAGE ---													GR SA SI CL			
11		Borehole was advanced from ground surface to approximate top of bedrock without sampling.																
12																		
13																		
14																		
15	Power Auger Hollow Steam Augers																	
16																		
17																		
18																		
19																		
20																		
		CONTINUED NEXT PAGE																

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PROJECT: 1668740
 LOCATION: N 4833012.11; E 604052.42

RECORD OF BOREHOLE: S4-10

SHEET 3 OF 4

BORING DATE: November 13 and 15, 2019

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH		WATER CONTENT PERCENT		WATER CONTENT PERCENT				
								Cu, kPa	nat V. + rem V. ⊕	Q - ● U - ○	Wp	W	Wi			
20		-- CONTINUED FROM PREVIOUS PAGE --													GR SA SI CL	
20		SHALE		177.96 20.08												
21		For rock coring details refer to Record of Drillhole S4-10.														
22																
23																
24																
25																
26																
27																
28																
29																
30																

DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH

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PROJECT: 1668740
 LOCATION: N 4836727.72; E 606899.67

RECORD OF BOREHOLE: S3-12

SHEET 1 OF 3

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: October 25, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60			80
0		GROUND SURFACE		172.94								
		ASPHALT (150 mm)		0.00								
		FILL - (SP-SM) Gravelly SAND, some fines; brown; non-cohesive, moist, dense		0.15	1	SS	37					
1		FILL - (CL) SILTY CLAY, some sand to sandy, trace gravel; grey, with oxidation staining, containing trace rootlets and wood pieces, hydrocarbon odour; cohesive, w-PL to w>PL, firm to stiff		172.18	2	SS	6					
		- Gravel seam from a depth of 1.5 m to 2.1 m		0.76	3	SS	11					
2					4	SS	5					
3					5	SS	8					
4		(SC) Gravelly CLAYEY SAND, with low to intermediate plasticity fines; grey, containing shale fragments (TILL); wet, very dense		169.21	6	SS	50/0.13					23 37 27 13
5		(C) Sandy SILTY CLAY, some gravel; grey, containing shale fragments (TILL); cohesive, w<PL, very stiff to hard		168.44	7	SS	25					8 22 54 16
6		- Auger grinding below a depth of 5.5 m.		166.77	8	SS	50/0.08					
7		SHALE		166.77								
		For rock coring details refer to Record of Drillhole S3-12.		6.17								

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PROJECT: 1668740
 LOCATION: N 4836727.72 ;E 606899.67
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S3-12

SHEET 3 OF 3
 DATUM: UTM NAD 83 (ZONE 17N)

DRILLING DATE: October 25, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W. L. CORE AXIS	DISCONTINUITY DATA				WEATH- ERING INDEX						Diametral Point Load Index (MPa)	FEATURES	PIEZOMETER			
							TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzo	W1	W2	W3	W4	W5	W6				2	4	6
							80/100	60/100																			
-- CONTINUED FROM PREVIOUS PAGE --																											
17	Rotary Diamond Drill HCS Core	Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)	[Symbolic Log]	151.51	NR	[Flush Return]	[Recovery]	[R.Q.D.]	[Fract. Index]	[Dip]	[BD, UN, SM, PC, CL]	2	4	16	[Weathering Index]												
		[BD, PL, SM, SA]		1							2	16															
		[CO, PL, SM, SA]		1							2	16															
		[BD, CU, SM, PC, CL]		2							4	16															
18	Limestone/Siltstone Layers: 17.70 m-17.73 m, 18.08 m-18.09 m, 18.31 m-18.36 m, 18.40 m-18.45 m		8	NR							[CO, PL, SM, SA]	1	2	16													
	[CO, UN, SM, SA]	1	2	16																							
	[BD, PL, SM, SA]	1	2	16																							
	[CO, PL, SM, PC, CL]	1	4	16																							
	[CO, PL, SM, PC, CL]	1	4	16																							
19	Limestone/Siltstone Layers: 18.51 m-18.52 m, 19.89 m-19.92 m		9	NR							[BD, UN, SM, SA]	2	2	16													
	[BD, PL, SM, IN, CL, 10 mm]	1	8	0																							
20	Limestone/Siltstone Layers: 20.13 m-20.14 m, 20.25 m-20.27 m, 20.32 m-20.33 m, 20.84 m- 20.87 m, 21.14 m-21.16 m		10	NR							[BD, UN, SM, SA]	2	2	16													
	[BD, PL, SM, SA]	1	2	16																							
21	END OF DRILLHOLE																										
22	NOTES: 1. NR - Not Recorded. 2. Ground water level measured at a depth of 1.6 m below ground surface (Elev. 171.0 m) during soil drilling.																										

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PROJECT: 1668740
 LOCATION: N 4836679.90; E 606809.61

RECORD OF BOREHOLE: S1-05

SHEET 1 OF 4

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: September 8 and 11, 2017

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
0		GROUND SURFACE		174.23												GR SA SI CL
		ASPHALT (150 mm)		0.00												
		FILL - (SW/GW) SAND and GRAVEL; brown; non-cohesive, moist, compact to very dense		0.15	1	SS	67									
1				173.09	2A											
		(Cl) - Sandy SILTY CLAY, trace to some gravel; grey; cohesive, w<PL to w~PL, firm to stiff		1.14	2B	SS	14									
2					3	SS	7									
		- Trace organics between depths of 2.3 m and 3.7 m.			4	SS	7									
3					5	SS	6									
		- Hydrocarbon odour and black staining between depths of 3.0 m and 3.7 m.														
4	Power Auger 178 mm O.D., 83 mm I.D. Hollow Stem Augers				6A											
5		Grey, SHALE		169.35	6B	SS	51									
				4.88												
6					7	SS	63/ 0.28									
				167.70												
7		SHALE		6.53												
		For rock coring details refer to Record of Drillhole S1-05.														
8																
9																
10																

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DEPTH SCALE

1 : 50



LOGGED: EN

CHECKED: MCK/ARV

PROJECT: 1668740
 LOCATION: N 4836679.90 ;E 606809.61
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-05

DRILLING DATE: September 8 and 11, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 2 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES	PIEZOMETER		
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA	WEATHERING INDEX	DIP W/L CORE AXIS		DIP W/L CORE AXIS		DIP W/L CORE AXIS			Diametral Point Load Index (MPa)	
							TOTAL CORE %	SOLID CORE %					Jr	Ja	J20	J30	J40				J50
							용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량	용량용량			용량용량	
		Continued from Record of Borehole S1-05		167.70																	
7		Moderately weathered to fresh, laminated to medium bedded, light to dark bluish grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		6.53	1	NR			BD,UN,SM,PC,CL		2 2	2 2			BC						
		Limestone/Siltstone Layers: 7.38 m-7.73 m							BD,UN,SM,PC,CL		2 2	2 2			BC						
		Limestone/Siltstone Layers: 8.42 m-8.58 m, 9.02 m-9.05 m, 9.09 m-9.17 m, 9.27 m-9.31 m			2	NR			BD,UN,SM,SA		2 1	2 1			BC						
8									BD,UN,SM,CI		2 1	2 1			LC						
									BD,PL,SM,PC,CL		1 4	1 2			BC						
9																					
10		Limestone/Siltstone Layers: 10.54 m-10.58 m, 10.64 m-10.69 m, 10.79 m-10.85 m			3	NR									LC						
									BD,IR,RO,PC,CL		3 4	3 2			BC						
														BC							
11														LC							
														BC							
					4	NR			BD,UN,SM,SA		2 2	2 2			BC						
12														BC							
		Limestone/Siltstone Layers: 12.97 m-13.00 m												BC							
13					5	NR															
									BD,PL,SM,PC,CL		1 4	1 2									
									BD,PL,SM,PC,CL		1 4	1 2			BC						
14									BD,PL,SM,PC,CL		1 4	1 2									
15					6	NR			BD,PL,SM,IN,CL		1 8	0									
									BD,PL,SM,PC,CL		1 4	1 2									
									BD,PL,RO,SA		1 5	2 2									
		Limestone/Siltstone Layers: 16.59 m-16.61 m							BD,UN,SM,SA		2 2	2 2									
16					7	NR			BD,PL,SM,SA		1 2	1 6			BC						
									BD,UN,RO,CI		3 1	1 2									

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PROJECT: 1668740
 LOCATION: N 4836679.90 ;E 606809.61
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-05

DRILLING DATE: September 8 and 11, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER										
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/EL. CORE AXIS	DISCONTINUITY DATA			WEATH- ERING INDEX								Diametral Point Load Index (MPa)									
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2	W3	W4	W5				W6								
						000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000	000000			000000	000000	000000	000000						
		--- CONTINUED FROM PREVIOUS PAGE --- 2. Groundwater level measurements in monitoring well: <table border="1"> <thead> <tr> <th>Date (mm/dd/yy)</th> <th>Depth (m)</th> <th>Elev. (m)</th> </tr> </thead> <tbody> <tr> <td>10/19/2017</td> <td>4.1</td> <td>170.1</td> </tr> <tr> <td>12/20/2017</td> <td>4.5</td> <td>169.7</td> </tr> <tr> <td>05/10/2019</td> <td>3.82</td> <td>170.41</td> </tr> </tbody> </table>	Date (mm/dd/yy)	Depth (m)	Elev. (m)	10/19/2017	4.1	170.1	12/20/2017	4.5	169.7	05/10/2019	3.82	170.41																	
Date (mm/dd/yy)	Depth (m)	Elev. (m)																													
10/19/2017	4.1	170.1																													
12/20/2017	4.5	169.7																													
05/10/2019	3.82	170.41																													
27																															
28																															
29																															
30																															
31																															
32																															
33																															
34																															
35																															
36																															

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PROJECT: 1668740
 LOCATION: N 4836631.85; E 606822.03

RECORD OF BOREHOLE: S4-23

SHEET 1 OF 2

BORING DATE: October 30, 2019

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								20 40 60 80		nat V. + Q - rem V. ⊕ U - ○		10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³					Wp ----- W ----- WI	
0		GROUND SURFACE		176.12											GR SA SI CL			
0		Borehole was advanced from ground surface to approximate top of bedrock without sampling.		0.00														
1																		
2																		
3	Power Auger Hollow Steam Augers																	
4																		
5																		
6		SHALE		170.33 5.79														
6		For rock coring details refer to Record of Drillhole S4-23.																
7																		
8																		
9																		
10																		

DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH

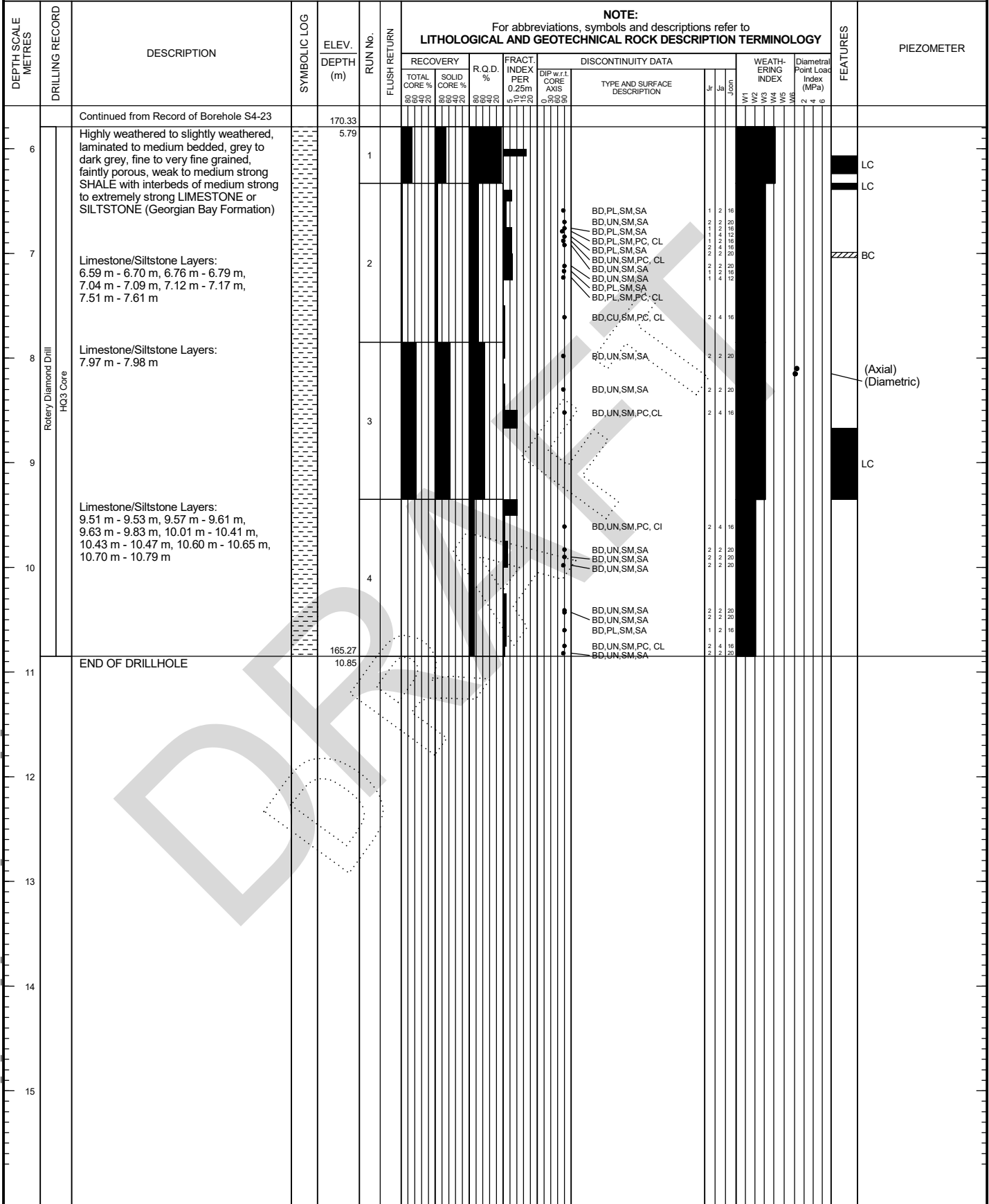
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PROJECT: 1668740
 LOCATION: N 4836631.85 ; E 606822.03
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S4-23

DRILLING DATE: October 30, 2019
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 2 OF 2
 DATUM: UTM NAD 83
 (ZONE 17N)



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DEPTH SCALE
 1 : 50



LOGGED: SK
 CHECKED: DH

PROJECT: 1668740
 LOCATION: N 4836517.57; E 606741.35

RECORD OF BOREHOLE: S1-06

SHEET 1 OF 4

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: April 10, 2017

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	WATER CONTENT PERCENT Wp	W		
0		GROUND SURFACE		176.60							
		ASPHALT (150 mm)		0.00							
		FILL - (SW/GW) SAND and GRAVEL, some fines; brown; non-cohesive, moist, dense		0.15	1 SS	40					
		(CL) Sandy SILTY CLAY, trace to some gravel; brown with oxidation staining (TILL); cohesive, w<PL, very stiff to hard		175.91							
1				0.69	2 SS	16					
2					3 SS	23					
3					4 SS	42					
4		Grey, SHALE		172.94							
				3.66							
5		SHALE		171.57							
				5.03	6 SS	92					
		For rock coring details refer to Record of Drillhole S1-06.									
6											
7											
8											
9											
10											

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DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: MCK/ARV

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-06

SHEET 2 OF 4

LOCATION: N 4836517.57 ;E 606741.35

DRILLING DATE: April 10, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA				WEATHERING INDEX					Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION				Jr	Ja	Jz01				Jz02
						용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용			용용용용용	
		Continued from Record of Borehole S1-06		171.57																	
5.03		Highly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			NR												LC Clay Seam Clay Seam				
6		Limestone/Siltstone Layers: 6.01 m-6.03 m, 6.10 m-6.17 m																			
7		Limestone/Siltstone Layers: 7.35 m-7.41 m, 7.50 m-7.55 m			NR												(Axial) (Axial)				
8		Limestone/Siltstone Layers: 7.90 m-7.94 m, 8.27 m-8.32 m 8.33 m-8.45 m, 8.67 m-8.72 m 8.75 m-8.83 m															Clay Seam Clay Seam				
9					NR																
10					NR												Clay Seam (Axial) (Axial)				
11		Limestone/Siltstone Layers: 11.02 m-11.05 m, 11.16 m-11.34 m 11.50 m-11.83 m, 11.88 m-11.97 m			NR																
12																	LC				
13		Limestone/Siltstone Layers: 12.22 m-12.30 m, 12.45 m-12.48 m 12.53 m-12.57 m, 12.71 m-12.77 m 12.99 m-13.25 m, 13.49 m-13.53 m 13.66 m-13.69 m			NR												(Axial)				
14		Limestone/Siltstone Layers: 13.84 m-13.89 m, 13.94 m-13.96 m 14.05 m-14.13 m, 14.22 m-14.26 m 14.27 m-14.33 m			NR																
15																					

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DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: AC/DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-06

SHEET 3 OF 4

LOCATION: N 4836517.57 ;E 606741.35

DRILLING DATE: April 10, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2			
						충충충충충	충충충충충	충충충충충	충충충충충									충충충충충
		--- CONTINUED FROM PREVIOUS PAGE ---																
16		Highly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			7	NR											(Axial)	
		Limestone/Siltstone Layers: 15.76 m-15.77 m, 15.92 m-15.94 m 15.96 m-15.97 m, 16.45 m-16.46 m 16.60 m-16.61 m			8	NR											(Axial)	
		Limestone/Siltstone Layers: 17.00 m-17.01 m, 17.17 m-17.18 m 17.35 m-17.37 m, 17.51 m-17.54 m 17.64 m-17.67 m, 17.94 m-17.96 m 18.01 m-18.02 m, 18.03 m-18.05 m			9	NR											(Axial)	
17																		
		Limestone/Siltstone Layers: 18.74 m-18.77 m, 19.05 m-19.07 m 19.15 m-19.17 m, 19.18 m-19.22 m 19.54 m-19.56 m, 19.59 m-19.63 m 19.65 m-19.67 m UCS=15.9 MPa			10	NR												
18																		
		Limestone/Siltstone Layers: 19.87 m-19.89 m, 20.00 m-20.21 m 20.33 m-20.34 m, 20.64 m-20.65 m 20.69 m-20.70 m, 20.71 m-20.72 m 20.84 m-20.85 m, 20.96 m-20.97 m 21.00 m-21.01 m, 21.11 m-21.12 m 21.15 m-21.17 m, 21.27 m-21.28 m			11	NR												(Axial)
19																		
		Limestone/Siltstone Layers: 21.39 m-21.41 m, 21.69 m-21.72 m 21.77 m-21.78 m, 22.02 m-22.03 m 22.25 m-22.26 m, 22.43 m-22.44 m			12	NR												(Axial)
20																		
		Limestone/Siltstone Layers: 22.97 m-22.99 m, 23.15 m-23.18 m 23.40 m-23.41 m, 23.50 m-23.53 m 23.57 m-23.59 m, 23.85 m-23.87 m 23.95 m-23.96 m, 24.15 m-24.17 m 24.20 m-24.23 m			13	NR												(Axial)
21																		
		Limestone/Siltstone Layers: 24.40 m-24.42 m, 24.47 m-24.48 m 24.52 m-24.53 m, 24.55 m-24.57 m 24.61 m-24.64 m, 24.76 m-24.77 m 24.94 m-24.95 m, 25.32 m-25.36 m			14	NR												(Axial)
22																		
23																		
24																		
25																		
		CONTINUED NEXT PAGE																

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PROJECT: 1668740
 LOCATION: N 4836517.57 ; E 606741.35
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-06

DRILLING DATE: April 10, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER						
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/EL CORE AXIS	DISCONTINUITY DATA							WEATH- ERING INDEX		Diametral Point Load Index (MPa)			
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1			W2	W3		W4	W5	W6
26	Rotary Diamond Drill HC3 Core	<p style="text-align: center;">-- CONTINUED FROM PREVIOUS PAGE --</p> 25.43 m-25.47 m, 25.62 m-25.63 m 25.83 m-25.92 m Highly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) END OF DRILLHOLE NOTE: 1. NR - Not recorded		150.68 25.92	14 NR																	(Axial) (Axial)	



PROJECT: 1668740
 LOCATION: N 4836456.88; E 606708.32

RECORD OF BOREHOLE: S4-22

SHEET 1 OF 2
 DATUM: UTM NAD 83
 (ZONE 17N)

BORING DATE: December 12, 2019
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	NUMBER	TYPE	20	40	60	80			10 ⁻⁶
0		GROUND SURFACE	176.34									GR SA SI CL
		Borehole was advanced from ground surface to approximate top of bedrock without sampling.	0.00									
1												
2												
3												
4	Power Auger Hollow Steam Augers											
5												
6												
7												
8		SHALE	168.21 8.13									
		For rock coring details refer to Record of Drillhole S4-22.										
9												
10												

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PROJECT: 1668740

RECORD OF DRILLHOLE: S4-22

SHEET 2 OF 2

LOCATION: N 4836456.88 ;E 606708.32

DRILLING DATE: December 12, 2019

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER					
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA				WEATHERING INDEX			Diametral Point Load Index (MPa)				
						TOTAL CORE %	SOLID CORE %				Jr	Ja	Jso1	Jso2	W1				W2			
FLUSH RETURN		DISCONTINUITY TYPE AND SURFACE DESCRIPTION		W3		W4		W5		W6												
		Continued from Record of Borehole S4-22		168.21																		
9	Rotary Diamond Drill HC3 Core	Moderately weathered to slightly weathered, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 8.19 m - 8.28 m, 8.53 m - 8.60 m, 8.68 m - 8.76 m, 9.10 m - 9.22 m Limestone/Siltstone Layers: 10.98 m - 11.03 m, 11.25 m - 11.36 m, 11.59 m - 11.97 m, 12.09 m - 12.21 m Limestone/Siltstone Layers: 12.51 m - 12.53 m, 12.59 m - 12.66 m, 13.06 m - 13.15 m		8.13																		
					BD, PL, SM, SA	1	2	16														
					BD, UN, SM, SA	2	2	20														
					BD, PL, SM, PC, CL	1	4	12														BC
					BD, PL, SM, PC, CL	1	4	12														(Axial) (Diametric)
10																						
11																						
12																						
13																						
14		END OF DRILLHOLE		162.46 13.88																		

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PROJECT: 1668740

RECORD OF BOREHOLE: S3-13

SHEET 1 OF 4

LOCATION: N 4836387.81; E 606680.15

BORING DATE: October 23, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴			
0		GROUND SURFACE		175.78												GR SA SI CL
		ASPHALT (250 mm)		0.00												
		FILL - (SW/GW) SAND and GRAVEL, trace to some fines; brown; non-cohesive, moist, very dense		175.53												
				0.25	1	SS	51									
1		(CL) Sandy SILTY CLAY, some gravel; brown becoming grey below a depth of 3.7 m (TILL); cohesive, w<PL, firm to hard		174.81												
				0.97	2A											
					2B	SS	11									
2					3	SS	8									
					4	SS	21									
					5	SS	28									
4					6	SS	63									6 33 43 18
					7	SS	62									
6		(SC) Gravelly CLAYEY SAND, with low plasticity fines; grey (TILL); moist, very dense		170.14												
				5.64	8	SS	66									13 40 34 13
7																
		- Containing shale fragments below a depth of 7.2 m.														
					9	SS	64									
9					10	SS	50/0.03									
10																

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740

RECORD OF BOREHOLE: S3-13

SHEET 2 OF 4

LOCATION: N 4836387.81; E 606680.15

BORING DATE: October 23, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRAATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			
10	Power Auger 178 mm O.D. 83 mm I.D. Hollow Stem Augers	-- CONTINUED FROM PREVIOUS PAGE -- (SC) Gravelly CLAYEY SAND, with low plasticity fines; grey (TILL); moist, very dense														GR SA SI CL
11				11	SS	65										21 41 26 12
12					12	SS	50/ 0.13									
13																
14		Grey, SHALE SHALE		13	SS	50/ 0.05										
15		For rock coring details refer to Record of Drillhole S3-13.														
16																
17																
18																
19																
20																

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PROJECT: 1668740
 LOCATION: N 4836387.81 ; E 606680.15
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S3-13

SHEET 4 OF 4
 DATUM: UTM NAD 83 (ZONE 17N)

DRILLING DATE: October 23, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER
						RECOVERY			FRACT. INDEX PER 0.25m	DIP w/E.I. CORE AXIS	DISCONTINUITY DATA			WEATHERING INDEX	Diametral Point Load Index (MPa)				
						TOTAL CORE %	SOLID CORE %	R.Q.D. %			TYPE AND SURFACE DESCRIPTION	Jr	Ja		Jzon	W1	W2		
		--- CONTINUED FROM PREVIOUS PAGE ---																	
24		NOTES: 1. NR -Not Recorded. 2. Borehole open and dry before switching to rotary diamond drill method.																	
25																			
26																			
27																			
28																			
29																			
30																			
31																			
32																			
33																			

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PROJECT: 1668740
 LOCATION: N 4836341.89; E 606607.85

RECORD OF BOREHOLE: S4-21

SHEET 1 OF 2
 DATUM: UTM NAD 83
 (ZONE 17N)

BORING DATE: October 28, 2019
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
						20	40	60	80	nat V. + rem V. ⊕	Q - U - ○	Wp	W			
0		GROUND SURFACE	175.85												GR SA SI CL	
0		Borehole was advanced from ground surface to approximate top of bedrock without sampling.	0.00													
1																
2																
3																
4																
5																
6																
7																
8																
9		SHALE	167.13													
9		For rock coring details refer to Record of Drillhole S4-21.	8.72													
9		NOTE: 1 Hard rock boulder cored from 7.9 m to 8.2 m below ground surface (Elev. 168.0 m to 167.6 m).														
10																

DEPTH SCALE
1 : 50



LOGGED: SK
 CHECKED: DH

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PROJECT: 1668740

RECORD OF DRILLHOLE: S4-21

SHEET 2 OF 2

LOCATION: N 4836341.89 ;E 606607.85

DRILLING DATE: October 28, 2019

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY															FEATURES	PIEZOMETER					
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA				WEATHERING INDEX			Diametral Point Load Index (MPa)									
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION				Jr	Jo	Jz		W1	W2			W3	W4	W5	W6	
						FLUSH RETURN																					
		Continued from Record of Borehole S4-21		167.13																							
9		Highly weathered to slightly weathered, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		8.72	1																						
10		Limestone/Siltstone Layers: 9.85 m - 9.87 m, 10.30 m - 10.36 m, 10.46 m - 10.89 m			2																						
11		Limestone/Siltstone Layers: 10.89 m - 10.96 m, 11.05 m - 11.31 m, 11.35 m - 11.58 m, 11.84 m - 11.87 m, 12.10 m - 12.17 m, 12.22 m - 12.27 m, 12.29 m - 12.39 m																									
12		Limestone/Siltstone Layers: 12.80 m - 12.85 m, 13.10 m - 13.16 m, 13.39 m - 13.42 m																									
13					4																						
14					5																						
15		END OF DRILLHOLE		161.15																							
16				14.70																							

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH

PROJECT: 1668740
 LOCATION: N 4836302.51; E 606530.76

RECORD OF BOREHOLE: S1-07

SHEET 1 OF 3

BORING DATE: April 11, 19 and 20, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		WATER CONTENT PERCENT				
								20	40	60	80	10 ⁻⁶	10 ⁻⁵			
0		GROUND SURFACE		177.10												GR SA SI CL
		FILL - (CL) SILTY CLAY, some gravel, some sand; brown; cohesive, w-PL		0.00												
1		(CL) Sandy SILTY CLAY, trace gravel to gravelly; brown with oxidation stains, becoming grey below a depth of 4.6 m (TILL); cohesive, w<PL, stiff to hard		176.34	0.76	1	SS	10								
2					2	SS	13									
3					3	SS	24									4 31 50 15
4					4	SS	29									
5					5	SS	41									
6					6	SS	47									19 26 40 15
8		Grey, SHALE		169.18	7.92	7A	SS	71								
				168.70	8.40	7B										
9		SHALE														
		For rock coring details refer to Record of Drillhole S1-07.														

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DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: MCK/ARV

PROJECT: 1668740

RECORD OF DRILLHOLE: S1-07

SHEET 2 OF 3

LOCATION: N 4836302.51 ;E 606530.76

DRILLING DATE: April 19, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
					RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
					TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS		TYPE AND SURFACE DESCRIPTION		W1	W2			
					용량용량	용량용량	용량용량	용량용량	Jr	Ja	W3	W4	W5	W6			
Continued from Record of Borehole S1-07			168.70														
9	Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)	[Symbolic Log]	8.40	1	NR												
			2	NR													
10	Limestone/Siltstone Layers: 8.57 m--8.60 m, 8.63 m--8.66 m 8.69 m--8.80 m, 8.84 m--8.89 m 9.13 m--9.24 m			3	NR												(Axial)
	Limestone/Siltstone Layers: 10.10 m-10.13 m, 10.79 m-10.80 m																(Axial)
11	Limestone/Siltstone Layers: 10.94 m-11.00 m, 11.13 m-11.17 m 11.42 m-11.97 m, 12.05 m-12.06 m 12.11 m-12.13 m, 12.15 m-12.26 m			4	NR												Clay Seam
12																	
13	Limestone/Siltstone Layers: 12.94 m-13.25 m, 13.90 m-13.97 m			5	NR												LC BC BC
14	Limestone/Siltstone Layers: 14.05 m-14.06 m, 14.58 m-14.61 m 14.70 m-14.72 m, 14.82 m-14.86 m																BC LC
15				6	NR												(Axial)
16																	(Axial)
17	Limestone/Siltstone Layers: 17.72 m-17.75 m			7	NR												
18	UCS=29.2 MPa			8	NR												(Axial)

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DEPTH SCALE

1 : 50



LOGGED: KG

CHECKED: AB/DAC

PROJECT: 1668740
 LOCATION: N 4836302.51 ;E 606530.76
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-07

DRILLING DATE: April 19, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 3 OF 3
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX			Diametral Point Load Index (MPa)			
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2		W3		
						00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000		
-- CONTINUED FROM PREVIOUS PAGE --																			
19		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			8	NR													(Axial)
20		Limestone/Siltstone Layers: 18.56 m-18.64 m, 18.69 m-18.71 m 18.75 m-18.78 m, 18.89 m-18.92 m 19.26 m-19.27 m, 19.37 m-19.38 m			9	NR													
		Limestone/Siltstone Layers: 20.24 m-20.31 m, 21.22 m-21.26 m																	
21					10	NR													(Axial)
		Limestone/Siltstone Layers: 21.82 m-21.85 m, 21.97 m-22.00 m																	
22					11	NR													(Axial)
23																			(Axial)
24					12	NR													(Axial)
25					13	NR													(Axial)
																			(Axial)
26		END OF DRILLHOLE		151.64 25.46															
		NOTE: 1. NR - Not recorded																	

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PROJECT: 1668740
 LOCATION: N 4836187.68; E 606505.71

RECORD OF BOREHOLE: S4-20

SHEET 1 OF 2

BORING DATE: December 9 and 10, 2019

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								Cu, kPa		nat V. + rem V. ⊕	Q - ● U - ○	Wp	W				WI	
0		GROUND SURFACE		177.38												GR SA SI CL		
0		Borehole was advanced from ground surface to approximate top of bedrock without sampling.		0.00														
1																		
2																		
3																		
4	Power Auger Hollow Stem Augers																	
5																		
6																		
7																		
8																		
8		SHALE		169.23 8.15														
9		For rock coring details refer to Record of Drillhole S4-20.																
10																		

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PROJECT: 1668740
 LOCATION: N 4836187.68 ;E 606505.71
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S4-20

DRILLING DATE: December 10, 2019
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 2 OF 2
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER				
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w/L CORE AXIS	DISCONTINUITY DATA			WEATHERING INDEX				Diametral Point Load Index (MPa)			
							TOTAL CORE %	SOLID CORE %			Jr	Ja	Jzon	W1	W2	W3				W4	W5	W6
							⊘	⊘	⊘	⊘												
TYPE AND SURFACE DESCRIPTION																						
		Continued from Record of Borehole S4-20		169.23																		
		Moderately weathered to slightly weathered, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		8.15	1													BC				
		Limestone/Siltstone Layers: 8.73 m - 8.84 m, 8.88 m - 8.92 m, 9.03 m - 9.12 m																BC				
		Limestone/Siltstone Layers: 9.70 m - 9.72 m, 9.91 m - 10.01 m, 10.18 m - 10.22 m, 10.24 m - 10.26 m, 10.60 m - 10.62 m, 10.91 m - 11.01 m			2													BC				
		Limestone/Siltstone Layers: 11.78 m - 12.18 m, 12.31 m - 12.33 m, 12.48 m - 12.52 m			3													BC				
		Limestone/Siltstone Layers: 12.52 m - 12.99 m, 13.00 m - 13.19 m, 13.31 m - 13.35 m, 13.67 m - 13.70 m, 13.76 m - 13.78 m, 14.00 m - 14.05 m			4																	
		END OF DRILLHOLE		163.33																		
				14.05																		

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINTDERRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 20-2-4

PROJECT: 1668740
 LOCATION: N 4836101.41; E 606469.64

RECORD OF BOREHOLE: S2-05

SHEET 1 OF 4

BORING DATE: September 19 and 20, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	WATER CONTENT PERCENT		
0		GROUND SURFACE		178.02							
		ASPHALT (140 mm)		0.00							GR SA SI CL
		FILL - (SW/GW) SAND and GRAVEL, trace fines; brown; non-cohesive, moist, compact to very dense		0.14	1 SS 51						
1				176.95	2A						
		FILL - (CL) SILTY CLAY, some sand to sandy, some gravel; brown to grey with some staining; cohesive, w<PL, firm to stiff - Trace organics at a depth of 1.5 m.		1.07	2B SS 15						
2					3 SS 9						
					4 SS 8						
3		(CL) Sandy SILTY CLAY, trace gravel to gravelly, grey (TILL); cohesive, w<PL, very stiff to hard		175.12	5 SS 17						4 23 52 21
				2.90							
4											
		- Shale fragments at a depth of 4.6 m.			6 SS 71/0.25						
5		- Auger grinding at a depth of 4.9 m.									
6				171.92	7 SS 51						
		Grey, SHALE		6.10							
7											
					8 SS 50/0.08						
8		SHALE		170.59							
		For rock coring details refer to Record of Drillhole S2-05.		7.43							
9											
10											

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\PEEL\RD MISSISSAUGA\02 DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT_19-5-24

DEPTH SCALE

1 : 50



LOGGED: EN
 CHECKED: MCK

PROJECT: 1668740
 LOCATION: N 4836101.41 ; E 606469.64
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-05

DRILLING DATE: September 19 and 20, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 2 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %		DIP w/ L. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2				
		Continued from Record of Borehole S2-5		170.59														
8		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		7.43	1	NR												Clay Seam
		Limestone/Siltstone Layers: 7.90 m-7.97 m, 8.00 m-8.16 m, 8.43 m-8.47 m, 8.95 m-9.05 m			2	NR												BC
9																		BC
																		BC
10					3	NR												LC
		Limestone/Siltstone Layers: 11.08 m-11.15 m, 11.92 m-12.19 m																
11																		
12					4	NR												BC
		Limestone/Siltstone Layers: 12.72 m-12.90 m, 12.92 m-12.95 m, 12.97 m-12.99 m, 13.09 m-13.11 m, 13.17 m-13.20 m, 13.75 m-13.80 m																
13																		
14					5	NR												
		Limestone/Siltstone Layers: 14.09 m-14.13 m																
15																		
16					6	NR												
		Limestone/Siltstone Layers: 15.55 m-15.60 m																
17																		
					7	NR												
		Limestone/Siltstone Layers: 17.17 m-17.22 m, 17.30 m-17.35 m, 17.83 m-17.84 m																
					8	NR												

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GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\GINT\DERRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4836101.41 ; E 606469.64
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-05

SHEET 3 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: September 19 and 20, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER								
						RECOVERY		R.Q.D.	FRACT.	DISCONTINUITY DATA				WEATHERING INDEX				Diameter							
						TOTAL CORE %	SOLID CORE %	%	INDEX PER 0.25m	TYPE AND SURFACE DESCRIPTION				Jr	Ja			Jz	W1	W2	W3	W4	W5	W6	MPa
						100	100	100	0-100										1	2	3	4	5	6	2
		-- CONTINUED FROM PREVIOUS PAGE --																							
18		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			8	NR																			
19		Limestone/Siltstone Layers: 18.77 m-18.79 m, 19.26 m-19.30 m, 19.43 m-19.45 m, 19.82 m-19.85 m			9	NR																			
20		Limestone/Siltstone Layers: 20.78 m-20.82 m, 21.17 m-21.21 m, 21.44 m-21.47 m			10	NR																			
21		UCS=23.9 MPa																							
22		Limestone/Siltstone Layers: 22.23 m-22.27 m			11	NR																			
23		Limestone/Siltstone Layers: 23.57 m-23.59 m, 23.98 m-24.00 m, 24.30 m-24.32 m			12	NR																			
24																									
25		Limestone/Siltstone Layers: 25.20 m-25.25 m			13	NR																			
26																									
27		Limestone/Siltstone Layers: 27.56 m-27.59 m			14	NR																			
		CONTINUED NEXT PAGE																							

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLERY RD MISSISSAUGA\02 DATA\GINT\DRILLERY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE
 1 : 50



LOGGED: MPL
 CHECKED: DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S2-05

SHEET 4 OF 4

LOCATION: N 4836101.41 ;E 606469.64

DRILLING DATE: September 19 and 20, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER				
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATH- ERING INDEX					Diametral Point Load Index (MPa)			
							TOTAL CORE %	SOLID CORE %		DIP W/EL CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2				W3	W4	W5
28	Rotary Diamond Drill HC3 Core	--- CONTINUED FROM PREVIOUS PAGE --- Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 28.37 m-28.41 m, 28.66 m-28.85 m		14	NR																	
29				15	NR																	
29		END OF DRILLHOLE		148.83 29.19																		
30		NOTE: 1. NR - Not recorded																				
31																						
32																						
33																						
34																						
35																						
36																						
37																						

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLING DATA\GINTDERRY_RD_MISSISSAUGA\02_DATA\GINTDERRY_RD_MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4836002.63; E 606392.85

RECORD OF BOREHOLE: S4-19

SHEET 1 OF 2

BORING DATE: November 19, 2019

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			
0		GROUND SURFACE		178.95												GR SA SI CL
		Borehole was advanced from ground surface to approximate top of bedrock without sampling.		0.00												
1																
2																
3	Power Auger Hollow Steam Augers															
4																
5																
6		SHALE		172.84 6.11												
		For rock coring details refer to Record of Drillhole S4-19.														
7																
8																
9																
10																

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL DERRY RD MISSISSAUGA\02 DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT 20-2-4

PROJECT: 1668740
 LOCATION: N 4835961.32; E 606280.28

RECORD OF BOREHOLE: S1-08

SHEET 1 OF 4

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: April 21 and 24, 2017

DATUM: UTM NAD 83
 (ZONE 17N)
 HAMMER TYPE: AUTOMATIC

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. + rem V. ⊕ ⊙	Q - U - ⊙			
0		GROUND SURFACE		179.38								GR SA SI CL
		ASPHALT (200 mm)		0.00								Concrete
		FILL - (SP-SM) Gravelly SAND, some silt; brown; non-cohesive, moist		179.18	1	AS	-					Sand
				0.20								
1		(Cl) Gravelly sandy SILTY CLAY; brown with oxidation staining (TILL); cohesive, w<PL, very stiff to hard		178.69	2	SS	19					Bentonite
				0.69								
2	Power Auger 150 mm O.D. Solid Stem Augers				3	SS	22					
					4	SS	33					
					5	SS	72					
					6	SS	92/ 0.28					
4		Mixture of Soil and Rock fragments		175.75								21 13 52 14
				3.63								
		SOIL: (SC) Gravelly CLAYEY SAND, containing plastic fines; grey; non-cohesive, moist, very dense		175.29								05/10/2019
				4.09								27 31 34 8
5		ROCK: Grey, SHALE SHALE										
		For rock coring details refer to Record of Drillhole S1-08.										

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PROJECT: 1668740
 LOCATION: N 4835961.32 ;E 606280.28
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-08

SHEET 2 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: April 21 and 24, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
							TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2			
							용량용량용량	용량용량용량	용량용량용량	용량용량용량	용량용량용량	용량용량용량	용량용량용량	용량용량용량	용량용량용량	용량용량용량			용량용량용량
		Continued from Record of Borehole S1-08		175.29															
		Highly weathered, grey, fine to very fine grained, faintly porous, weak SHALE (Georgian Bay Formation)		4.09	1	NR												LC BC	
5		Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 5.50 m--5.51 m, 5.80 m--5.86 m		174.58 4.80	2	NR												BC Clay Seam BC Clay Seam BC Clay Seam BC Clay Seam BC Clay Seam BC Clay Seam	
6		Limestone/Siltstone Layers: 6.55 m--6.65 m, 7.12 m--7.13 m 7.31 m--7.33 m																BC Clay Seam BC	
7		Limestone/Siltstone Layers: 8.09 m--8.14 m, 8.30 m--8.32 m 8.45 m--8.50 m, 8.57 m--8.61 m 9.08 m--9.25 m			3	NR												BC Clay Seam BC Clay Seam BC Clay Seam BC Clay Seam BC Clay Seam BC Clay Seam	
8		Limestone/Siltstone Layers: 10.24 m--10.27 m, 10.48 m--10.50 m 10.78 m--10.86 m			4	NR												BC Clay Seam (Axial) (Axial) LC Clay Seam	
9		Limestone/Siltstone Layers: 11.09 m--11.12 m, 11.14 m--11.15 m 11.25 m--11.92 m, 11.96 m--12.27 m			5	NR												Bentonite Clay Seam (Axial) (Axial)	
10		Limestone/Siltstone Layers: 12.70 m--12.71 m, 12.78 m--12.81 m 13.01 m--13.03 m, 13.09 m--13.29 m 13.33 m--13.44 m			6	NR												LC BC Clay Seam	
11		Limestone/Siltstone Layers: 12.70 m--12.71 m, 12.78 m--12.81 m 13.01 m--13.03 m, 13.09 m--13.29 m 13.33 m--13.44 m			7	NR												Clay Seam BC Clay Seam	
12		Limestone/Siltstone Layers: 12.70 m--12.71 m, 12.78 m--12.81 m 13.01 m--13.03 m, 13.09 m--13.29 m 13.33 m--13.44 m			8	NR												BC Clay Seam	
13		Limestone/Siltstone Layers: 12.70 m--12.71 m, 12.78 m--12.81 m 13.01 m--13.03 m, 13.09 m--13.29 m 13.33 m--13.44 m																	
14		Limestone/Siltstone Layers: 12.70 m--12.71 m, 12.78 m--12.81 m 13.01 m--13.03 m, 13.09 m--13.29 m 13.33 m--13.44 m																	

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DEPTH SCALE
1 : 50



LOGGED: KG
CHECKED: AB/DAC

PROJECT: 1668740
 LOCATION: N 4835961.32 ; E 606280.28
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-08

DRILLING DATE: April 21 and 24, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 3 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN		RECOVERY TOTAL CORE %	SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA						WEATHERING INDEX	Diametral Point Load Index (MPa)	FEATURES	PIEZOMETER
						DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION					Jr			J _z						
												W1	W2	W3	W4	W5	W6				
NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY																					
15		--- CONTINUED FROM PREVIOUS PAGE --- Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 14.13 m-14.14 m, 14.26 m-14.40 m 14.58 m-14.59 m Limestone/Siltstone Layers: 16.10 m-16.12 m			8	NR															BC BC (Axial)
16					9	NR															(Axial)
17					10	NR															BC BC (Axial)
18					11	NR															BC BC Bentonite LC (Axial)
19		Limestone/Siltstone Layers: 18.82 m-18.87 m, 18.99 m-19.01 m 19.45 m-19.49 m			12	NR															BC LC (Axial)
20		Limestone/Siltstone Layers: 20.14 m-20.16 m, 20.20 m-20.22 m 20.24 m-20.26 m, 20.40 m-20.47 m 20.92 m-20.95 m, 21.56 m-21.57 m			13	NR															BC LC 338 (Axial)
21		Limestone/Siltstone Layers: 22.16 m-22.19 m, 22.37 m-22.41 m 22.83 m-22.86 m, 22.92 m-22.95 m			14	NR															(Axial) Sand
22																					(Axial) Screen
23		Limestone/Siltstone Layers: 23.46 m-23.47 m, 23.80 m-23.83 m 23.89 m-23.93 m, 23.95 m-23.98 m 24.34 m-24.36 m, 24.70 m-24.73 m UCS=25.1 MPa																			Sand
24																					

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PROJECT: 1668740
 LOCATION: N 4835961.32 ; E 606280.28
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-08

SHEET 4 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: April 21 and 24, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY													PIEZOMETER																																		
							TOTAL CORE %	SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX			Diametral Point Load Index (MPa)																																			
		--- CONTINUED FROM PREVIOUS PAGE --- Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 24.73 m-24.77 m, 24.86 m-24.88 m 24.89 m-24.90 m, 24.93 m-24.94 m 24.95 m-24.96 m, 24.98 m-24.99 m 25.13 m-25.14 m, 25.36 m-25.37 m 25.61 m-25.62 m, 25.68 m-25.69 m			14	NR																		Sand																														
25		Limestone/Siltstone Layers: 26.52 m-26.54 m, 26.63 m-26.64 m			15	NR																		(Axial) (Axial)																														
26					16	NR																		Bentonite (Axial) (Axial)																														
27					17	NR																																																
28																																																						
29		END OF DRILLHOLE		150.36 29.02																																																		
30		NOTES: 1. NR - Not recorded 2. Groundwater level measurements in monitoring well: <table border="1"> <thead> <tr> <th>Date (mm/dd/yy)</th> <th>Depth (m)</th> <th>Elev. (m)</th> </tr> </thead> <tbody> <tr><td>05/16/2017</td><td>2.9</td><td>176.5</td></tr> <tr><td>06/06/2017</td><td>3.4</td><td>176.0</td></tr> <tr><td>06/16/2017</td><td>3.4</td><td>176.0</td></tr> <tr><td>07/27/2017</td><td>3.3</td><td>176.1</td></tr> <tr><td>09/22/2017</td><td>3.3</td><td>176.1</td></tr> <tr><td>12/19/2017</td><td>3.2</td><td>176.2</td></tr> <tr><td>07/27/2018</td><td>3.4</td><td>175.9</td></tr> <tr><td>10/19/2018</td><td>3.3</td><td>176.0</td></tr> <tr><td>05/10/2019</td><td>3.2</td><td>176.1</td></tr> </tbody> </table>	Date (mm/dd/yy)	Depth (m)	Elev. (m)	05/16/2017	2.9	176.5	06/06/2017	3.4	176.0	06/16/2017	3.4	176.0	07/27/2017	3.3	176.1	09/22/2017	3.3	176.1	12/19/2017	3.2	176.2	07/27/2018	3.4	175.9	10/19/2018	3.3	176.0	05/10/2019	3.2	176.1																						
Date (mm/dd/yy)	Depth (m)	Elev. (m)																																																				
05/16/2017	2.9	176.5																																																				
06/06/2017	3.4	176.0																																																				
06/16/2017	3.4	176.0																																																				
07/27/2017	3.3	176.1																																																				
09/22/2017	3.3	176.1																																																				
12/19/2017	3.2	176.2																																																				
07/27/2018	3.4	175.9																																																				
10/19/2018	3.3	176.0																																																				
05/10/2019	3.2	176.1																																																				
31																																																						
32																																																						
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34																																																						

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRRY RD MISSISSAUGA\02 DATA\INTDERRRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4835805.30; E 606199.68

RECORD OF BOREHOLE: S2-06

SHEET 1 OF 4

BORING DATE: September 21, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	WATER CONTENT PERCENT		
0		GROUND SURFACE		179.67							
		ASPHALT (180 mm)		179.00							
		FILL - (SW/GW) SAND and GRAVEL; brown; non-cohesive, moist, dense		179.49	1	SS	36				
				178.98							
		FILL - (CL) Sandy gravelly SILTY CLAY; grey to dark grey; cohesive, w<PL, stiff		0.69	2	SS	14				
				178.30							
		(CI) SILTY CLAY, some sand, some gravel; brown becoming grey below a depth of 2.3 m; cohesive, w<PL, stiff to very stiff		1.37	3	SS	14				
				176.77							
		(CI) Gravelly Sandy SILTY CLAY; grey, containing shale fragments (TILL); cohesive, w<PL, hard		2.90	5	SS	43				
				175.10							
		Grey, SHALE		4.57	6	SS	50/0.07				
				173.58							
		SHALE		6.09	7	SS	50/0.13				
		For rock coring details refer to Record of Drillhole S2-06.									

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL/DERRY RD MISSISSAUGA\02 DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT_19-5-24

DEPTH SCALE

1 : 50



LOGGED: EN
 CHECKED: MCK

PROJECT: 1668740
LOCATION: N 4835805.30 ;E 606199.68
INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-06

DRILLING DATE: September 21, 2017
DRILL RIG: CME 75 Truck Mount
DRILLING CONTRACTOR: Davis Drilling

SHEET 2 OF 4
DATUM: UTM NAD 83 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER							
							RECOVERY		R.Q.D.	FRACT.	DISCONTINUITY DATA				WEATHERING INDEX				Diametral						
							TOTAL CORE %	SOLID CORE %	%	INDEX PER 0.25m	TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jzon	W1			W2	W3	W4	W5	W6	WMS	Point Load Index (MPa)
							충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충			충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충	충충충충충충
		Continued from Record of Borehole S2-06		173.58																					
7		Highly weathered to fresh, grey, fine to very fine grained, faintly porous, weak SHALE (Georgian Bay Formation)		6.09	1	NR																			
					2	NR																			
8		Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		171.80																					
		Limestone/Siltstone Layers: 8.38 m-8.40 m, 8.46 m-8.60 m, 8.89 m-9.03 m, 9.13 m-9.15 m		7.87																					
9					3	NR																			
10		Limestone/Siltstone Layers: 9.40 m-9.49 m																							
					4	NR																			
11		Limestone/Siltstone Layers: 11.25 m-11.46 m, 11.53 m-11.65 m, 11.66 m-11.80 m, 11.81 m-11.90 m, 11.96 m-12.04 m, 12.13 m-12.32 m																							
					5	NR																			
12																									
13		Limestone/Siltstone Layers: 12.54 m-12.63 m, 12.68 m-12.73 m, 13.36 m-13.43 m, 13.57 m-13.62 m																							
					6	NR																			
14		Limestone/Siltstone Layers: 14.48 m-14.50 m, 14.57 m-14.61 m																							
15																									
16																									

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DEPTH SCALE
1 : 50



LOGGED: MPL
CHECKED: DAC

CONTINUED NEXT PAGE

PROJECT: 1668740
 LOCATION: N 4835805.30 ;E 606199.68
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-06

SHEET 3 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: September 21, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY								FEATURES	PIEZOMETER					
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX			Diametral Point Load Index (MPa)				
				TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Type and Surface Description	Jr	Ja	Jzon	W1	W2	W3		W4	W5	W6	
		--- CONTINUED FROM PREVIOUS PAGE --- Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)	[Symbolic Log Pattern]		8															
17		Limestone/Siltstone Layers: 17.93 m-17.96 m			NR					BD, PL, SM, CC, CL		1	4	12						
18		Limestone/Siltstone Layers: 18.92 m-19.01 m, 19.08 m-19.11 m, 19.53 m-19.55 m			9					BD, PL, SM, PC, CL		1	4	12						
19		Limestone/Siltstone Layers: 20.22 m-20.27 m, 20.91 m-20.94 m			10					BD, UN, SM, CI		2	1	20						
20		Limestone/Siltstone Layers: 21.73 m-21.85 m, 22.08 m-22.12 m, 22.87 m-22.90 m			11					BD, PL, SM, SA		1	2	16						
21	Rotary Diamond Drill HC3 Core	Limestone/Siltstone Layers: 23.59 m-23.62 m, 23.83 m-23.91 m, 24.35 m-24.39 m			12					BD, PL, SM, PC, CL		1	4	12						
22		UCS=22.8 MPa			13					BD, UN, SM, CI		2	1	20						
23		Limestone/Siltstone Layers:			14															
24		Limestone/Siltstone Layers:			15															

CONTINUED NEXT PAGE

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DEPTH SCALE
 1 : 50



LOGGED: MPL
 CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4835805.30 ; E 606199.68
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-06

SHEET 4 OF 4
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: September 21, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER			
						FLUSH RETURN		RECOVERY TOTAL CORE %	SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATH- ERING INDEX			Diametral Point Load Index (MPa)		
						TOTAL	RECYCLED					TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon				W1	W2
						RECORDED	NOT RECORDED
27		<p>--- CONTINUED FROM PREVIOUS PAGE ---</p> <p>26.22 m-26.25 m, 27.07 m-27.11 m - Core barrel overpacked causing mechanical break throughout core Moderately weathered to fresh, laminated to medium bedded, grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)</p>		26.22 - 26.25 27.07 - 27.11	NR															
28		<p>Limestone/Siltstone Layers: 27.98 m-28.01 m, 28.26 m-28.29 m</p> <p>- Core barrel overpacked causing mechanical break throughout core</p>		27.98 - 28.01 28.26 - 28.29	NR															
29	Rotary Diamond Drill HQ3 Core	<p>Limestone/Siltstone Layers: 29.09 m-29.13 m, 29.43 m-29.62 m, 29.81 m-29.84 m</p>		29.09 - 29.13 29.43 - 29.62 29.81 - 29.84	NR						...IN,CL	1	15	9			Clay Seam			
30		<p>Limestone/Siltstone Layers: 30.48 m-30.52 m, 30.72 m-30.75 m, 31.41 m-31.46 m, 31.94 m-31.96 m</p>		30.48 - 30.52 30.72 - 30.75 31.41 - 31.46 31.94 - 31.96	NR						BD,PL,SM,PC,CL	1	4	12						
32		<p>END OF DRILLHOLE</p> <p>NOTE: 1. NR - Not recorded</p>		147.57 32.10																

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PROJECT: 1668740
 LOCATION: N 4835703.26; E 606116.24

RECORD OF BOREHOLE: S1-09

SHEET 1 OF 5

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: April 11 and 12, 2017

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	WATER CONTENT PERCENT		
0		GROUND SURFACE		181.94							
		ASPHALT (150 mm)		0.00							
		FILL - (SP/GP) SAND and GRAVEL, trace to some fines; brown; non-cohesive, moist, compact to dense		0.15	1 SS	45					
1		FILL - (CL) SILTY CLAY, some sand; dark grey; cohesive, w~PL		180.92	2A SS	10					
				1.02	2B						
		(CL/CI) Sandy SILTY CLAY, some gravel; brown with oxidation staining (TILL); cohesive, w<PL, stiff to hard		180.57	3 SS	15					
				1.37							
2					4 SS	28					
					5 SS	28					
3											
4											
5		Containing shale fragments below a depth of 4.6 m.		177.09	6A SS	102/0.28					
		Grey, SHALE		4.85	6B						
		SHALE		4.93							
6		For rock coring details refer to Record of Drillhole S1-09.									
7											
8											
9											
10											

Power Auger
150 mm O.D. Solid Stem Augers

02/16/2018
12 23 46 19

5 21 54 20

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DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: MCK/ARV

PROJECT: 1668740
 LOCATION: N 4835703.26 ;E 606116.24
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-09

DRILLING DATE: April 11, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 5
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER				
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA			WEATHERING INDEX					Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %				Type and Surface Description	Jr	Ja	Jzon	W1			W2		W3	W4
25		--- CONTINUED FROM PREVIOUS PAGE --- 25.36 m-25.38 m, 25.90 m-25.92 m Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)			14	NR													(Axial)		
26		Limestone/Siltstone Layers: 26.24 m-26.26 m, 26.30 m-26.31 m 26.52 m-26.56 m, 27.22 m-27.24 m 27.30 m-27.31 m, 27.63 m-27.64 m			15	NR													(Axial) (Axial)		
27		Limestone/Siltstone Layers: 27.84 m-27.86 m, 28.47 m-28.49 m 28.60 m-28.62 m UCS=27.5 MPa			16	NR													(Axial)		
28		Limestone/Siltstone Layers: 29.27 m-29.28 m, 29.35 m-29.38 m 30.27 m-30.30 m, 30.38 m-30.42 m			17	NR													(Axial)		
29		Limestone/Siltstone Layers: 30.74 m-30.79 m, 31.25 m-31.28 m 31.43 m-31.45 m, 31.51 m-31.61 m 31.73 m-31.83 m, 31.89 m-32.06 m			18	NR													(Axial)		
30		Limestone/Siltstone Layers: 32.49 m-32.51 m, 32.80 m-32.81 m 32.89 m-32.91 m, 33.20 m-33.22 m 33.42 m-33.45 m, 33.52 m-33.57 m 33.61 m-33.65 m			19	NR													(Axial)		
31		Limestone/Siltstone Layers: 33.98 m-33.99 m, 34.04 m-34.06 m 34.24 m-34.26 m, 34.30 m-34.31 m 34.48 m-34.50 m, 34.60 m-34.61 m 34.63 m-34.64 m, 34.70 m-34.71 m			20	NR													(Axial)		
32		CONTINUED NEXT PAGE																	(Axial)		

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PROJECT: 1668740
 LOCATION: N 4835703.26 ;E 606116.24
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S1-09

SHEET 5 OF 5
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: April 11, 2017
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY													FEATURES	PIEZOMETER																		
						RECOVERY			FRACT. INDEX PER 0.25m CORRECTION	DISCONTINUITY DATA			WEATH- ERING INDEX			Diametral Point Load Index (MPa)																						
						TOTAL CORE %	SOLID CORE %	R.Q.D. %		TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2		W3	W4			W5	W6																
						FLUSH RETURN	DIP W.R.T. CORE AXIS		Jr		Jzon	W1		W2	W3	W4	W5	W6																				
35	-- CONTINUED FROM PREVIOUS PAGE --			138.98																																		
36		END OF DRILLHOLE NOTES: 1. NR - Not recorded 2. Groundwater level measurements in monitoring well: <table style="margin-left: 20px;"> <tr> <td>Date (mm/dd/yy)</td> <td>Depth (m)</td> <td>Elev. (m)</td> </tr> <tr> <td>06/16/2017</td> <td>0.9</td> <td>181.0</td> </tr> <tr> <td>07/27/2017</td> <td>0.2</td> <td>181.7</td> </tr> <tr> <td>09/22/2017</td> <td>3.0</td> <td>178.9</td> </tr> <tr> <td>12/20/2017</td> <td>2.5</td> <td>179.4</td> </tr> <tr> <td>02/16/2018</td> <td>2.3</td> <td>179.6</td> </tr> </table>	Date (mm/dd/yy)	Depth (m)	Elev. (m)	06/16/2017	0.9	181.0	07/27/2017	0.2	181.7	09/22/2017	3.0	178.9	12/20/2017	2.5	179.4	02/16/2018	2.3	179.6																		
Date (mm/dd/yy)	Depth (m)	Elev. (m)																																				
06/16/2017	0.9	181.0																																				
07/27/2017	0.2	181.7																																				
09/22/2017	3.0	178.9																																				
12/20/2017	2.5	179.4																																				
02/16/2018	2.3	179.6																																				
37																																						
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PROJECT: 1668740

LOCATION: N 4835616.11; E 605994.25

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: S2-07

BORING DATE: September 27 and 28, 2017

DRILL RIG: CME 75 Track Mount

SHEET 1 OF 5

DATUM: UTM NAD 83 (ZONE 17N)
HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%) GR SA SI CL	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
							20 40 60 80		nat V. + rem V. Q - U -		10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³		Wp W WI				
0		GROUND SURFACE		184.92													
		ASPHALT (150 mm)		0.00													
		FILL - (SW/GW) SAND and GRAVEL; brown; non-cohesive, moist, compact		0.15	1A												
		FILL - (CL) SILTY CLAY, some sand to sandy, some gravel; mottled brown and grey; cohesive, w<PL, to w~PL, soft to firm		184.46	1B	SS	24										
1				0.46	1B	SS	9										
					2	SS	9										
					3	SS	5										
					4	SS	3										
3		(SC) Gravelly CLAYEY SAND, with plastic fines; brown becoming grey at a depth of at 4.0 m (TILL); moist, compact to very dense		182.02	5	SS	30									17 40 36 7	
				2.90	5	SS	30										
					6	SS	84										
					7	SS	50/0.13									13 39 42 6	
				179.33	7	SS	50/0.13										
		(SM) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist, very dense		5.59	8	SS	50/0.10										
					8	SS	50/0.10										
					9	SS	50/0.10										
		- Shale fragments below a depth of 9.1 m.			9	SS	50/0.10										

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DEPTH SCALE

1 : 50



LOGGED: EN

CHECKED: MCK/ARV

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PROJECT: 1668740
 LOCATION: N 4835616.11; E 605994.25

RECORD OF BOREHOLE: S2-07

SHEET 2 OF 5

BORING DATE: September 27 and 28, 2017

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		Wp				
10	Power Auger	-- CONTINUED FROM PREVIOUS PAGE --														GR SA SI CL
		(SM) SILTY SAND, some gravel to gravelly; grey (TILL); non-cohesive, moist, very dense			174.35											
		Grey, SHALE		10.57	10	SS	50/0.10									
		SHALE		10.67												
11		For rock coring details refer to Record of Drillhole S2-07.														
		NOTE:														
		1. Rock coring carried out in a Borehole located approximately 0.5 m north of the original Borehole S2-07 location.														
12																
13																
14																
15																
16																
17																
18																
19																
20																

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DEPTH SCALE

1 : 50



LOGGED: EN

CHECKED: MCK/ARV

PROJECT: 1668740

RECORD OF DRILLHOLE: S2-07

SHEET 3 OF 5

LOCATION: N 4835616.11 ;E 605994.25

DRILLING DATE: September 27 and 28, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Track Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	W1	W2			
						FLUSH RETURN												
		Continued from Record of Borehole S2-7		174.25														
11		Moderately weathered to fresh, laminated to medium bedded, grey to dark bluish grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		10.67	1	NR											BC	
12		Limestone/Siltstone Layers: 11.49 m-11.51 m, 12.40 m-12.44 m, 12.47 m-12.52 m			2	NR											BC	
13		Limestone/Siltstone Layers: 12.98 m-13.03 m, 13.76 m-13.81 m			3	NR											BC	
14		Limestone/Siltstone Layers: 14.12 m-14.30 m			4	NR											BC	
15					5	NR											Clay Seam	
16		Limestone/Siltstone Layers: 16.16 m-16.18 m, 17.02 m-17.23 m			6	NR											BC	
17					7	NR											Clay Seam	
18		Limestone/Siltstone Layers: 17.43 m-17.49 m, 17.52 m-17.61 m, 17.77 m-17.92 m, 18.03 m-18.06 m, 18.08 m-18.10 m, 18.16 m-18.24 m, 18.26 m-18.30 m			8	NR											BC	
19		Limestone/Siltstone Layers: 18.70 m-19.01 m, 19.10 m-19.28 m, 19.31 m-19.44 m, 20.14 m-20.24 m			9	NR											BC	
20					10	NR												

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GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY RD_MISSISSAUGA\02_DATA\GINT\DERRY RD_MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: DAC

PROJECT: 1668740

RECORD OF DRILLHOLE: S2-07

SHEET 4 OF 5

LOCATION: N 4835616.11 ;E 605994.25

DRILLING DATE: September 27 and 28, 2017

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Track Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH- ERING INDEX					
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2			W3	W4
Rotary Diamond Drill HC3 Core		--- CONTINUED FROM PREVIOUS PAGE ---		8		NR		BD, PL, SM, SA		1 2 16									
		Moderately weathered to fresh, laminated to medium bedded, grey to dark bluish grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		9		NR													
		Limestone/Siltstone Layers: 23.60 m-23.62 m, 24.28 m-24.31 m, 24.57 m-24.62 m, 24.18 m-24.23 m, 24.87 m-24.90 m		10		NR		BD, UN, SM, PC, CL		2 4 16									
				11		NR													
				12		NR													
		UCS=24.8 MPa Limestone/Siltstone Layers: 28.58 m-28.60 m, 28.64 m-28.67 m, 28.99 m-29.03 m, 29.22 m-29.24 m, 29.32 m-29.54 m		13		NR													
				14		NR													
		Limestone/Siltstone Layers: 29.63 m-29.66 m, 30.73 m-30.76 m																	
		CONTINUED NEXT PAGE																	

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\GINT\DERRYS RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: MPL

CHECKED: DAC

PROJECT: 1668740
 LOCATION: N 4835616.11 ;E 605994.25
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S2-07

SHEET 5 OF 5
 DATUM: UTM NAD 83 (ZONE 17N)

DRILLING DATE: September 27 and 28, 2017
 DRILL RIG: CME 75 Track Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATH- ERING INDEX				Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %		DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2					
						⊚⊚⊚⊚⊚	⊚⊚⊚⊚⊚	⊚⊚⊚⊚⊚								W3			W4	W5
		-- CONTINUED FROM PREVIOUS PAGE --																		
31	Rotary Diamond Drill H03 Core	Moderately weathered to fresh, laminated to medium bedded, grey to dark bluish grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 32.39 m-32.41 m Limestone/Siltstone Layers: 32.70 m-32.73 m, 32.76 m-32.88 m Limestone/Siltstone Layers: 35.06 m-35.10 m, 35.14 m-35.34 m Limestone/Siltstone Layers: 36.08 m-36.10 m		14	NR															
32				15	NR															
33				16	NR															
34				17	NR															
35				18	NR															
36		END OF DRILLHOLE		148.55 36.37																
37		NOTE: 1. Rock coring carried out in adjacent Borehole located about 0.5 m from Borehole S2-07 location. 2. NR- Not recorded.																		
38																				
39																				
40																				

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\GINT\DERRYS RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4835493.58; E 605948.40

RECORD OF BOREHOLE: S4-18

SHEET 1 OF 3

BORING DATE: December 5, 2019

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								20 40 60 80		nat V. + Q - ● rem V. ⊕ U - ○		10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³					Wp ----- W ----- WI	
0		GROUND SURFACE		185.33											GR SA SI CL			
		Borehole was advanced from ground surface to approximate top of bedrock without sampling.		0.00														
1																		
2																		
3																		
4																		
5	Power Auger Hollow Steam Augers																	
6																		
7																		
8																		
9																		
10																		
		CONTINUED NEXT PAGE																

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INT\DERRY RD MISSISSAUGA.GPJ GAL-MIS.GDT 20-2-4

PROJECT: 1668740
 LOCATION: N 4835493.58; E 605948.40

RECORD OF BOREHOLE: S4-18

SHEET 2 OF 3
 DATUM: UTM NAD 83
 (ZONE 17N)

BORING DATE: December 5, 2019
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		WATER CONTENT PERCENT				
								20	40	60	80	10 ⁻⁶	10 ⁻⁵			
10		-- CONTINUED FROM PREVIOUS PAGE -- Borehole was advanced from ground surface to approximate top of bedrock without sampling.		174.92											GR SA SI CL	
11		SHALE For rock coring details refer to Record of Drillhole S4-18.		10.41												
12																
13																
14																
15																
16																
17																
18																
19																
20																

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\INTDERRYS RD MISSISSAUGA.GPJ GAL-MIS.GDT 20-24

PROJECT: 1668740
 LOCATION: N 4835493.58 ;E 605948.40
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S4-18

DRILLING DATE: December 5, 2019
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 3 OF 3
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA				WEATHERING INDEX			Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %				Jr	Jd	Jn	Jz	W1				W2
		Continued from Record of Borehole S4-18		174.92															
11	Rotary Diamond Drill HQ3 Core	Moderately weathered to slightly weathered, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		10.41	1												LC BC LC		
12		Limestone/Siltstone Layers: 12.27 m - 12.29 m			2														
13		Limestone/Siltstone Layers: 13.10 m - 13.14 m, 13.57 m - 13.62 m, 13.71 m - 13.73 m, 13.75 m - 13.79 m				3												BC	
14		Limestone/Siltstone Layers: 15.11 m - 15.15 m				4													
15		Limestone/Siltstone Layers: 15.51 m - 15.67 m				5												(Axial) (Diametric)	
16		END OF DRILLHOLE		169.08 16.25															

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY_RD_MISSISSAUGA\02_DATA\GINT\DERRY_RD_MISSISSAUGA.GPJ_GAL-MISS.GDT 20-2-4

PROJECT: 1668740
 LOCATION: N 4835439.35; E 605894.40

RECORD OF BOREHOLE: 410C-1

SHEET 1 OF 6

BORING DATE: March 28, April 2 and 5, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	WATER CONTENT PERCENT			
0		GROUND SURFACE		185.30								GR SA SI CL
		ASPHALT (150 mm)		0.00								
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, dense		0.15	1 SS 31							
1		FILL - (CL) Sandy SILTY CLAY, trace to some gravel; brown; cohesive, w<PL, stiff to stiff		184.54	2 SS 15							
				0.76	3 SS 23							
2				183.09	4 SS 57/0.18							
		(Cl) SILTY CLAY, some sand, trace gravel; grey; cohesive, w<PL, very stiff to hard - Auger grinding at a depth of 2.6 m.		2.21	5 SS 47							
3					6 SS 19							3 8 54 35
4					7 SS 28							6 34 41 19
5					8 SS 50/0.10							
6		(Cl) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL, very stiff to hard		179.66								
				5.64								
7		- Auger grinding between depths of 7.0 m to 7.3 m.										
8		(SC) Gravelly CLAYEY SAND, with plastic fines; grey (TILL); moist, dense		177.38								
				7.92								
9		- Shale fragments below a depth of 9.1 m.			9 SS 45							20 42 28 10
10												

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GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INTDERRY RD MISSISSAUGA.GPJ GAL-MIS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835439.35; E 605894.40

RECORD OF BOREHOLE: 410C-1

SHEET 2 OF 6

BORING DATE: March 28, April 2 and 5, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			
10	Power Auger 200 mm O.D. Hollow Stem Augers	--- CONTINUED FROM PREVIOUS PAGE --- (SC) Gravelly CLAYEY SAND, with plastic fines; grey (TILL); moist, dense	[Pattern]	174.63												GR SA SI CL
11		Grey, SHALE	[Pattern]	10.67	10	SS	50/0.07									
12		SHALE	[Pattern]	173.06												
13		For rock coring details refer to Record of Drillhole 410C-1.		12.24												
14																
15																
16																
17																
18																
19																
20																

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT_19-5-24

PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-1

SHEET 3 OF 6

LOCATION: N 4835439.35 ;E 605894.40

DRILLING DATE: March 28, April 2 and 5, 2018

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Driling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diameter Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	W1	W2			
						FLUSH RETURN												
		Continued from Record of Borehole 410-C-1		173.06														
13		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)		12.24	1	NR											BC	
		Limestone/Siltstone Layers: 13.25 m-13.28 m, 13.54 m-13.56 m, 14.07 m-14.13 m			2	NR											BC	
14		Limestone/Siltstone Layers: 14.19 m-14.21 m, 14.29 m-14.31 m, 14.36 m-14.60 m, 14.69 m-14.72 m, 14.86 m-14.88 m, 15.41 m-15.46 m															BC	
15		Limestone/Siltstone Layers: 16.21 m-16.25 m, 16.44 m-16.47 m, 17.03 m-17.06 m, 17.17 m-17.22 m, 17.29 m-17.31 m			3	NR												
16		Limestone/Siltstone Layers: 17.33 m-17.43 m, 17.61 m-17.95 m, 17.95 m-18.13 m, 18.26 m-18.42 m, 18.48 m-18.81 m			4	NR												
17		Limestone/Siltstone Layers: 18.92 m-18.94 m, 19.28 m-19.29 m, 19.31 m-19.44 m, 19.44 m-19.46 m, 19.78 m-19.89 m, 20.30 m-20.33 m			5	NR												
18		Limestone/Siltstone Layers: 20.33 m-20.37 m			6	NR												
19					7	NR												
20					8	NR												
21																		
22																		

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GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLING RD MISSISSAUGA\02 DATA\GINT\DRILLING RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835439.35 ; E 605894.40
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-1

DRILLING DATE: March 28, April 2 and 5, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 6
 DATUM: UTM NAD 83 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W.r.t. CORE AXIS	DISCONTINUITY DATA			WEATHERING INDEX				Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jss	W1				W2	W3
		--- CONTINUED FROM PREVIOUS PAGE ---																		
23		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)	[Symbolic Log]		8	NR														
		Limestone/Siltstone Layers: 23.09 m-23.12 m	[Symbolic Log]		9	NR														
24		Limestone/Siltstone Layers: 23.95 m-23.96 m, 24.44 m-24.45 m, 24.63 m-24.68 m, 24.76 m-24.78 m	[Symbolic Log]		10	NR														
25		Limestone/Siltstone Layers: 24.90 m-24.94 m, 25.05 m-25.09 m, 25.53 m-25.58 m, 25.83 m-25.84 m, 26.09 m-26.10 m	[Symbolic Log]		11	NR														
26		Limestone/Siltstone Layers: 26.47 m-26.50 m, 26.69 m-26.76 m, 27.46 m-27.47 m, 27.64 m-27.65 m	[Symbolic Log]		12	NR														
27		Limestone/Siltstone Layers: 28.08 m-28.18 m, 28.22 m-28.26 m, 28.81 m-28.82 m, 28.97 m-29.00 m, 29.03 m-29.06 m, 29.14 m-29.15 m	[Symbolic Log]		13	NR														
28		Limestone/Siltstone Layers: 29.53 m-29.54 m, 29.77 m-29.82 m, 29.61 m-29.62 m, 29.86 m-29.87 m, 29.92 m-29.93m	[Symbolic Log]		14	NR														
29		Limestone/Siltstone Layers: 31.03 m-31.06 m, 31.22 m-31.25 m, 31.57 m-31.58 m, 31.73 m-31.74 m, 32.30 m-32.31 m, 32.34 m-32.34 m	[Symbolic Log]		15	NR														
		CONTINUED NEXT PAGE																		

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLERY RD MISSISSAUGA\02 DATA\INT\DRILLERY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-1

SHEET 5 OF 6

LOCATION: N 4835439.35 ;E 605894.40

DRILLING DATE: March 28, April 2 and 5, 2018

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATH- ERING INDEX						Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Jr	Ja	Jz	W1	W2	W3	W4				W5
--- CONTINUED FROM PREVIOUS PAGE ---																					
33		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)			15	NR															
34		Limestone/Siltstone Layers: 32.66 m-32.68 m, 33.10 m-33.11 m, 33.19 m-33.22 m, 33.75 m-33.80 m			16	NR															
35		Limestone/Siltstone Layers: 34.08 m-34.09 m, 34.25 m-34.26 m, 34.53 m-34.54 m, 34.68 m-34.69 m, 35.41 m-35.58 m			17	NR															
36		UCS = 35.8 MPa Limestone/Siltstone Layers: 35.58 m-35.74 m, 35.89 m-35.91 m, 36.22 m-36.25 m, 36.96 m-36.97 m, 37.03 m-37.04 m			18	NR															
37	Rotary Drill HC3 Core	Limestone/Siltstone Layers: 37.27 m-37.28 m, 37.36 m-37.39 m, 37.76 m-37.77 m, 38.28 m-38.37 m			19	NR															
38		Limestone/Siltstone Layers: 38.80 m-38.81 m, 38.98 m-39.12 m, 39.23 m-39.31 m, 39.47 m-39.50 m			20	NR															
39		Limestone/Siltstone Layers: 40.29 m-40.32 m, 30.49 m-40.57 m, 40.56 m-40.59 m, 40.77 m-40.79 m, 40.97 m-40.99 m, 41.06 m-41.11 m, 41.31 m-41.34m			21	NR															
40				143.54																	
41		END OF DRILLHOLE		41.76																	
42		CONTINUED NEXT PAGE																			

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DRILLING\RD MISSISSAUGA\02 DATA\GINT\DERRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835439.35 ;E 605894.40
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-1

DRILLING DATE: March 28, April 2 and 5, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 6 OF 6
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA			WEATH- ERING INDEX			Diametral Point Load Index (MPa)		
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1	W2			
						FLUSH RETURN													
		--- CONTINUED FROM PREVIOUS PAGE ---																	
43		NOTES: 1. Groundwater measured at a depth of 10.1 m below ground surface (Elev. 175.2 m) in open borehole during soil drilling. 2. NR - Not recorded																	
44																			
45																			
46																			
47																			
48																			
49																			
50																			
51																			
52																			

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\GINT\DERRYS RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4835343.85; E 605791.74

RECORD OF BOREHOLE: 410C-2

SHEET 1 OF 5

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: March 25 to 28, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴		
0		GROUND SURFACE		188.23											
		ASPHALT (300 mm)		0.00											GR SA SI CL
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, very dense		187.93	1	SS	76								
1		FILL - (CL) Sandy SILTY CLAY, some gravel; brown; cohesive, w<PL, stiff to very stiff		187.32	2A	SS	13								
				0.91	2B	SS	13								
2					3	SS	22								
		- Trace organics at a depth of 2.3 m.			4	SS	13								
3					5	SS	10								
4		(CL) Sandy SILTY CLAY, some gravel; brown to grey (TILL); cohesive, w<PL, very stiff to hard		184.12	6	SS	22								
				4.11	7	SS	46								
5															
6															
7															
8		- Auger grinding below a depth of 7.9 m.			8	SS	66								
9		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist to wet, very dense		179.54	9	SS	50/0.10								
				8.69											
10		- Auger grinding below a depth of 9.8 m.													

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5 March 25 2018

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835343.85; E 605791.74

RECORD OF BOREHOLE: 410C-2

SHEET 2 OF 5

BORING DATE: March 25 to 28, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴			
10	Power Auger 200 mm O.D. Hollow Stem Augers	-- CONTINUED FROM PREVIOUS PAGE -- (SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist to wet, very dense														GR SA SI CL
11				10	SS	58										
12				11	SS	50/ 0.13										
13			- Auger grinding below a depth of 13.1 m.													
14				12	SS	99/ 0.23										12 56 28 4 Non-Plastic
15				13	SS	50/ 0.10										
16				171.92 16.31												
17			(SP-SM) Gravelly SAND, some fines; grey; non-cohesive, moist, very dense		14	SS	50/ 0.13									32 58 8 2
18			- Auger grinding at a depth of 17.4 m.													
19			SHALE		15	SS	50/ 0.02									
19			For rock coring details refer to Record of Drillhole 410C-2.		169.94 18.29											
20																

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PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-2

SHEET 3 OF 5

LOCATION: N 4835343.85 ;E 605791.74

DRILLING DATE: March 25 to 28, 2018

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jz01	Jz02			
						충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충			충충충충충
		Continued from Record of Borehole 410-C-2		169.94														
19		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 19.70 m-19.77 m, 19.96 m-20.22 m		18.29	1	NR											LC	
20		Limestone/Siltstone Layers: 20.22 m-21.09 m, 21.23 m-21.34 m, 21.44 m-21.52 m			2	NR											Clay	
21		Limestone/Siltstone Layers: 22.07 m-22.22 m, 22.27 m-22.36 m, 22.42 m-22.48 m, 22.81 m-22.83 m			3	NR											Clay	
22		Limestone/Siltstone Layers: 23.70 m-23.72 m			4	NR											Clay	
23		Limestone/Siltstone Layers: 25.10 m-25.14 m			5	NR											Clay	
24		Limestone/Siltstone Layers: 26.91 m-27.00 m, 27.02 m-27.04 m, 27.09 m-27.11 m, 27.75 m-27.78 m			6	NR												
25		Limestone/Siltstone Layers: 27.92 m-28.02 m, 28.10 m-28.14 m, 28.96 m-29.00 m, 29.01 m-29.03 m			7	NR												
26																		
27																		
28																		

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835209.98; E 605713.10

RECORD OF BOREHOLE: 410C-3

SHEET 1 OF 5

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: April 20, 23 and 24, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴			
0		GROUND SURFACE		192.44												GR SA SI CL
		ASPHALT (330 mm)		0.00												
				192.11												
		FILL - (SP/GP) SAND and GRAVEL, some silt; brown; non-cohesive,		0.33												
		FILL - (SW-SM) SAND, some gravel, some silt; brown; non-cohesive, compact, dry		0.46												
1				191.35	1A	SS	13									
		FILL - (CL) Sandy SILTY CLAY, some gravel to gravelly; brown becoming grey at a depth of 2.1 m; cohesive, w<PL, stiff to very stiff		1.09	1B	SS	13									
2					2	SS	20									
					3	SS	9									
3					4	SS	14									
4					5	SS	24									
5					6	SS	20									
6					7	SS	21									
7					8	SS	32									
8																
9				183.83												
		(CL) Sandy SILTY CLAY, trace to some gravel; grey (TILL); cohesive, w<PL, hard		8.61												
10																

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DEPTH SCALE

1 : 50



LOGGED: MA

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835209.98; E 605713.10
 SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: 410C-3

SHEET 2 OF 5

BORING DATE: April 20, 23 and 24, 2018

DATUM: UTM NAD 83
(ZONE 17N)
HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION				
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20		40		60		80				WATER CONTENT PERCENT			
								SHEAR STRENGTH Cu, kPa		nat V. rem V.		+ ⊕		Q - U				10 ⁻⁶		10 ⁻⁵	
10		--- CONTINUED FROM PREVIOUS PAGE --- (CL) Sandy SILTY CLAY, trace to some gravel; grey (TILL); cohesive, w<PL, hard																GR SA SI CL			
11					9	SS	68							○							
12					10	SS	50/ 0.15							○	-----			10 33 41 16			
13																					
14	Power Auger 200 mm O.D. Hollow Stem Augers				11	SS	59							○							
15							177.73 14.71														
15		(ML/SM) SILT and SAND, some gravel; grey (TILL); non-cohesive, moist, very dense																			
16					12	SS	84/ 0.20							○							
17					13	SS	84							○	CH			10 39 43 8			
18							174.10 14.34 18.42							○							
19		Grey, SHALE SHALE For rock coring details refer to Record of Drillhole 410C-3.					74A 14B	65/ 0.15						○							
20																					

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PROJECT: 1668740
 LOCATION: N 4835209.98 ; E 605713.10
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-3

DRILLING DATE: April 20, 23 and 24, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 5
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX					Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %			DIP W/L CORE AXIS	Jr	Ja	Jzon	W1	W2				W3
29		--- CONTINUED FROM PREVIOUS PAGE ---		7		NR													
30		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 29.89 m - 29.92 m, 30.14 m - 30.16 m		8		NR			BD,PL,SM,CC,CL	1	4	12						BC	
31		Limestone/Siltstone Layers: 31.65 m - 31.68 m, 31.79 m - 31.82 m		9		NR			BD,PL,SM,SA	1	2	16							
32		Limestone/Siltstone Layers: 32.89 m - 32.92 m, 33.64 m - 33.68 m		10		NR			BD,PL,SM,SA BD,UN,SM,SA	1	2	16 2	2	20					
33		Rotary Drill HG3 Core		11		NR			BD,PL,SM,IN,CL BD,PL,SM,SA CO,PL,SM,SA	1	8	0 1 1	2	16					
34		Limestone/Siltstone Layers: 34.08 m - 34.15 m, 34.34 m - 34.37 m		12		NR			BD,PL,SM,SA	1	2	16							
35				13		NR													
36																			
37		Limestone/Siltstone Layers: 38.28 m - 38.31 m, 39.30 m - 39.32 m																	
38		UCS = 24.4 MPa																	

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PROJECT: 1668740
 LOCATION: N 4835150.61; E 605617.31

RECORD OF BOREHOLE: 410C-4

SHEET 1 OF 5

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: March 20 to 22, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			
0		GROUND SURFACE		186.81												GR SA SI CL
0.10		FILL - (SP/GP) Sand and Gravel (100 mm)		0.00	1	SS	14									
0.8		FILL - (CL) Sandy SILTY CLAY, some gravel; brown; cohesive, w<PL, stiff to very stiff			2	SS	15									
0.8		- Trace organics at a depth of 0.8 m.			3	SS	20									
2.21		(CL) Gravelly Sandy SILTY CLAY; brown to grey (TILL); cohesive, w<PL, very stiff to hard		184.60	4	SS	23									
3.33					5	SS	33									
4.41					6	SS	41									20 28 36 16
5.52					7	SS	52									
7.11		(CL-ML) Sandy SILTY CLAY - CLAYEY SILT, trace gravel; grey (TILL); cohesive, w<PL, very stiff		179.70	8	SS	26									2 17 64 17
8.69		(SM) SILTY SAND, some gravel; grey (TILL); non-cohesive, moist, very dense		178.12	9	SS	74/0.28									
		CONTINUED NEXT PAGE														

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DEPTH SCALE

1 : 50



LOGGED: EN

CHECKED: DH/ARV

PROJECT: 1668740

LOCATION: N 4835150.61 ; E 605617.31

INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-4

DRILLING DATE: March 20 to 22, 2018

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

SHEET 3 OF 5

DATUM: UTM NAD 83

(ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY				FRACT. INDEX PER 0.25m	DISCONTINUITY DATA						WEATH- ERING INDEX I1 I2 I3 I4 I5 I6	Diametral Point Load Index (MPa)	FEATURES	PIEZOMETER			
							TOTAL CORE %	SOLID CORE %	R.Q.D. %			TYPE AND SURFACE DESCRIPTION												
							RECOVERY SYMBOLS	SOLID CORE SYMBOLS	R.Q.D. SYMBOLS			Jr	Ja	Js	Jd	Jc	Je							
													DIP W.r.t. CORE AXIS											
		Continued from Record of Borehole 410-C-4		173.07																				
14		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 14.70 m-14.72 m	[Symbolic Log]	13.74	1	NR								BD, PL, SM, SA BD, PL, SM, SA	1 2 16 1 2 16									
15					2	NR								BD, PL, SM, SO BD, UN, SM, SA CO, UN, SM, SA BD, PL, SM, SA BD, UN, SM, SA	1 1 16 2 2 16 2 2 16 2 2 16					BC BC LC BC				
16					3	NR								BD, UN, SM, PC, CL BD, PL, SM, PC, CL BD, PL, SM, PC, CL BD, PL, SM, PC, CL BD, CU, SM, SA	2 4 16 1 4 12 1 4 12 2 2 20									
17		Limestone/Siltstone Layers: 17.12 m-17.14 m, 17.20 m-17.26 m, 17.98 m-18.04 m			4	NR								BD, PL, SM, IN, CL	1 15 0									
18					4	NR								BD, UN, SM, SA BD, PL, SM, CC, CL BD, PL, SM, SA CO, PL, SM, SA	2 2 20 1 4 12 1 2 16 1 2 16					BC BC				
19		Limestone/Siltstone Layers: 19.40 m-19.44 m, 19.77 m-19.96 m			5	NR								BD, PL, SM, PC, CL BD, PL, SM, SA BD, PL, SM, SA	1 4 12 1 2 16 1 2 16							BC BC		
20		Limestone/Siltstone Layers: 20.94 m-20.96 m, 21.00 m-21.04 m, 21.12 m-21.25 m, 21.47 m-21.50 m			6	NR								CO, UN, RO BD, PL, SM, CC, CL BD, PL, SM, SA BD, PL, SM, PC, CL CO, UN, RO, SO	3 1 20 1 4 12 1 4 12 3 1 20							BC BC		
21					6	NR								CO, UN, RO CO, UN, SM, SO	3 1 20 2 1 20									
22		Limestone/Siltstone Layers: 21.50 m-21.53 m, 21.74 m-21.82 m, 21.92 m-22.12 m, 22.86 m-22.93 m			7	NR								CO, PL, SM, SA CO, UN, SM, PC, CL BD, UN, SM, SA	1 2 16 2 2 20 2 2 20							BC		
23		Limestone/Siltstone Layers: 23.42 m-23.44 m			8	NR								BD, UN, SM, SA BD, UN, SM, SA	2 2 20 2 2 20								BC	

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DEPTH SCALE

1 : 50



LOGGED: EN

CHECKED: DH/ARV

PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-4

SHEET 4 OF 5

LOCATION: N 4835150.61 ;E 605617.31

DRILLING DATE: March 20 to 22, 2018

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 75 Truck Mount

DRILLING CONTRACTOR: Davis Drilling

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	WEATHERING INDEX					Diametral Point Load Index (MPa)	FEATURES	PIEZOMETER
							TOTAL CORE %	SOLID CORE %					W1	W2	W3	W4	W5			
							00000000	00000000												
24		--- CONTINUED FROM PREVIOUS PAGE ---			8	NR														
25		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)			9	NR														
26		Limestone/Siltstone Layers: 26.50 m-26.56 m			10	NR														
27																				
28		Limestone/Siltstone Layers: 28.83 m-28.90 m			11	NR														
29		Limestone/Siltstone Layers: 30.46 m-30.42 m			12	NR							•	CO,PL,SM,SA	1	2	16			
30																				
31		Limestone/Siltstone Layers: 30.94 m-30.97 m, 31.51 m-31.57 m			13	NR							•	CO,UN,SM,SA	2	2	28			
31													•	BD,PL,SM,SA	1	2	16			
31													•	BD,UN,SM,SA	2	2	28			
33		UCS = 18.8 MPa			14	NR														

DEPTH SCALE
1 : 50



LOGGED: EN
CHECKED: DH/ARV

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PROJECT: 1668740
 LOCATION: N 4835150.61 ;E 605617.31
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-4

SHEET 5 OF 5
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: March 20 to 22, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER											
						RECOVERY		R.Q.D.	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATH- ERING INDEX				Diametral Point Load Index (MPa)													
					FLUSH RETURN	TOTAL CORE %	SOLID CORE %	%		TYPE AND SURFACE DESCRIPTION					Jr	Ja	Jzon	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	2	4	6		
		-- CONTINUED FROM PREVIOUS PAGE --																														
		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong Limestone/SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 34.38 m-34.40 m Limestone/Siltstone Layers: 35.62 m- 35.64 m Limestone/Siltstone Layers: 37.51 m-37.57 m, 37.87 m-37.6 m Limestone/Siltstone Layers: 39.16 m-39.18 m		15	NR								•	BD,PL,SM,SA	1	2	16															
															•	BD,PL,SM,SA	1	2	16													
															•	BD,PL,SM,SA	1	2	16													
															•	BD,PL,SM,SA	1	2	16													
				147.16 39.65																												
		END OF DRILLHOLE																														
		NOTE:																														
		1. NR - Not recorded																														

PROJECT: 1668740
 LOCATION: N 4835077.72; E 605623.90

RECORD OF BOREHOLE: 410C-5

SHEET 1 OF 5

BORING DATE: April 16 to 19, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. + rem V. ⊕ ⊙	Q - U - ⊙			
0		GROUND SURFACE		187.44								GR SA SI CL
		ASPHALT (300 mm)		0.00								
		FILL - (SW-GW) SAND and GRAVEL, some silt; brown; non-cohesive, moist, compact		187.14								
				0.30								
1		(CL) Sandy SILTY CLAY, some gravel; brown, becoming grey below a depth of 4.0 m (TILL); cohesive, w<PL, very stiff to hard		186.37	1A	SS	30					
				1.07	1B							
2					2	SS	28					
					3	SS	41					
3												
					4	SS	50					7 28 44 21
4												
5					5	SS	54					
6												
		- Containing silt and sand seams below a depth of 6.1 m.			6	SS	53					
7												
		(SC) Gravelly CLAYEY SAND, with plastic fines; grey (TILL); moist to wet, very dense		180.30								
				7.14								
8					7	SS	54/ 0.07					
9												
					8	SS	68					24 34 33 9
10												

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GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\PEEL\RD MISSISSAUGA\02 DATA\INTDERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT_19-5-24

DEPTH SCALE

1 : 50



LOGGED: MA

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835077.72; E 605623.90

RECORD OF BOREHOLE: 410C-5

SHEET 2 OF 5

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: April 16 to 19, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵				10 ⁻⁴	10 ⁻³
10	Power Auger 200 mm O.D. Hollow Stem Augers	--- CONTINUED FROM PREVIOUS PAGE --- (SC) Gravelly CLAYEY SAND, with plastic fines; grey (TILL); moist to wet, very dense														GR SA SI CL		
11				9	SS	92												
12		(ML/SM) SILT and SAND, trace gravel; grey; non-cohesive, wet, very dense		175.15 12.29	10A 10B	SS	50/ 0.10											
13				173.60														
14		Grey, SHALE For rock coring details refer to Record of Drillhole 410C-5.		11	SS	50/ 0.07												
15																		
16																		
17																		
18																		
19																		
20																		

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DEPTH SCALE
1 : 50



LOGGED: MA
CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835077.72 ;E 605623.90
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-5

SHEET 3 OF 5
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: April 16 to 19, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY													FEATURES	PIEZOMETER										
					RECOVERY		R.Q.D.	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			WEATHERING INDEX								Diameter Point Load Index (MPa)									
					TOTAL CORE %	SOLID CORE %	%	TYPE AND SURFACE DESCRIPTION			Jr	Ja	Jso	W1	W2	W3	W4				W5	W6							
					용량용량	용량용량	용량용량	DIP W/L CORE AXIS							1	2	3			4	5								
14	Continued from Record of Borehole 410-C-5 No Recovery		173.53 13.91	1	NR																					LC			
15	Moderately weathered to fresh, thinly laminated to medium bedded, grey, very fine to fine grained, slightly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)		172.95 14.49	2	NR																						BC		
16	Limestone/Siltstone Layers: 17.78 m-17.75 m, 17.77 m-17.82 m, 18.25 m-18.27 m, 18.33 m-18.36 m, 18.42 m-18.46 m			3	NR																							BC	
18	Limestone/Siltstone Layers: 18.74 m-18.87 m			4	NR																							Clay	
19	Limestone/Siltstone Layers: 20.5 m-21.73 m			5	NR																							BC Clay	
21	Limestone/Siltstone Layers: 21.9 m-21.94 m, 22 m-22.07 m, 22.24 m-22.26 m, 22.5 m-22.55 m, 23.12 m-23.14 m			6	NR																								
22	Limestone/Siltstone Layers: 23.66 m-23.72 m, 23.74 m-23.77 m, 24.06 m-24.11 m			7	NR																								
23				8	NR																								

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GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INT\DRY RD MISSISSAUGA.GPJ GAL-MISS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4835077.72 ; E 605623.90
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-5

SHEET 5 OF 5
 DATUM: UTM NAD 83 (ZONE 17N)

DRILLING DATE: April 16 to 19, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY													FEATURES	PIEZOMETER						
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA				WEATH- ERING INDEX											
						TOTAL CORE %	SOLID CORE %				Type and Surface Description	Jr	Ja	Jso	Jso	W1	W2	W3			W4	W5	W6	Diametral Point Load Index (MPa)		
34		-- CONTINUED FROM PREVIOUS PAGE -- Slightly weathered to fresh, very thin to thin laminated, grey, very fine to fine grained, slightly porous to non-porous, weak SHALE (Georgian Bay Formation)																								
35		Limestone/Siltstone Layers: 34.03 m-34.04 m, 34.65 m-34.67 m			15	NR																				
36		Limestone/Siltstone Layers: 36.03 m-36.05 m, 36.25 m-36.28 m, 36.56 m-36.60 m			16	NR																				
37	Rotary Drill HQ3 Core	Limestone/Siltstone Layers: 37.47 m-37.49 m, 38.42 m-38.49 m			17	NR																				
39		Limestone/Siltstone Layers: 38.58 m-38.59 m, 38.73 m-38.86 m			18	NR																				
40		END OF DRILLHOLE NOTE: 1. Ground water encountered at a depth of 12.3 m below ground surface (Elev. 175.1 m) during soil drilling. 2. NR - Not recorded		147.45 39.99																						

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PROJECT: 1668740
 LOCATION: N 4835076.10; E 605563.72

RECORD OF BOREHOLE: 410C-6

SHEET 1 OF 5

BORING DATE: March 21 to 22, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	WATER CONTENT PERCENT Wp W Wi	GRAIN SIZE DISTRIBUTION (%)		
0		GROUND SURFACE		187.50							GR SA SI CL
		TOPSOIL (75 mm)		0.00							
		FILL - (CL/CI) Sandy SILTY CLAY, some gravel; brown becoming grey at a depth of 3.1 m; containing organics and pieces of wood to a depth of 1.4 m; cohesive, w<PL, firm to very stiff		0.08	1 SS 8						
1					2 SS 24						
2					3 SS 27						
		(CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL, hard		185.29							7 25 44 24
				2.21	4 SS 42						
3					5 SS 49						
4		(CL/SC) SILTY CLAY and SAND, trace gravel; grey (TILL); cohesive, w<PL, very stiff to hard		183.39							4 36 43 17
				4.11	6 SS 34						
5					7 SS 23						
6					8 SS 50/0.05						
7					9 SS 50/0.07						
8		(SM) SILTY SAND, trace to some gravel; grey (TILL); non-cohesive, moist, very dense		180.34							
				7.16							
9											
10				177.57							

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DEPTH SCALE
1 : 50



LOGGED: SK
CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835076.10; E 605563.72

RECORD OF BOREHOLE: 410C-6

SHEET 2 OF 5

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: March 21 to 22, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 55 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			10 ⁻⁴
10	Power Auger 200 mm O.D. Hollow Stem Augers	-- CONTINUED FROM PREVIOUS PAGE -- (CL-ML) Sandy SILTY CLAY - CLAYEY SILT, some gravel; grey (TILL); cohesive, w<PL, hard		9.93											GR SA SI CL	
11				10	SS	67									10 34 42 14	
12		- Containing shale fragments below a depth of 12.2 m.														
13		- Auger grinding at a depth of 13.1 m.														
14		Grey, SHALE SHALE	173.80 13.70 13.79	12	SS	50/ 0.07										
		For rock coring details refer to Record of Drillhole 410C-6.														

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PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-6

SHEET 3 OF 5

LOCATION: N 4835076.10 ;E 605563.72

DRILLING DATE: March 21 to 22, 2018

DATUM: UTM NAD 83
(ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55 Track Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION			Jr	Ja				W1
						충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충			충충충충충	충충충충충
		Continued from Record of Borehole 410-C-6		173.71															
14		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)		13.79	1	NR													
15		Limestone/Siltstone Layers: 14.03 m-14.06 m, 14.16 m-14.18 m			2	NR													
16		Limestone/Siltstone Layers: 14.98 m-15.00 m, 15.59 m-15.61 m																	
17		Limestone/Siltstone Layers: 15.93 m-15.95 m, 17.00 m-17.04 m			3	NR													Clay
18		Limestone/Siltstone Layers: 17.93 m-17.97 m, 18.08 m-18.14 m, 18.23 m-18.27 m, 18.37 m-18.41 m, 18.60 m-18.64 m, 18.67 m-18.70 m			4	NR													BC
19		Limestone/Siltstone Layers: 19.08 m-19.21 m, 19.72 m-19.75 m, 19.91 m-19.93 m, 20.03 m-20.05 m,			5	NR													
20		Limestone/Siltstone Layers: 21.86 m-21.78 m																	BC
21		Limestone/Siltstone Layers: 21.78 m-22.10 m, 22.22 m-22.27 m, 22.30 m-22.38 m, 22.78 m-22.83 m, 23.08 m-23.21 m			6	NR													
22		Limestone/Siltstone Layers: 23.83 m-23.86 m, 23.90 m-23.91 m, 24.04 m-24.05 m, 24.26 m-24.28 m			7	NR													
23					8	NR													

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-6

SHEET 4 OF 5

LOCATION: N 4835076.10 ;E 605563.72

DRILLING DATE: March 21 to 22, 2018

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55 Track Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER				
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA			WEATHERING INDEX				Diametral Point Load Index (MPa)			
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION			Jr	Ja				Jzon	W1	W2
						충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충	충충충충충			충충충충충	충충충충충	충충충충충	충충충충충
24		--- CONTINUED FROM PREVIOUS PAGE ---		8		NR		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)		BD,UN,SM,SA		2 2 20									
25				9		NR				BD,PL,SM,SA		1 2 16									
26		Limestone/Siltstone Layers: 27.48 m-27.50 m, 27.58 m-27.65 m		10		NR				BD,PL,SM,SA BD,PL,SM,SA		1 2 16 1 2 16									
27				11		NR				BD,PL,SM,SO		1 1 16									
28		Limestone/Siltstone Layers: 28.09 m-28.11 m, 28.46 m-28.47 m, 28.73 m-28.75 m		12		NR				BD,PL,SM,SO BD,PL,SM,SA		1 1 16 1 2 16									
29				13		NR				BD,UN,SM,SA BD,PL,SM,SA		2 2 20 1 2 16									
30		Limestone/Siltstone Layers: 29.48 m-29.50 m, 29.63 m-29.65 m, 29.85 m-29.88 m, 30.14 m-30.20 m, 30.67 m-30.69 m		14		NR				BD,PL,SM,SO BD,PL,SM,IN,CL BD,PL,SM,SA BD,PL,SM,SO BD,PL,SM,SO		1 1 16 1 15 0 1 2 16 1 1 16 1 1 16									
31		Limestone/Siltstone Layers: 31.33 m-31.34 m, 31.46 m-31.49 m, 31.57 m-31.59 m, 31.79 m-31.83 m, 31.94 m-31.97 m		15		NR				BD,UN,SM,SA BD,PL,SM,SO		2 2 20 1 1 16									
32				16		NR				BD,PL,SM,SO BD,PL,SM,SA		1 1 16 1 2 16									
33		Limestone/Siltstone Layers: 32.69 m-32.73 m, 32.82 m-32.83 m, 32.99 m-33.01 m, 33.24 m-33.26 m, 33.58 m-33.59 m, 33.72 m-33.74 m		17		NR				BD,UN,SM,SO		2 1 20									
		UCS = 24.4 MPa		18		NR				BD,PL,SM,SA BD,PL,SM,SO BD,PL,SM,SO BD,PL,SM,SA		1 2 16 1 1 16 1 2 16 1 2 16									
		CONTINUED NEXT PAGE		19		NR				BD,PL,SM,SO		1 1 16									

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4835076.10 ;E 605563.72
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-6

SHEET 5 OF 5
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: March 21 to 22, 2018
 DRILL RIG: CME 55 Track Mount
 DRILLING CONTRACTOR: Davis Drilling

NOTE:
 For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	FLUSH RETURN	RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX	Diametral Point Load Index (MPa)	PIEZOMETER
							TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION							
							충충충충충	충충충충충			Jr	Ja	Jzon	W1	W2			
Rotary Drill HQ3 Core		--- CONTINUED FROM PREVIOUS PAGE ---		147.27	NR													
34		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)	[Symbolic Log]		14													
		Limestone/Siltstone Layers: 34.15 m-34.18 m, 34.29 m-34.28 m, 34.70 m, 34.72 m, 34.92 m-34.93 m			15													BC
		Limestone/Siltstone Layers: 35.15 m-35.16 m, 35.76 m-35.79 m, 35.80 m-35.81 m, 35.96 m-35.98 m			16													BC
		Limestone/Siltstone Layers: 36.79m-36.84 m			17													
		Limestone/Siltstone Layers: 37.48 m-37.50 m, 37.55 m-37.57 m, 37.72 m-37.76 m, 38.60 m-38.63 m			18													BC BC
		Limestone/Siltstone Layers: 38.69 m-38.79 m, 38.84 m-38.95 m, 39.14 m-39.22 m, 39.39 m-39.42 m, 39.56 m-39.61 m, 39.64 m-39.66 m, 39.97 m-39.98 m, 40.05 m-40.06 m			19													
40		END OF DRILLHOLE		40.23														
41		NOTE: 1. Borehole open and water level measured at 12.2 m below ground surface (Elev. 175.3 m) upon completion of augering. 2. NR - Not recorded																

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PROJECT: 1668740

RECORD OF BOREHOLE: 410C-7

SHEET 1 OF 6

LOCATION: N 4834993.32; E 605513.75

BORING DATE: March 15 to 16 and 19 to 21, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	WATER CONTENT PERCENT Wp, WI	GRAIN SIZE DISTRIBUTION (%)		
0		GROUND SURFACE		194.37							GR SA SI CL
		TOPSOIL (80 mm)		0.00							
		FILL - (SW-SM) SAND, some silt, some gravel; brown; non-cohesive, moist, compact		0.08	1 SS	11					
1		FILL - (CI) Sandy Gravelly SILTY CLAY; brown to grey; cohesive, w<PL to w>PL, firm to very stiff		193.68	2 SS	8					
				0.69							
2					3 SS	10					
					4 SS	6					20 23 37 20
3											
		- Rock fragments from 3.4 m to 3.7 m.			5 SS	11					
4											
					6 SS	11					Bentonite
5											
					7 SS	19					
6											
7		(CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL, very stiff to hard		187.34							
				7.03							
8					8 SS	41					6 26 46 22
9					9 SS	52					
10											

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GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INTDERRY RD MISSISSAUGA.GPJ GAL-MIS.GDT 19-5-24

DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4834993.32; E 605513.75

RECORD OF BOREHOLE: 410C-7

SHEET 2 OF 6

BORING DATE: March 15 to 16 and 19 to 21, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT							
10	Power Auger 200 mm O.D. Hollow Stem Augers	-- CONTINUED FROM PREVIOUS PAGE -- (CL) Sandy SILTY CLAY, some gravel; grey (TILL); cohesive, w<PL, very stiff to hard (SC) Gravelly CLAYEY SAND, with plastic fines; grey (TILL); moist, very dense		10	SS	28											
11				11	SS	33											
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	

DEPTH SCALE
1 : 50



LOGGED: SK
CHECKED: DH/ARV

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INT\DERRY_RD_MISSISSAUGA.GPJ GAL-MIS.GDT 19-5-24

PROJECT: 1668740
 LOCATION: N 4834993.32; E 605513.75

RECORD OF BOREHOLE: 410C-7

SHEET 3 OF 6

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

BORING DATE: March 15 to 16 and 19 to 21, 2018

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 55 Track Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa	nat V. + rem V. ⊕ ⊙	Q - U -		
20	Power Auger 200 mm O.D. Hollow Stem Augers	-- CONTINUED FROM PREVIOUS PAGE -- (SC) Gravelly CLAYEY SAND, with plastic fines; grey (TILL); moist, very dense									GR SA SI CL
21				173.03 21.34	17	SS	50 / 0.10				
22		SHALE, grey			171.43 22.94	18	SS	50 / 0.08			
23		For rock coring details refer to Record of Drillhole 410C-7.									
24											
25											
26											
27											
28											
29											
30											

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DEPTH SCALE
1 : 50



LOGGED: SK
CHECKED: DH/ARV

PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-7

SHEET 4 OF 6

LOCATION: N 4834993.32 ;E 605513.75

DRILLING DATE: March 15 to 16 and 19 to 21, 2018

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55 Track Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)
						TOTAL CORE %	SOLID CORE %	%	DIP W/L CORE AXIS	TYPE AND SURFACE DESCRIPTION			Jr	Ja	W1			
23		Continued from Record of Borehole 410-C-7		171.43														
23		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)		22.94	1	NR												
24		Limestone/Siltstone Layers: 23.08 m-23.17 m, 23.45 m-23.51 m			2	NR												
25					3	NR												
26					4	NR												
27		Limestone/Siltstone Layers: 26.70 m-26.75 m, 27.08 m-27.11 m			5	NR												
28		Limestone/Siltstone Layers: 27.96 m-28.02 m, 28.74 m-28.78 m, 29.30 m-29.38 m			6	NR												
29					7	NR												
30		Limestone/Siltstone Layers: 29.55 m-29.62 m, 30.25 m-30.40 m, 30.82 m-30.90 m			8	NR												
31		Limestone/Siltstone Layers: 31.09 m-31.11 m, 31.45 m-31.57 m, 32.37 m-32.39 m			9	NR												
32					10	NR												

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740

RECORD OF DRILLHOLE: 410C-7

SHEET 5 OF 6

LOCATION: N 4834993.32 ; E 605513.75

DRILLING DATE: March 15 to 16 and 19 to 21, 2018

DATUM: UTM NAD 83 (ZONE 17N)

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME 55 Track Mount

DRILLING CONTRACTOR: Davis Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX					
						TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	Jr	Ja	Jz	W1	W2			W3	W4	W5
						FLUSH RETURN			TYPE AND SURFACE DESCRIPTION											
--- CONTINUED FROM PREVIOUS PAGE ---																				
33		Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation) UCS = 115.6 MPa			8	NR											BC Sand			
34		Limestone/Siltstone Layers: 34.03 m-34.40 m, 34.50 m-34.59 m, 34.66 m-34.70 m, 34.92 m-35.05 m, 35.15 m-35.18 m, 35.30 m-35.38 m, 35.48 m-35.65 m			9	NR											BC			
35																	Screen			
36		Limestone/Siltstone Layers: 35.83 m-35.85 m, 36.39 m-36.48 m			10	NR											BC			
37		Limestone/Siltstone Layers: 38.17 m-38.21 m															Bentonite and Sand			
38					11	NR														
39					12	NR														
40		Limestone/Siltstone Layers: 39.78 m-39.84 m			13	NR											BC			
41		Limestone/Siltstone Layers: 40.31 m-40.36 m, 40.60 m-40.70 m															LC Grout			
42		Limestone/Siltstone Layers: 41.85 m-41.92 m, 42.00 m-42.08 m, 42.23 m-42.32 m			14	NR											BC			
					15	NR											BC			

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DEPTH SCALE

1 : 50



LOGGED: SK

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4834993.32 ;E 605513.75
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-7

DRILLING DATE: March 15 to 16 and 19 to 21, 2018
 DRILL RIG: CME 55 Track Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 6 OF 6
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER					
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX					Diametral Point Load Index (MPa)				
						TOTAL CORE %	SOLID CORE %		DIP W/L CORE AXIS		TYPE AND SURFACE DESCRIPTION			Jr	Ja	Jzon	W1				W2	W3	W4	W5
						●●●●●●	●●●●●●	●●●●●●	●	●	●	●	●	●	●	●	●			●	●	●	●	●
43	Rotary Drilling HQ3 Core	-- CONTINUED FROM PREVIOUS PAGE --																						
44			Slightly weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)		NR													BC						
			Limestone/Siltstone Layers: 43.58 m-43.60 m, 43.83 m-43.85 m, 44.82 m-44.85 m, 44.61 m-44.68 m		NR		●	BD,UN,RO,SO	3	1	25										BC	Grout		
		END OF DRILLHOLE		149.69 44.68																				
45		NOTES:																						
46		1. Groundwater level recorded in open borehole at a depth of 21.2 m below ground surface (Elev. 173.2 m) upon completion of soil drilling																						
47		2. Groundwater level recorded at a depth of about 3.7 m below ground surface (Elev. 190.7 m) upon completion of well installation (March 20, 2018)																						
48		3. NR - Not recorded																						
49																								
50																								
51																								
52																								

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PROJECT: 1668740

RECORD OF BOREHOLE: 410C-8

SHEET 1 OF 5

LOCATION: N 4834893.63; E 605464.63

BORING DATE: March 15 to 16, 19, 21, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20 40 60 80	10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³	WATER CONTENT PERCENT		
0		GROUND SURFACE		191.74							GR SA SI CL
		ASPHALT (150 mm)		0.00							
		FILL - (SP /GP) Gravelly SAND to SAND and GRAVEL; brown to grey; non-cohesive, dry to moist, compact to very dense		0.15	1 SS 76						
1		- Silty clay seam at a depth of 1.2 m.			2A SS 24						
		- Containing rock fragments at a depth of 1.5 m.			2B SS 24						
2					3 SS 50 / 0.07						
3					4 SS 48						
4					5 SS 23						
4		(CI) Gravelly Sandy SILTY CLAY; grey; cohesive, w<PL, stiff		187.62 4.12							
5					6 SS 13						30 16 35 19
6		(SM) SILTY SAND, trace gravel; brown; non-cohesive, moist, compact		186.24 5.50							
7		- Containing silty clay seams below a depth of 6.4 m.			7 SS 10						
8		(CL) Sandy SILTY CLAY, some gravel; brown becoming grey at a depth of 9.1 m (TILL); cohesive, w<PL, vey stiff to hard		184.58 7.16							9 28 50 13
9					8 SS 30						
10		- Containing sandy silt pocket at a depth of 9.1 m.			9 SS 74						
		CONTINUED NEXT PAGE									

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DEPTH SCALE

1 : 50



LOGGED: EN

CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4834893.63; E 605464.63

RECORD OF BOREHOLE: 410C-8

SHEET 2 OF 5

BORING DATE: March 15 to 16, 19, 21, 2018

DATUM: UTM NAD 83
(ZONE 17N)

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck Mount

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40			60	80
10		-- CONTINUED FROM PREVIOUS PAGE --									GR SA SI CL		
10.21 - 181.53		(CL/SC) SILTY CLAY and SAND, some gravel; grey (TILL); cohesive, w<PL, hard	[Hatched pattern]	181.53 10.21									
11					10	SS	45				7 36 41 16		
12													
12.21 - 178.53		(SC) CLAYEY SAND, some gravel, with plastic fines; grey (TILL); moist to wet, very dense	[Hatched pattern]	178.53 12.21									
13					11	SS	80						
14													
14.25 - 98 / 0.25					12	SS	98 / 0.25						
15													
16					13	SS	56				9 41 39 11		
17													
17.14 - 174.60		Grey, SHALE	[Dotted pattern]	174.60 17.14	14	SS	99 / 0.23						
18													
18.36 - 173.38		For rock coring details refer to Record of Drillhole 410C-8.	[Dotted pattern]	173.38 18.36	15	SS	50 / 0.08						
19													
20													

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PROJECT: 1668740
 LOCATION: N 4834893.63 ;E 605464.63
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-8

SHEET 3 OF 5
 DATUM: UTM NAD 83
 (ZONE 17N)

DRILLING DATE: March 15 to 16, 19, 21, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Driling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA				WEATHERING INDEX				Diametral Point Load Index (MPa)			
						TOTAL CORE %	SOLID CORE %			TYPE AND SURFACE DESCRIPTION		Jr	Js	Jz	W1	W2	W3		W4		
		Continued from Record of Borehole 410-C-8		173.38																	
19		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation)		18.36	1	NR														LC	
20		Limestone/Siltstone Layers: 20.8 m-20.91 m, 21 m-21.04 m, 21.24 m-21.26 m, 21.35 m-21.4 m			2	NR														LC	
21		Limestone/Siltstone Layers: 21.57 m-21.6 m, 21.84 m-21.9 m, 22.14 m-22.18 m, 22.28 m-22.31 m, 22.36 m-22.46 m, 22.63 m-22.65 m			3	NR														BC	
22		Limestone/Siltstone Layers: 23.25 m-23.31 m, 0.75 m-23.8 m, 24.02 m-24.1 m, 24.13 m-24.2 m, 24.27 m-24.39 m			4	NR														Clay	
23		Limestone/Siltstone Layers: 24.81 m-24.85 m, 25.25 m-25.3 m, 25.34 m-25.38 m, 25.41 m-25.46 m			5	NR															
24		Limestone/Siltstone Layers: 26.52 m-26.57 m, 26.87 m-26.9 m			6	NR															
25		Limestone/Siltstone Layers: 27.74 m-27.78 m, 28.63 m-28.68 m			7	NR														Gouge	

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DEPTH SCALE
 1 : 50



LOGGED: EN
 CHECKED: DH/ARV

PROJECT: 1668740
 LOCATION: N 4834893.63 ;E 605464.63
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-8

DRILLING DATE: March 15 to 16, 19, 21, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 4 OF 5
 DATUM: UTM NAD 83 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES	PIEZOMETER	
						RECOVERY			FRACT. INDEX PER 0.25m	DISCONTINUITY DATA					WEATHERING INDEX							
						TOTAL CORE %	SOLID CORE %	R.Q.D. %		DIP W/L CORE AXIS		TYPE AND SURFACE DESCRIPTION			Jr	Ja	Jso	W1	W2			W3
-- CONTINUED FROM PREVIOUS PAGE --																						
29		Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 29.58 m-29.62 m, 29.94 m-30 m, 30.32 m-30.4 m			7	NR																
30		Limestone/Siltstone Layers: 30.69 m-30.71 m, 30.74 m-30.76 m			8	NR																
31					9	NR																
32					10	NR																
33					11	NR																Clay
34		Limestone/Siltstone Layers: 33.9 m-33.92 m, 35.1 m-35.19 m			12	NR																
35		UCS = 22.6 MPa			13	NR																BC
36		Limestone/Siltstone Layers: 35.2 m-35.3 m, 36.44 m-36.47 m			14	NR																
37		Limestone/Siltstone Layers: 37.08 m-37.09 m, 37.23 m-37.26 m, 37.38 m-37.41 m, 37.45 m-37.52 m, 37.69 m-37.73 m, 37.75 m-37.81 m, 37.98 m-38 m			15	NR																
38		Limestone/Siltstone Layers: 38.46 m-38.49 m			16	NR																

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PROJECT: 1668740
 LOCATION: N 4834893.63 ;E 605464.63
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: 410C-8

DRILLING DATE: March 15 to 16, 19, 21, 2018
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 5 OF 5
 DATUM: UTM NAD 83 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES	PIEZOMETER						
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W/L CORE AXIS	DISCONTINUITY DATA			WEATH-ERING INDEX				Diametral Point Load Index (MPa)					
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	Jzon	W1				W2	W3	W4	W5	W6
						00000000	00000000																
		-- CONTINUED FROM PREVIOUS PAGE -- Moderately weathered to fresh, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE/SILTSTONE (Georgian Bay Formation) Limestone/Siltstone Layers: 39.96 m-39.98 m, 40.19 m-40.22 m, 40.35 m-41.22 m - Crushed shale at a depth of 40.25 m mechanically Limestone/Siltstone Layers: 41.22 m-41.29 m, 41.32 m-41.37 m, 41.52 m-41.58 m, 42 m-42.03 m, 42.21 m-42.29 m, 42.37 m-42.39 m, 42.45 m-42.49 m																					
39					14	NR																	
40	Relay Drill HC3 Core				15	NR						1	4	12									
41																							
42					16	NR											BC						
				148.92																			
		END OF DRILLHOLE		42.82																			
43		NOTE: 1. NR - Not recorded																					
44																							
45																							
46																							
47																							
48																							

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PROJECT: 1668740
 LOCATION: N 4834799.73; E 605406.18

RECORD OF BOREHOLE: S4-17

SHEET 1 OF 3
 DATUM: UTM NAD 83
 (ZONE 17N)

BORING DATE: November 1, 2019
 DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT						
								Cu, kPa		nat V. + rem V. ⊕	Q - U - ⊙	Wp	W				Wi	Wi
0		GROUND SURFACE		189.05												GR SA SI CL		
		Borehole was advanced from ground surface to approximate top of bedrock without sampling.		0.00														
1																		
2																		
3																		
4																		
5	Power Auger Hollow Steam Augers																	
6																		
7																		
8																		
9																		
10																		

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PROJECT: 1668740
 LOCATION: N 4834799.73; E 605406.18

RECORD OF BOREHOLE: S4-17

SHEET 2 OF 3

BORING DATE: November 1, 2019

DATUM: UTM NAD 83
(ZONE 17N)

DRILL RIG: CME 75 Truck Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		WATER CONTENT PERCENT				
								20	40	60	80	10 ⁻⁶	10 ⁻⁵			
10	Power Auger Hollow Steam Augers	--- CONTINUED FROM PREVIOUS PAGE ---													GR SA SI CL	
11		Borehole was advanced from ground surface to approximate top of bedrock without sampling.														
12																
13																
14																
15																
16																
17		SHALE		172.34 16.71												
18		For rock coring details refer to Record of Drillhole S4-17.														
19																
20																

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\REGION OF PEEL\DERRY RD MISSISSAUGA\02 DATA\INT\DERRY RD MISSISSAUGA.GPJ GAL-MIS.GDT 20-2-4

PROJECT: 1668740
 LOCATION: N 4834799.73 ;E 605406.18
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: S4-17

DRILLING DATE: November 1, 2019
 DRILL RIG: CME 75 Truck Mount
 DRILLING CONTRACTOR: Davis Drilling

SHEET 3 OF 3
 DATUM: UTM NAD 83
 (ZONE 17N)

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	PIEZOMETER		
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA				WEATH- ERING INDEX					Diametral Point Load Index (MPa)	
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION		Jr	Ja	Jso	I1	I2				I3
						용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용	용용용용용용			용용용용용용	용용용용용용
		Continued from Record of Borehole S4-17		172.34																	
17	Rotary Diamond Drill HQ3 Core	Slightly weathered, laminated to medium bedded, grey to dark grey, fine to very fine grained, faintly porous, weak to medium strong SHALE with interbeds of medium strong to extremely strong LIMESTONE or SILTSTONE (Georgian Bay Formation)		16.71	1																
18		Limestone/Siltstone Layers: 16.71 m - 16.80 m, 16.92 m - 17.09 m			2																
19		Limestone/Siltstone Layers: 17.09 m - 17.12 m, 17.15 m - 17.25 m, 17.66 m - 17.74 m, 18.03 m - 18.05 m, 18.48 m - 18.61 m			3																
20		Limestone/Siltstone Layers: 19.38 m - 19.39 m, 19.56 m - 19.58 m, 19.70 m - 19.77 m, 19.93 m - 20.16 m																			
21		Limestone/Siltstone Layers: 20.24 m - 20.34 m, 20.37 m - 20.48 m, 20.70 m - 21.01 m, 21.08 m - 21.10 m, 21.31 m - 21.34 m, 21.52 m - 21.59 m			4																
		END OF DRILLHOLE		167.39 21.66																	

(Axial)
(Diametric)

GTA-RCK 046 S:\CLIENTS\REGION OF PEEL\DERRYS RD MISSISSAUGA\02 DATA\GINT\DERRYS RD MISSISSAUGA.GPJ GAL-MISS.GDT 20-2-4

DEPTH SCALE
1 : 50



LOGGED: SK
CHECKED: DH

PROJECT: 09-1111-6069

RECORD OF BOREHOLE: BH-12

SHEET 1 OF 1

LOCATION: N 4824903.62; E 603203.24

BORING DATE: August 12, 2010

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. + rem V. ⊕ ⊖		Q - U - ⊙		Wp			W
0		GROUND SURFACE		182.44													
		TOPSOIL		0.00	1	50 DO	50										
1	CME-75 Truck-Mount Power Augers 108 mm I.D. Hollow Stem Augers	Very stiff, moist, reddish brown clayey silt, trace to some sand, trace gravel (FILL)		181.94													
				0.50	2	50 DO	24									CHEM	
2		Very stiff to hard, moist, brown and grey SILTY CLAY, some sand, trace gravel, containing organics (TILL)		180.92													
				1.52	3	50 DO	15										
				179.70		2.74	4	50 DO	62								
3		Weathered, reddish brown SHALE		179.16													
				3.28	5	50 DO	50/.08								CHEM		
4	END OF BOREHOLE - REFER TO RECORD OF DRILLHOLE BH-12 FOR CORING DETAILS																
5	NOTES:																
	1. Borehole dry upon completion of drilling.																
	2. An additional borehole was drilled south-east of Borehole BH-12 as a result of change in the Manhole 7 location; Refer to Record of Borehole and Drillhole BH-12A.																
	3. Refer to Record of Drillhole BH-12 for bedrock details from a depth of 3.28 m to 35.25 m below ground surface.																

DEPTH SCALE

1 : 50



LOGGED: SB

CHECKED: TZ/HJ

GTA-BHS 001 09-1111-6069 (GDR-SOIL).GPJ GAL-MIS.GDT 07/18/12_CD

PROJECT: 09-1111-6069

RECORD OF BOREHOLE: BH-12A

SHEET 1 OF 1

LOCATION: N 4824892.38; E 603212.17

BORING DATE: April 14, 2011

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								20 40 60 80		nat V. + Q - rem V. ⊕ U - ⊙		10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³		Wp ----- W ----- Wi			
0	CME-75 Truck-Mount Power Augers 108 mm I.D. Hollow Stem Augers	GROUND SURFACE		182.48													
		TOPSOIL		0.00													
1		Stiff, moist brown clayey silt, trace to some sand (FILL)		181.87	0.61												
		Stiff to hard, moist, brown, SILTY CLAY, some sand, trace to some gravel, containing organics (TILL)		181.11	1.37	1A	50 DO	13									
2		Weathered, reddish brown SHALE		180.04	2.44	1B	50 DO	38									
3					2	50 DO											
					3	50 DO	0.10										
4		END OF BOREHOLE - REFER TO RECORD OF DRILLHOLE BH-12A FOR CORING DETAILS		178.78													
5		NOTES:		3.70													
6		1. Borehole dry upon completion of drilling.															
7		2. Water level measurements in piezometers:															
8		Date Depth (m) Elev (m)															
9		10/13/11 3.63 178.85															
10		10/27/11 3.91 178.57															
		03/07/12 5.28 165.76															
		3. Refer to Record of Drillhole BH-12A for bedrock details from a depth of 3.70 m to 70.06 m below ground surface and complete piezometer installation details.															

GTA-BHS 001 09-1111-6069 (GDR-SOIL).GPJ GAL-MIS.GDT 07/18/12_CD

DEPTH SCALE

1 : 50



LOGGED: TZ

CHECKED: TZ

PROJECT: 09-1111-6069

RECORD OF BOREHOLE: BH-13

SHEET 1 OF 2

LOCATION: N 4824012.87; E 604161.81

BORING DATE: July 27, 2010

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴		
0		GROUND SURFACE		168.46											
		TOPSOIL		168.00											
		Stiff to hard, dry, reddish brown to brown clayey silt to silty clay, some sand, trace gravel, containing rootlets (FILL)		168.28	1A	50	DO	13							
1				0.18	1B	DO									
				167.01	2	50	DO	53							
2		Hard to very stiff, moist, reddish brown silty clay, trace gravel, trace sand, containing rootlets, wood pieces, asphalt fragments and shale fragments (FILL)		1.45	3	50	DO	56							
					4A	50	DO	19							
					4B	DO									
3					5	50	DO	16							
4					6	50	DO	16							
5					7	50	DO	18							
6				162.36	8	50	DO	18							
		Very stiff, moist, reddish brown, CLAYEY SILT, trace sand (Residual Soil)		6.10											
7				161.45											
		Weathered, reddish brown SHALE with grey LIMESTONE interlayers		7.01											
8					9	50	DO	94							
9				159.29											
		END OF BOREHOLE - REFER TO RECORD OF DRILLHOLE BH-13 FOR CORING DETAILS		9.17											
10		NOTES: 1. Water level observed at a depth of _____													

DEPTH SCALE

1 : 50



LOGGED: TZ

CHECKED: SB/HJ

GTA-BHS 001 09-1111-6069 (GDR-SOIL) GPJ GAL-MIS.GDT 07/18/12 CD

PROJECT: 09-1111-6069

RECORD OF BOREHOLE: BH-13

SHEET 2 OF 2

LOCATION: N 4824012.87; E 604161.81

BORING DATE: July 27, 2010

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION																																																		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT																																																						
								20	40	60	80	nat V. +	rem V. ⊕	Q - ●			U - ○	Wp	W	Wi																																														
10		-- CONTINUED FROM PREVIOUS PAGE --																																																																
11		7.3 m below ground surface (Elev. 161.16 m) during drilling. 2. An additional borehole was drilled about 2 m east of Borehole BH-13 to install a piezometer. 3. Water level measurements in piezometer: <table style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th>Date</th> <th>Depth (m)</th> <th>Elev. (m)</th> </tr> </thead> <tbody> <tr><td>08/09/10</td><td>6.69</td><td>161.77</td></tr> <tr><td>08/23/10</td><td>6.71</td><td>161.75</td></tr> <tr><td>09/08/10</td><td>6.71</td><td>161.75</td></tr> <tr><td>10/06/10</td><td>6.72</td><td>161.74</td></tr> <tr><td>11/04/10</td><td>6.73</td><td>161.73</td></tr> <tr><td>12/15/10</td><td>6.73</td><td>161.73</td></tr> <tr><td>02/14/11</td><td>6.74</td><td>161.72</td></tr> <tr><td>03/25/11</td><td>6.70</td><td>161.76</td></tr> <tr><td>05/09/11</td><td>6.60</td><td>161.86</td></tr> <tr><td>06/20/11</td><td>6.65</td><td>161.81</td></tr> <tr><td>07/18/11</td><td>6.67</td><td>161.79</td></tr> <tr><td>08/28/11</td><td>6.72</td><td>161.74</td></tr> <tr><td>09/21/11</td><td>6.75</td><td>161.71</td></tr> <tr><td>09/27/11</td><td>6.54</td><td>161.92</td></tr> <tr><td>03/07/12</td><td>6.64</td><td>161.82</td></tr> </tbody> </table>			Date	Depth (m)	Elev. (m)	08/09/10	6.69	161.77	08/23/10	6.71	161.75	09/08/10	6.71	161.75	10/06/10	6.72	161.74	11/04/10	6.73	161.73	12/15/10	6.73	161.73	02/14/11	6.74	161.72	03/25/11	6.70	161.76	05/09/11	6.60	161.86	06/20/11	6.65	161.81	07/18/11	6.67	161.79	08/28/11	6.72	161.74	09/21/11	6.75	161.71	09/27/11	6.54	161.92	03/07/12	6.64	161.82														
Date	Depth (m)	Elev. (m)																																																																
08/09/10	6.69	161.77																																																																
08/23/10	6.71	161.75																																																																
09/08/10	6.71	161.75																																																																
10/06/10	6.72	161.74																																																																
11/04/10	6.73	161.73																																																																
12/15/10	6.73	161.73																																																																
02/14/11	6.74	161.72																																																																
03/25/11	6.70	161.76																																																																
05/09/11	6.60	161.86																																																																
06/20/11	6.65	161.81																																																																
07/18/11	6.67	161.79																																																																
08/28/11	6.72	161.74																																																																
09/21/11	6.75	161.71																																																																
09/27/11	6.54	161.92																																																																
03/07/12	6.64	161.82																																																																
12		4. Refer to Record of Drillhole BH-13 for bedrock details from a depth of 9.17 m to 50.88 m below ground surface.																																																																
13																																																																		
14																																																																		
15																																																																		
16																																																																		
17																																																																		
18																																																																		
19																																																																		
20																																																																		

DEPTH SCALE

1 : 50



LOGGED: TZ

CHECKED: SB/HJ

GTA-BHS 001 09-1111-6069 (GDR-SOIL) GPJ GAL-MIS.GDT 07/18/12_CD

PROJECT: 09-1111-6069

RECORD OF BOREHOLE: BH-14

SHEET 1 OF 2

LOCATION: N 4823870.45; E 604307.38

BORING DATE: June 7, 2010

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		WATER CONTENT PERCENT		WATER CONTENT PERCENT			
								20	40	60	80	10 ⁻⁶	10 ⁻⁵		
0		GROUND SURFACE		167.90											
		TOPSOIL		0.00											
		Dense, moist, brown sand and gravel, trace clay (FILL)		0.09	1	50 DO	33								
		Stiff, moist, brown to reddish brown SILTY CLAY, trace gravel, trace sand		167.29											
				0.61	2	50 DO	14								
					3	50 DO	13								
					4	50 DO	14								
				164.85											
		Dense to very dense, moist, reddish brown SAND and SILT, trace gravel, trace clay (TILL)		3.05	5	50 DO	37							CHEM	
					6	50 DO	37								
					7	50 DO	63/.13							MH	Bentonite Grout
				162.57											10/27/11
		Very dense, moist, reddish brown silty SAND and GRAVEL, trace to some clay (TILL)		5.33											
					8	50 DO	62/.15							MH	
				160.28											
		Hard, moist to wet, reddish brown SILTY CLAY, trace gravel, trace sand (TILL)		7.62	9	50 DO	51/.15							CHEM	
					10	50 DO	50/.09								
		Wet below a depth of 9.14 m													
															Bentonite

CONTINUED NEXT PAGE

GTA-BHS 001 09-1111-6069 (GDR-SOIL).GPJ GAL-MIS.GDT 07/18/12_CD

DEPTH SCALE

1 : 50



LOGGED: SB

CHECKED: TZ/HJ

PROJECT: 09-1111-6069

RECORD OF BOREHOLE: BH-14

SHEET 2 OF 2

LOCATION: N 4823870.45; E 604307.38

BORING DATE: June 7, 2010

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE			SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m										
								SHEAR STRENGTH Cu, kPa		nat V. + Q - rem V. ⊕ U - ⊙		WATER CONTENT PERCENT Wp — W — Wi					
10		157.08	11	50 DO	50/.05										Screen		
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	

--- CONTINUED FROM PREVIOUS PAGE ---
 Hard, moist to wet, reddish brown SILTY CLAY, trace gravel, trace sand (TILL)

Weathered, grey SHALE noted in tip of split spoon in Sample No. 11

END OF BOREHOLE - REFER TO RECORD OF DRILLHOLE BH-14 FOR CORING DETAILS

NOTES:

1. Water level observed at a depth of 9.1 m below ground surface (Elev. 158.80 m) during drilling.

2. Water level measurements in piezometer:

Date	Depth (m)	Elev. (m)
07/05/10	5.24	162.66
07/21/10	5.30	162.60
07/30/10	5.29	162.61
08/09/10	5.33	162.57
08/23/10	5.33	162.57
09/08/10	5.34	162.56
10/06/10	5.32	162.58
11/04/10	5.26	162.64
12/15/10	5.33	162.57
02/14/11	5.40	162.50
03/25/11	5.30	162.60
05/09/11	4.83	163.07
06/20/11	5.00	162.90
07/18/11	5.15	162.75
08/28/11	5.23	162.67
09/21/11	5.30	162.60
10/27/11	4.97	162.93
03/07/12	4.99	162.91

3. Refer to Record of Drillhole BH-14 for bedrock details from a depth of 10.82 m to 58.08 m below ground surface and complete piezometer installation details.

GTA-BHS 001 09-1111-6069 (GDR-SOIL).GPJ GAL-MIS.GDT 07/18/12_CD

DEPTH SCALE

1 : 50



LOGGED: SB

CHECKED: TZ/HJ

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES							
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX									
						TOTAL CORE %	SOLID CORE %		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2	W3	W4		W5	W6					
		Continued from Record of Borehole BH-12		179.16																				
4		3.28 - 6.24 m: Slightly to moderately weathered, thinly laminated, reddish brown and greenish grey banded, fine grained, non to fairly porous, extremely weak to very weak, SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) layers		178.97	1																		Lc Ci/Br Ci/Br Ci/Br	
5		LST layers >2.5cm 3.47 - 3.50 m 3.57 - 3.67 m 3.74 - 3.78 m Total LST in run#1: ~15%		177.71																			Bc	
6				176.20	2																			
7		6.24 - 9.30 m: Fresh to slightly weathered, thinly laminated, reddish brown and greenish grey banded, fine grained, non to faintly porous, very weak SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) layers		174.66	3																		Lc Bc Bc	
8		LST layers > 2.5cm 9.25 - 9.29 m Total LST in run#4: <5%		173.19	4																		Lc Bc	
9				172.75																				
10		9.30 - 29.75 Fresh, thinly laminated, reddish brown and greenish grey banded, fine grained, non to faintly porous, weak SHALE of the QUEENSTON FORMATION interbedded with occasional LIMESTONE (LST) layers		171.59	5																			
11		LST layers >2.5cm 9.30 - 9.35 m 9.41 - 9.43 m 9.69 - 9.74 m Total LST in run#5: ~15% Total LST in run#6: < 5%		170.07	6																			
12				169.18	7																			
13		LST layers > 2.5 cm 12.45 - 12.47 m 12.59 - 12.62 m 13.26 - 13.31 m 13.62 - 13.67 m Total LST in run#7: ~15%																						
		CONTINUED NEXT PAGE																						

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/AMK

PROJECT: 09-1111-6069-01

RECORD OF DRILLHOLE: BH-12

SHEET 2 OF 4

LOCATION: N 4824903.6 ;E 603203.2

DRILLING DATE: AUGUST 19, 2010

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES						
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec				WEATHERING INDEX					
							TOTAL CORE %	SOLID CORE %				Type and Surface Description	Jr	Ja	10	10		10	10	W1	W2	W3	W4
-- CONTINUED FROM PREVIOUS PAGE --																							
14		LST layers > 2.5 cm 14.27 - 14.30 m 14.45 - 14.49 m 14.54 - 14.58 m 14.85 - 14.89 m 14.97 - 15.00 m 15.08 - 15.10 m 15.22 - 15.25 m Total LST in run#8: ~20%		168.82 168.54 168.17	7						JA,UN,SM JA,CU,SM CA,PL,SM BA,UN,SM											Lc	
15		LST layers > 2.5 cm 15.63 - 15.65 m 15.69 - 15.72 m 16.16 - 16.20 m 16.32 - 16.36 m Total LST in run#9: ~15%		167.59 167.01 166.81	8						CA,CU,SM CA,PL,SM BA,CU,SM												
16		LST layers > 2.5 cm 16.96 - 17.01 m 17.22 - 17.25 m 17.33 - 17.36 m 17.43 - 17.52 m 17.62 - 17.75 m Total LST in run#10: ~30%		166.28 165.49 165.22	9						JA,CU,SM,SA,CI CA,UN,SM CA,UN,SM BA,UN,SM												
17		LST layers > 2.5 cm 19.44 - 19.48 m Total LST in run#11: ~5%		163.97 163.00	10						BA,UN,SM BA,PL,SM,CT,CI BA,CU,SM,SA,CI BA,UN,SM,CT,CI JA,UN,SM,SA,CI JA,UN,SM,SA,CI JA,CU,SM BA,CU,SM,IN,CI/Br,25 mm JA,UN,SM,SA,CI JA,CU,SM,CT,CI JA,UN,SM JA,UN,SM JA,ST,SM BA,UN,SM											Br/Go	
18		LST layers > 2.5 cm 20.82 - 20.84 m 21.05 - 21.1 m 21.46 - 21.51 m Total LST in run#12: ~15%		162.44 161.62 161.39	11						BA,UN,SM BA,CU,SM,SA,CI BA,UN,SM,SA,CI												
19		LST layers > 2.5 cm 22.69 - 22.76 m 23.04 - 23.05 m Total LST in run#13: ~10%		160.98 159.75	12						BA,CU,SM,IN,CI,5 mm BA,PL,SM,IN,CI/Go,20 mm												Go
20		LST layers > 2.5 cm 23.28 - 23.31 m		159.40 159.16	13						BA,CU,SM BA,PL,PO												
CONTINUED NEXT PAGE																							

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/ MK

DEPTH SCALE 1 : 50



LOGGED: AH CHECKED: AH

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX			
						TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	10 ⁰	10 ¹	10 ²	W1		W2
--- CONTINUED FROM PREVIOUS PAGE ---																			
24		23.56 - 23.67 m 23.69 - 23.76 m 23.81 - 23.87 m 23.96 - 24.02 m Total LST in run#14: ~10%		158.88	14														
		LST layers >2.5 cm 25.07 - 25.11 m 25.45 - 25.47 m 25.52 - 25.61 m 25.9 - 25.94 m 25.96 - 25.98 m Total LST in run#15: ~25%		157.86															
25				157.37															
				156.99	15														
				156.54															
26		LST layers >2.5 cm 26.93 - 26.95 m 26.99 - 27.01 m 27.04 - 27.06 m 27.2 - 27.22 m 27.26 - 27.28 m 27.3 - 37.32 m Total LST in run#16: ~20%		155.51	16														
				154.82															
27				154.46															
				154.02	17														
28		LST layers >2.5 cm 27.98 - 28 m 28.17 - 28.13 m 28.42 - 28.48 m 28.49 - 28.55 m 28.57 - 28.63 m 28.64 - 28.69 m 28.77 - 28.81 m 28.93 - 29.06 m Total LST in run#17: ~45%		151.75															
				151.22	19														
29		SST layers >2.5 cm 29.32 - 29.37 m 29.48 - 29.56 m 29.62 - 29.66 m 29.71 - 29.75 m 29.9 - 30.04 m 30.3 - 30.36 m 30.51 - 30.56 m Total LST in run#18: ~40%		150.24															
30		SST layers >2.5 cm 29.41 - 29.43 m 30.21 - 30.24 m 30.45 - 30.51 m Total SST in run#18: ~15%			20														
31		FOSS LST layers >2.5 cm 30.69 - 30.75 m																	
32																			
33																			
CONTINUED NEXT PAGE																			

GTA-RCK 031_09-1111-6069.GPJ GAL-MASS.GDT 05/11/12 BR/AMK

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES					
							RECOVERY		R.Q.D.	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec		WEATHERING INDEX							
							TOTAL CORE %	SOLID CORE %	%			Jr	Ja	10 ⁰	10 ¹	10 ²	10 ³		W1	W2	W3	W4	W5
							○○○○○○○	○○○○○○○	○○○○○○○	○	○	○	○	○	○	○	○		○	○	○	○	○
-- CONTINUED FROM PREVIOUS PAGE --																							
	HQ-3 Btr / HQ Rods Triple Tube Sampling	30.8 - 30.84 m 30.91 - 30.96 m 31.22 - 31.26 m 30.29 - 30.32 m 30.36 - 30.39 m Total FOSS LST in run#19: ~30%	[Symbolic Log]	148.41																			
		LST layers >2.5 cm 30.34 - 30.36 m Total LST in run#19: ~10% mostly in thin beds FOSS LST layers >2.5 cm 32.27 - 32.42 m 32.52 - 32.66 m 32.88 - 32.93 m 33.02 - 33.05 m 33.13 - 33.23 m 33.6 - 33.65 m Total FOSS LST in run#20: ~45%	[Symbolic Log]	148.08																			
		32.27 - 32.42 m 32.52 - 32.66 m 32.88 - 32.93 m 33.02 - 33.05 m 33.13 - 33.23 m 33.6 - 33.65 m Total FOSS LST in run#20: ~45%	[Symbolic Log]	147.28																			
		LST layers >2.5 cm 32.79 - 32.88 m 32.93 - 32.99 m 33.08 - 33.12 m 33.4 - 33.43 m Total LST in run#20: ~20% FOSS LST layers >2.5 cm 34.03 - 34.05 m 34.47 - 34.55 m 35.16 - 35.2 m Total FOSS LST in run#21: ~15%	[Symbolic Log]																				
		LST layers >2.5 cm 34.36 - 34.38 m 34.63 - 34.7 m 34.74 - 34.89 m 34.9 - 34.92 m Total LST in run#21: ~30% END OF DRILLHOLE	[Symbolic Log]																				
		END OF DRILLHOLE	[Symbolic Log]																				

PROJECT: 09-1111-6069-01

RECORD OF DRILLHOLE: BH-12A

SHEET 2 OF 7

LOCATION: N 4824892.4 ; E 603212.2

DRILLING DATE: APRIL 15 to MAY 5, 2011

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

NOTE:

For abbreviations, symbols and descriptions refer to **LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY**

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY													FEATURES					
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY			WEATHERING INDEX								
						TOTAL CORE %	SOLID CORE %				Type and Surface Description	Jr	Ja	K ₁₀	K ₅	K ₁	W1	W2		W3	W4	W5	W6	
--- CONTINUED FROM PREVIOUS PAGE ---																								
14		LST layers >2.5cm 14.28 - 14.35 m Total LST in run#8: ~6%	[Symbolic Log]	168.20	7																			
15		LST layers >2.5cm 16.12 - 16.28 m Total LST in run#9: ~11%	[Symbolic Log]		8																			
16		15.59 - 29.60 m: Fresh to Slightly weathered, thinly laminated, reddish brown and grey banded, fine grained, faintly to non-porous, weak to very weak, SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) and FOSSILIFEROUS LIMESTONE (FOSS LST) layers	[Symbolic Log]	166.36 166.20	9																			
17		LST layers >2.5cm 17.12 - 17.26 m 17.36 - 17.47 m 17.63 - 17.73 m 18.12 - 18.17 m Total LST in run#10: ~26%	[Symbolic Log]	165.36																				
18		FOSS LST layers >2.5 cm 20.82 - 20.87 m Total FOSS LST in run#12: ~3%	[Symbolic Log]	164.36	10																			
19	HQ-3 Bit / HQ Rods Triple Tube Sampling	LST layers >2.5 cm 20.23 - 20.37 m 21.38 - 21.45 m Total LST in run#12: ~14%	[Symbolic Log]		11																			
20			[Symbolic Log]	162.25																				
21			[Symbolic Log]	161.66	12																			
22		FOSS LST layers >2.5 cm 21.83 - 21.94 m Total FOSS LST in run#13: ~7%	[Symbolic Log]	161.10																				
22		FOSS LST layers >2.5 cm 23.62 - 23.81 m Total FOSS LST in run#14: ~13%	[Symbolic Log]	160.65																				
23			[Symbolic Log]		13																			
			[Symbolic Log]	158.86	14																			
CONTINUED NEXT PAGE																								

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/ MK

DEPTH SCALE

1 : 50



LOGGED: TZ, MS, MK

CHECKED: AH

PROJECT: 09-1111-6069-01
 LOCATION: N 4824892.4 ; E 603212.2
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: BH-12A

SHEET 3 OF 7
 DATUM: NAD83

DRILLING DATE: APRIL 15 to MAY 5, 2011
 DRILL RIG: CME-75
 DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES							
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			HYDRAULIC CONDUCTIVITY K, cm/sec				WEATHERING INDEX						
							TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	Jr	Ja	10 ¹⁰	10 ¹⁰	10 ¹⁰		10 ¹⁰	W1	W2	W3	W4	W5	W6
							용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용		용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용	용용용용용용용용
-- CONTINUED FROM PREVIOUS PAGE --																								
24		FOSS LST layers >2.5 cm 25.32 - 25.56 m Total FOSS LST in run#15: ~16%		158.67	14																			
25				157.16																				
26		FOSS LST layers >2.5 cm 27.42 - 27.51 m Total FOSS LST in run#16: ~6%		156.92	15																			
27		LST layers >2.5 cm 27.17 - 27.21 m Total LST in run#16: ~2.5%																						
				155.31	16																			
				155.06																				
28		FOSS LST layers >2.5 cm 28.32 - 28.86 m 28.96 - 29.08 m Total FOSS LST in run#17: ~43%		154.37	17																			
		LST layers >2.5 cm 28.11 - 28.19 m Total LST in run#17: ~5%																						
				153.62	18																			
29		FOSS LST layers >2.5 cm 29.38 - 29.41 m 29.85 - 29.97 m 30.17 - 30.40 m Total FOSS LST in run#18: ~37%		153.10																				
		LST layers >2.5 cm 29.60 - 29.70 m 29.77 - 29.80 m 30.12 - 30.15 m Total LST in run#18: ~15%		152.88																				
		Run #19 Fresh, thinly laminated, grey, fine grained with occasional medium to coarse grained calcitic clasts, faintly to non-porous, weak to very weak, SHALE of the GEORGIAN BAY FORMATION interbedded with LIMESTONE (LST) and FOSSILIFEROUS LIMESTONE (FOSS LST) layers		152.08	19																			
		Run #20 FOSS LST layers >2.5 cm 30.87 - 30.96 m		151.61	20																			
		Run #21 FOSS LST layers >2.5 cm 30.96 - 31.03 m Total FOSS LST in run#20: ~29%		151.12																				
		Run #22 FOSS LST layers >2.5 cm 31.36 - 31.44 m 31.95 - 32.01 m 32.35 - 32.54 m 32.61 - 32.72 m Total FOSS LST in run#21: ~30%		150.53	21																			
		Total LST in run#21: ~7%		150.13																				
		Run #23 FOSS LST layers >2.5 cm 33.01 - 33.07 m Total FOSS LST in run#22: ~9%		149.94	22																			
		Total LST in run#22: ~7%																						
		CONTINUED NEXT PAGE																						

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK



PROJECT: 09-1111-6069-01

RECORD OF DRILLHOLE: BH-12A

SHEET 4 OF 7

LOCATION: N 4824892.4 ; E 603212.2

DRILLING DATE: APRIL 15 to MAY 5, 2011

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES			
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX				
							TOTAL CORE %	SOLID CORE %		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2	W3		W4	W5	W6
-- CONTINUED FROM PREVIOUS PAGE --																				
34		LST layers >2.5 cm 32.86 - 32.91 m 33.10 - 33.17 m Total LST in run#22: ~10% FOSS LST layers >2.5 cm 34.64 - 34.37 m 35.09 - 35.13 m 35.35 - 35.39 m 35.68 - 35.71 m Total FOSS LST in run#23: ~10%		148.18	22															
35		LST layers >2.5 cm 34.30 - 34.37 m 34.45 - 34.49 m 34.68 - 34.78 m 34.80 - 34.96 m Total LST in run#23: ~24% FOSS LST layers >2.5 cm 35.80 - 35.85 m 37.24 - 37.32 m Total FOSS LST in run#24: ~12% Total LST in run#24: ~2%		147.13 146.80	23 24															
36																				
37				145.24																
38		Run #25 FOSS LST layers >2.5 cm 37.35 - 37.52 m 38.12 - 38.24 m		144.36	25															
39	HQ-3 Bit / HQ Rods Triple Tube Sampling																			
40																				
41		Total FOSS LST in run#27: ~12%		142.12																
42				141.15	27															
43		Run #28 FOSS LST layers >2.5 cm 42.06 - 42.13 m 42.53 - 42.65 m 42.90 - 42.97 m 43.35 - 43.40 m		140.42 139.95 139.58	28															
44		Run #29 FOSS LST layers >2.5 cm		139.13	29															
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GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE

1 : 50



LOGGED: TZ, MS, MK

CHECKED: AH

PROJECT: 09-1111-6069-01

RECORD OF DRILLHOLE: BH-12A

SHEET 6 OF 7

LOCATION: N 4824892.4 ;E 603212.2

DRILLING DATE: APRIL 15 to MAY 5, 2011

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES		
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX			
							TOTAL CORE %	SOLID CORE %		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	10 ⁰	10 ¹	10 ²		W1	W2
-- CONTINUED FROM PREVIOUS PAGE --																			
54					35														
55					36														
56		Run #37 FOSS LST layers >2.5 cm 55.85 - 56.13 m		126.63 126.35	37					CO,PL,SM	1	1							
57										BO,PL,PO,CT,Gy	0.5	4							
58		Run #38 DOLOSTONE 57.99 - 58.05 m		124.49	38					BD,PL,SM	1	1							
59	HQ-3 Bit / HQ Rods Triple Tube Sampling				39														
60																			
61		Run #40 DOLOSTONE 60.25 - 60.52 m 60.65 - 60.81 m		122.23 121.96	40					BO,PL,SM CO,PL,SM BO,PL,SM	1 1 1	1 1 1							
62					41					BO,PL,SM	1	1							
63					42					BO,PL,SM	1	1							
CONTINUED NEXT PAGE																			

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE

1 : 50



LOGGED: TZ, MS, MK

CHECKED: AH

PROJECT: 09-1111-6069-01

RECORD OF DRILLHOLE: BH-12A

SHEET 7 OF 7

LOCATION: N 4824892.4 ;E 603212.2

DRILLING DATE: APRIL 15 to MAY 5, 2011

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX			
						TOTAL CORE %	SOLID CORE %				Type and Surface Description	Jr	Ja	10 ⁻⁶	10 ⁻⁵	10 ⁻⁴	W1		W2
-- CONTINUED FROM PREVIOUS PAGE --																			
64		Run #42 FOSS LST layers >2.5 cm 64.06 - 64.13 m		118.42															
				42															
65						43													
66																			
67	HQ-3 Bit / HQ Rods Triple Tube Sampling						44												
68							45												
69																			
70				112.42															
71		END OF DRILLHOLE																	
72		NOTE: 1. Rock samples were collected from depths of 3.50m and 48.0m below ground surface and submitted for chemical analysis.																	
73																			

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE

1 : 50



LOGGED: TZ, MS, MK

CHECKED: AH

RECORD OF DRILLHOLE: BH-13

NOTE:
For abbreviations, symbols and descriptions refer to
LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN NO.	FLUSH RETURN	RECOVERY										DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY			WEATHERING INDEX			FEATURES		
							TOTAL CORE %		SOLID CORE %		R.Q.D. %		FRACT INDEX PER 0.25m	DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	K _v	K _h	K _z	W1	W2	W3	W4		W5	W6
							RECOVERY	RECOVERY	RECOVERY	RECOVERY	RECOVERY	RECOVERY															
Continued from Record of Borehole BH-13																											
9.17 - 10.93 m: Slightly to moderately weathered, reddish brown and grey banded, fine grained, non to faintly porous, very weak SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) layers																											
LST layers >2.5cm 9.25 - 9.30 m Total LST in run#1: ~27%																											
LST layers >2.5cm 9.92 - 9.97 m 10.40 - 10.44 m Total LST in run#2: ~10%																											
10.93 - 12.45 m: Fresh to slightly weathered, red, fine grained, non to faintly porous, very weak SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) layers																											
LST layers >2.5cm 11.28 - 11.32 m 11.59 - 11.66 m 11.91 - 11.99 m Total LST in run#3: ~19%																											
12.45 - 19.87 m: Fresh, reddish brown and grey banding, fine grained, non to faintly porous, very weak SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) and FOSSILIFEROUS LIMESTONE (FOSS LST) layers																											
LST layers >2.5cm 13.08 - 13.22 m 13.35 - 13.44 m 13.65 - 13.68 m Total LST in run#4: ~20%																											
LST layers >2.5cm 14.10 - 14.22 m 15.42 - 15.45 m Total LST in run#5: ~17%																											
LST layers >2.5cm 15.63 - 15.70 m 15.73 - 15.80 m 16.85 - 16.98 m Total LST in run#6: ~16%																											
FOSS LST layers >2.5cm 15.70 - 15.73 m 16.41 - 16.58 m 16.69 - 16.83 m Total FOSS LST in run#6: ~23%																											
LST layers >2.5cm 17.30 - 17.41 m 17.75 - 17.82 m 18.41 - 18.50 m Total LST in run#7: ~16%																											
FOSS LST layers >2.5cm 18.02 - 18.06 m 18.53 - 18.57 m 18.58 - 18.66 m Total FOSS LST in run#7: ~12%																											
FOSS LST layers >2.5cm 18.66 - 18.71 m 18.80 - 18.85 m 18.88 - 19.06 m																											

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/AMK

PROJECT: 09-1111-6069-01
 LOCATION: N 4824012.9 ; E 604161.8
 INCLINATION: -90° AZIMUTH: ---

RECORD OF DRILLHOLE: BH-13

SHEET 5 OF 5
 DATUM: NAD83

DRILLING DATE: JULY 29, 2010
 DRILL RIG: CME-75
 DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES			
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec				WEATHERING INDEX		
						TOTAL CORE %	SOLID CORE %				Jr	Ja	10 ⁰	10 ¹	10 ²		10 ³	W1	W2
-- CONTINUED FROM PREVIOUS PAGE --																			
50	HQ-3 Bit / HQ Rods Triple Tube Sampling	LST layers >2.5cm 49.47 - 49.50 m 50.70 - 50.76 m Total LST in run#28: ~12%	[Symbolic Log]	118.99 118.72	28	[Recovery]	[R.Q.D.]	[Fract. Index]	[DIP]	[Discontinuity]	[Hydraulic]	[Weathering]	Lc						
		FOSS LST layers >2.5cm 49.74 - 49.79 m Total FOSS LST in run#28: ~4%	[Symbolic Log]	117.76															
51		END OF DRILLHOLE																	
52																			
53																			
54																			
55																			
56																			
57																			
58																			
59																			

DEPTH SCALE
 1 : 50



LOGGED: BR/TZ
 CHECKED: AH

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/IMK

PROJECT: 09-1111-6069-01

RECORD OF DRILLHOLE: BH-14

SHEET 3 OF 5

LOCATION: N 4823870.5 ; E 604307.4

DRILLING DATE: JUNE 7 TO 22, 2010

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES						
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec				WEATHERING INDEX					
						TOTAL CORE %	SOLID CORE %				Type and Surface Description	Jr	Ja	10 ¹⁰	10 ⁹		10 ⁸	W1	W2	W3	W4	W5
--- CONTINUED FROM PREVIOUS PAGE ---																						
31				137.05	16																	
				136.63																		
				136.43																		
				136.18																		
32				135.78	17																	
				135.43																		
				134.16																		
33					18																	
34					19																	
35		LST layers >2.5cm 36.05 - 36.29 m Total LST in run#19: ~20%		132.75	20																	
				131.85																		
				131.61																		
				131.18																		
36	HQ-3 Bit / HQ Rods Triple Tube Sampling				21																	
				130.54																		
				129.65																		
				129.15																		
37		LST layers >2.5cm 37.36 - 37.53 m Total LST in run#20: ~15%			22																	
				128.15																		
				127.93																		
				127.53																		
38		LST layers >2.5cm 38.75 - 38.78 m 38.81 - 38.85 m 38.91 - 39.07 m 39.10 - 39.14 m Total LST in run#21: ~15%			22																	
39					22																	
40		LST layers >2.5cm 39.97 - 40.02 m 40.18 - 40.37 m 41.11 - 41.37 m Total LST in run#22: ~32%			22																	
CONTINUED NEXT PAGE																						

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE

1 : 50



LOGGED: SB/AH/BR

CHECKED: AH

PROJECT: 09-1111-6069-01

RECORD OF DRILLHOLE: BH-14

SHEET 5 OF 5

LOCATION: N 4823870.5 ; E 604307.4

DRILLING DATE: JUNE 7 TO 22, 2010

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY											FEATURES						
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			HYDRAULIC CONDUCTIVITY K, cm/sec			WEATH- ERING INDEX							
						TOTAL CORE %	SOLID CORE %			DIP W/PL CORE AXIS	Jr	Ja	Jc	10 ⁰	10 ¹	10 ²		W1	W2	W3	W4	W5	W6
--- CONTINUED FROM PREVIOUS PAGE ---																							
51		Total LST in run#29: ~7%			29																		
52		Total LST in run#30: ~12% FOSS LST layers >2.5cm 52.91 - 52.95 LST in run#30: ~3%		115.92																			
53				114.99	30																		
54		Total LST in run#31: ~13%		114.37																			
55	HQ-3 Btr / HQ Rods Triple Tube Sampling				31																		
56		LST layers >2.5cm 55.56 - 55.61 m 55.89 - 55.98 m 56.17 - 56.23 m Total LST in run#32: ~50%		112.34																			
				112.01	32																		
				111.73																			
				111.34																			
57		LST layers >2.5cm 56.71 - 56.78 m 57.23 - 57.26 m Total LST in run#33: ~25%		110.87																			
		FOSS LST layers >2.5cm 57.03 - 57.10 m Total FOSS LST in run#33: ~5%		110.67	33																		
58		END OF DRILLHOLE		109.82																			
59		NOTE: 1. Rock samples were collected from depths of 11.65 m and 48.10 m below ground surface and submitted for chemical analysis.																					
60																							

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MLK

DEPTH SCALE

1 : 50



LOGGED: SB/AH/BR

CHECKED: AH

RECORD OF BOREHOLE 07-025A

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 31, 2009
 COMPLETED : July 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.07							
		TOPSOIL: (50mm)		150.00							
1		Clayey SILT, some sand, trace gravel, occasional cobble Very Stiff Brown (FILL)			1	SS	17				
		With broken shale pieces			2	SS	17				
2					3	SS	16				
					4	SS	19				
3					5	SS	15				
					6	SS	2				
4		SAND, trace to some gravel, some silt Very Loose to Loose Brown Damp		147.34 3.73	6	SS	2	Grain Size Analysis: G 1%/ Sa 84%/ Si & Cl 15%			
5					7	SS	4				
6					8	SS	10				
					9	SS	8				
7		SHALE, highly weathered Grey		144.21 144.86 6.96	10	SS	50/ 100				▽
8		END OF BOREHOLE AT 6.9m. BOREHOLE OPEN AND WATER LEVEL AT 6.4m UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE TO 2.1m, THEN CUTTINGS TO SURFACE.									
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.07.31

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-001

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		154.04							
		TOPSOIL: (75mm)		150.88							
1		Silty CLAY, some sand, trace gravel, trace roots and rootlets Stiff Brown (FILL)		153.43	1	SS	9				
		SAND, trace to some gravel, trace silt, trace clay Loose Brown Moist (FILL)		0.61	2	SS	6				
2					3	SS	6				
3		SHALE, weathered, thinly bedded, with limestone layers Grey		151.60	4	SS	78/275				
		END OF BOREHOLE AT 2.8m UPON AUGER REFUSAL ON PROBABLE LIMESTONE LAYER. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		2.44 151.25 2.79							
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/10/09

RECORD OF BOREHOLE 09-002

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 7, 2009
 COMPLETED : April 7, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		159.67							
		ASPHALT: (125mm)		158.88							
1		SAND and GRAVEL, some silt Compact Brown Damp (FILL)			1 AS						
					1 SS	23					
2		Becoming loose			2 SS	27					
3					3 SS	4	Grain Size Analysis: Gr 38%/Sa 48%/Si & Cl 14%				
					4 SS	7					
4		Silty CLAY, some sand, trace gravel Firm Brown (TILL)		156.04 3.63							
				155.43 4.24							
5		SHALE, highly weathered Brown Grey		154.64 5.03	5 SS	100/ .150					
6		END OF BOREHOLE AT 5.0m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.									
7		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 DRY - 2009.05.05 DRY - 2009.05.21 DRY -									

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-003

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 7, 2009
 COMPLETED : April 7, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		159.84								
1		TOPSOIL (100mm) Silty CLAY, some sand, trace gravel, trace organics Firm Brown (FILL)		159.84 159.00 0.10	1	SS	4					
2		SAND and GRAVEL, silty Compact Light Brown Moist (FILL)		158.62 1.22	2	SS	11					
3		Silty CLAY, some sand, trace gravel, occasional shale fragments Very Stiff Grey (FILL)		157.93 1.91	3	SS	20	Grain Size Analysis: Gr 35%/ Sa 44%/ Si & Cl 21%				
4		Silty CLAY, some sand, trace gravel, occasional shale fragments Very Stiff Brown (TILL)		157.25 2.59	4	SS	18					
5		SHALE, highly weathered, thinly bedded, weak, grey, with medium strong to very strong limestone interbeds		155.24 4.60	6	SS	50/ 150				FI	
6		Limestone layers (greater than 50mm): 50mm at 4.7m 90mm at 4.9m 325mm at 5.2m 50mm at 6.9m 75mm at 7.0m			1	NQ		TCR=100%, SCR=35%, RQD=30%			52	174
7		Clay seams: 100mm at 4.6m 75mm at 4.8m 125mm at 5.0m			2	NQ		TCR=100%, SCR=57%, RQD=47%			190	
8		Rubble zone: 150mm at 5.5m 50mm at 6.4m 50mm at 7.0m										
9		Subvertical fracture at 5.2m, 5.9m, 6.0m, 6.3m, 6.7m, 7.0m and 7.5m Moderately weathered			3	NQ		TCR=100%, SCR=67%, RQD=53%			26	
10		Limestone layers (greater than 50mm): 100mm at 8.4m 75mm at 8.8m 75mm at 8.9m 75mm at 9.9m			4	NQ		TCR=100%, SCR=100%, RQD=95%			9 32	100
11		Subvertical fracture at 8.1m, 8.3m, 8.8m and 8.9m Moderately to slightly weathered		149.60 10.24							112	111
12		END OF BOREHOLE AT 10.2m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.						All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-004

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 8, 2009
 COMPLETED : April 8, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - rem V - Cpen		
		GROUND SURFACE		160.37							
1		TOPSOIL (125mm) Gravelly SAND Brown Moist (FILL)		160.09 0.13	1	AS					
1		Silty CLAY, some sand, trace gravel, occasional shale fragments Stiff Grey (FILL)		159.60 0.76	1	SS	12				
2		Silty CLAY, some sand, trace gravel Stiff to Very Stiff Brown (TILL)		158.16 2.21	2	SS	14				
3					3	SS	13				
4		With shale and limestone fragments			4	SS	18	Grain Size Analysis: Gr 0%/ Sa 13%/ Si 48%/ Cl 39%			
5		SHALE, highly weathered, weak to very weak, thinly bedded, with medium strong to very strong limestone interbeds, grey		155.54 4.82	5	SS	50/100				
6		Limestone layers (greater than 50mm): 100mm at 5.6m 75mm at 5.7m 150mm at 5.9m 125mm at 6.1m 100mm at 6.7m 125mm at 7.6m			1	NQ		TCR=94%, SCR=33%, RQD=21%			
7		Clay seams: 100mm at 5.4m Becoming moderately weathered			2	NQ		TCR=100%, SCR=92%, RQD=63%			
8					3	NQ		TCR=100%, SCR=88%, RQD=70%			
9		Slightly weathered									
10		Limestone layers (greater than 50mm): 100mm at 8.9m 125mm at 9.2m 100mm at 9.4m 50mm at 10.3m 75mm at 10.4m 75mm at 10.8m 50mm at 11.8m 50mm at 11.9m 100mm at 12.1m			4	NQ		TCR=100%, SCR=97%, RQD=97%			
11											
12		Subvertical fractures at 8.3m, 8.5m and 9.6m			5	NQ		TCR=100%, SCR=98%, RQD=98%			
13		END OF BOREHOLE AT 12.2m. BOREHOLE BACKFILLED BENTONITE TO SURFACE.		148.15 12.22							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-005

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 13, 2009
 COMPLETED : April 13, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		160.83							
		TOPSOIL, trace roots and rootlets (50mm)		160.82							
1		SAND and GRAVEL, some clay Brown Moist (FILL)		160.14	1	AS					
				0.69							
2		Silty CLAY, some sand, trace gravel, occasional organics Firm to Stiff Brown (FILL)			1	SS	10				
		Layer of sand (200mm) Occasional brick fragments			2	SS	6				
3					3	SS	9				
4		Sandy zone			4	SS	12				
5		SHALE, highly weathered, thinly bedded, very weak to medium strong, with medium strong to very strong limestone interbeds Grey		156.73	5	SS	80/200				
				4.10	6	SS	50/100				
6						SS	50/100				
7		Limestone layers (greater than 50mm): 50mm at 6.6m 65mm at 6.9m 100mm at 8.0m Rubble zone (100mm) at 6.4m			1	NQ		TCR=90%, SCR=0%, RQD=0%			
		Becoming slightly weathered									
8		Clay seam (25mm) at 8.1m			2	NQ		TCR=100%, SCR=100%, RQD=93%			
9											
10											
11		Becoming fresh Limestone layers (greater than 50mm): 100mm at 10.2m 75mm at 10.4m 75mm at 10.6m 50mm at 10.8m			4	NQ		TCR=100%, SCR=98%, RQD=97%			
		150mm at 11.0m 100mm at 11.4m 75mm at 11.9m 150mm at 12.3m 160mm at 12.6m 100mm at 12.9m 175mm at 13.1m 75mm at 13.4m Sub-vertical fracture at 11.3m									
12											
13					5	NQ		TCR=100%, SCR=85%, RQD=85%			
14					6	NQ		TCR=100%, SCR=88%, RQD=88%			
		END OF BOREHOLE AT 14.6m. BOREHOLE BACKFILLED WITH		146.25							
				14.58							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-005

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 13, 2009
 COMPLETED : April 13, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●	Q - ✕	Cpen ▲		
				BENTONITE TO SURFACE.							WATER CONTENT, PERCENT wp -----○----- wl 10 20 30 40			
16														
17														
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



THURBER2S(REV) 1160.GPJ 6/10/09

RECORD OF BOREHOLE 09-006

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 13, 2009
 COMPLETED : April 13, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ●, rem V - ●, Q - ✕, Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ○ w wl		
		GROUND SURFACE		160.71							
		ASPHALT (75mm)		160.88							
1		SAND and GRAVEL, some silt Brown Moist (FILL)		160.02	1	AS					
				0.69							
		Silty CLAY, some sand, trace gravel Very Stiff to Stiff Brown (FILL)			1	SS	25				
2					2	SS	12				
3		Occasional asphalt fragments			3	SS	11				
				157.74							
		Silty CLAY, some sand, trace gravel, trace limestone and shale fragments, occasional oxide lenses Hard Brown (TILL)(CI)		2.97	4	SS	35	Grain Size Analysis: Gr 5%/ Sa 16%/ Si 54%/ Cl 25%			
4				156.90							
				3.81	5	SS	70/ .175				
5		SHALE, highly weathered, occasional limestone interbeds Grey			6	SS	50/ .075				
6				154.59							
		END OF BOREHOLE AT 6.1m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m, THEN CUTTINGS TO 0.1m THEN ASPHALT TO SURFACE.		6.12	7	SS	50/ .025				
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



RECORD OF BOREHOLE 09-007

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 13, 2009
 COMPLETED : April 13, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES		COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER		TYPE	Blows/0.3m		
		GROUND SURFACE		161.15						
		PAVING STONE (50mm)		160.80						
1		SAND and GRAVEL, some silt Brown Moist (FILL)		160.46	1	AS				Concrete
		Silty CLAY, some sand, trace gravel, occasional cobbles Very Stiff Brown (FILL)		159.93	1	SS	70/ 225			19mm PVC Pipe
2		Gravelly SAND, some clay, some silt, occasional cobbles Very Dense to Compact Brown Moist (FILL)		158.33	2	SS	50/ 075			159.02
3		Silty CLAY, some sand, trace gravel Very Stiff to Hard Brown (FILL)		156.67	3	SS	24			Bentonite
4		Occasional oxide staining		155.00	4	SS	20			157.49
5		SHALE, highly weathered, thinly bedded, occasional limestone interbeds Grey		155.00	5	SS	72			Sand Filter
6		END OF BOREHOLE AT 6.15m. BOREHOLE OPEN AND DRY UPON COMPLETION. Piezometer installation consists of 19mm diameter pipe. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.14 5.9 155.2 2009.05.05 5.5 155.6 2009.05.21 5.7 155.4		155.00	6	SS	56/ .150			156.58
7				155.00	7	SS	50/ .050			Slotted Screen
8				155.00						155.05
9										
10										
11										
12										
13										
14										

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



RECORD OF BOREHOLE 09-008

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		160.99							
1		SAND and GRAVEL, some silt Brown Moist (FILL)		160.30	1	AS	12				
2		Silty CLAY, some sand, trace gravel, occasional limestone fragments Stiff to Hard Brown (FILL)		158.01	2	SS	42				
3		Silty CLAY, some sand, trace gravel, occasional limestone and shale fragments Very Stiff to Hard Brown (TILL)		157.59	3	SS	13				
4		SHALE, highly weathered, thinly bedded, weak to medium strong, with medium strong to very strong limestone interbeds Grey		158.01 2.97	4	SS	25				
5		Rubble zones (100mm) at 4.7m and 5.0m Clay seam (100mm) at 5.5m		157.59 3.40	5	SS	50/100				
6		Clay zones: 50mm at 5.3m 50mm at 5.8m 50mm at 7.1m			1	NQ		TCR=94%, SCR=94%, RQD=0%			Fi
7		Moderately weathered			2	NQ		TCR=100%, SCR=16%, RQD=0%			8
8		Rubble zone (50mm) at 8.9m Limestone layer (150mm) at 7.5m			3	NQ		TCR=100%, SCR=0%, RQD=0%			10 >20
9		Limestone layer (50mm) at 9.3m			4	NQ		TCR=100%, SCR=53%, RQD=50%			12 31x 137 81 189
10		Slightly weathered			5	NQ		TCR=100%, SCR=100%, RQD=83%			5 3 4 >20
11		Clay zone (50mm) at 10.4m Limestone layers (greater than 50mm): 250mm at 10.5m 50mm at 11.4m 50mm at 11.8m 150mm at 11.9m 250mm at 12.9m 220mm at 13.3m 50mm at 13.6m			6	NQ		TCR=100%, SCR=97%, RQD=97%	75+		1 2 1 0 1 6 4 0 0
12					7	NQ		TCR=90%, SCR=90%, RQD=90%			1 4 3 0 1 1 0 0
13					8	NQ		TCR=100%, SCR=100%, RQD=100%			1 1 1 0 1 1 0 0
14		END OF BOREHOLE AT 13.6m. Piezometer installation consists of 19mm diameter pipe. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.14 9.3 151.7 2009.05.05 6.6 154.4 2009.05.05 8.5 152.5		147.42 13.56							151.08 149.56 148.03 147.42

THURBER2S(REV) 1160.GPJ 7/9/09

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 DEEP/DUAL INSTALLATION
 WATER LEVEL (date) 2009.05.21
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR



RECORD OF BOREHOLE 09-009

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲ 40 80 120 160		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40		
		GROUND SURFACE		163.00							
		Silty SAND Grey Moist (FILL)		0.00	1	AS					
1		Silty CLAY, some sand, trace gravel and Silty SAND, some clay, some gravel, occasional cobbles and wood fragments Very Stiff/Compact to Very Loose Grey (FILL)		162.39 0.61	1	SS	26				
2					2	SS	11	Grain Size Analysis: Gr 10%/ Sa 41%/ Si 31%/ Cl 18%			
3					3	SS	2				
4		Silty CLAY, some sand to sandy, trace gravel Firm to Stiff Brown (TILL)		160.03 2.97	4	SS	8				
5		END OF BOREHOLE UPON AUGER REFUSAL AT 4.9m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		158.12 4.88	5	SS	9	Grain Size Analysis: Gr 0%/ Sa 23%/ Si 38%/ Cl 39%			
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : WB
CHECKED : MA



RECORD OF BOREHOLE 09-010

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		159.76							
1		Silty CLAY, some sand, trace gravel Stiff to Very Stiff Brown (TILL)		0.00	1	AS					
2		Silty SAND, trace gravel, occasional cobbles Brown Moist		157.55	1	SS	16				
3		SHALE, weathered, with clay seams and limestone interbeds Grey		156.71	2	SS	14	Grain Size Analysis: Gr 0%/ Sa 19%/ Si 45%/ Cl 36%			
4		END OF BOREHOLE UPON AUGER REFUSAL AT 3.3m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		158.85	3	SS	50/ .000	sampler driving on cobble			
5		SHALE, weathered, with clay seams and limestone interbeds Grey		156.71	4	SS	54/ .050	sampler driving on probable bedrock			
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/16/09

RECORD OF BOREHOLE 09-011

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		163.56							
1		TOPSOIL, clayey Brown (130mm)		160.00 0.13	1	AS					
		Silty CLAY, some sand, some gravel, occasional cobbles Very Stiff Grey (FILL)		162.11 1.45	1	SS	21				
2		Clayey SILT and SAND, trace gravel, occasional cobbles Stiff to Very Stiff Brown (TILL)			2	SS	15				
3					3	SS	8	Grain Size Analysis: Gr 11%/Sa 36%/Si 32%/Cl 21%			
					4	SS	13				
4											
5					5	SS	18				
				158.53 5.03							
6		END OF BOREHOLE UPON AUGER REFUSAL AT 5.0m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.									
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



RECORD OF BOREHOLE 09-012

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V -		
		GROUND SURFACE		160.88							
1		TOPSOIL: (180mm) Silty CLAY, some sand Stiff Brown (TILL)		160.00 0.18	1	AS					
2		Trace shale fragments			1	SS	15				
3		SHALE, highly weathered, weak to very weak, thinly bedded, with medium strong to very strong limestone interbeds, grey Limestone layers (greater than 50mm): 275mm at 2.7m 190mm at 3.1m 100mm at 4.0m 175mm at 5.5m		158.33 2.55	2	SS	11	Grain Size Analysis: Gr 0%/ Sa 15%/ Si 51%/ Cl 34%			
4		Clay seams: 40mm at 2.8m 75mm at 3.1m 75mm at 3.3m 50mm at 3.9m 50mm at 4.1m			3	SS	50/075				
5		Rubble zone at: 30mm at 3.8m 250mm at 5.2m 75mm at 5.7m			1	NQ		TCR=100%, SCR=86%, RQD=29%			
6		Becoming slightly weathered to fresh Limestone layers (greater than 50mm) 125mm at 6.4m 50mm at 7.3m 60mm at 8.8m 125mm at 9.1m 75mm at 10.6m			2	NQ		TCR=100%, SCR=87%, RQD=18%			
7		Rubble zones: 50mm at 7.3m 100mm at 7.5m			3	NQ		TCR=100%, SCR=77%, RQD=27%			
8					4	NQ		TCR=95%, SCR=78%, RQD=28%			
9					5	NQ		TCR=100%, SCR=100%, RQD=47%			
10					6	NQ		TCR=100%, SCR=100%, RQD=70%			
11		END OF BOREHOLE AT 10.9m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		149.91 10.97				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			
12		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 3.7 157.2 2009.05.05 3.0 157.9 2009.05.21 4.7 156.2									

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : SL
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/19/09

RECORD OF BOREHOLE 09-013

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

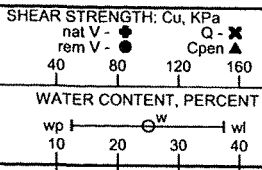
SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		158.89							
		TOPSOIL: (100mm)	1	158.89							
1		Silty CLAY, sandy, with shale fragments Hard Brown (TILL)	1	158.00	1	SS	65/ 200				
			2	157.26	2	SS	100/ .000				
2		END OF BOREHOLE AT 1.6m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN AND WATER LEVEL AT 0.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		1.62							
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

DRAFT

Grain Size Analysis:
 Gr 9% / Sa 35% / Si 30% / Cl 26%



GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : SL
 CHECKED : MA



RECORD OF BOREHOLE 09-014

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		159.65							
		TOPSOIL: (130mm)		159.60							
1		Silty CLAY, trace sand, trace shale fragments Very Stiff to Hard Brown (TILL)		0.13	1	SS	21				
2		END OF BOREHOLE AT 1.7m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN AND WATER LEVEL AT 1.2m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		157.90	2	SS	50/125	Grain Size Analysis: Gr 0% / Sa 6% / Si 58% / Cl 36%			
3				1.75							
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : SL
 CHECKED : MA



THURBER2S(REV) 1.160.GPJ 6/16/09

RECORD OF BOREHOLE 09-015

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: C_u , KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		159.55							
		TOPSOIL: (100mm)	[Hatched Box]	158.98	1	AS					
1		Silty CLAY, some sand, trace gravel, occasional cobble Brown (TILL)	[Hatched Box]	158.18	1	SS	64/ 050				
2		SHALE, highly weathered, with clay seams Grey	[Dotted Box]	157.17							
3		END OF BOREHOLE AT 2.4m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.	[Dotted Box]	157.17 2.39	2	SS	100/ 100				
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB/SL
 CHECKED : MA



RECORD OF BOREHOLE 09-016

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 5, 2009
 COMPLETED : April 5, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		159.64								
		TOPSOIL: (150mm)		159.80								
1		Silty CLAY, some sand, some gravel, occasional shale fragments Very Stiff to Hard Brown (TILL)		0.15	1	SS	16					
2					2	SS	60					
					3	SS	88	Grain Size Analysis: Gr 16%/ Sa 16%/ Si 44%/ Cl 24%				
		END OF BOREHOLE AT 2.2m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE OPEN AND WATER LEVEL AT 0.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		157.43								
				2.21								
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION WATER LEVEL (date)
▽ DEEP/DUAL INSTALLATION WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-017

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 3, 2009
 COMPLETED : April 5, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	rem V - ○	Q - ✕		
		GROUND SURFACE		159.63									
		TOPSOIL: (150mm)		150.88									
1		Silty CLAY, trace roots and rootlets, occasional shale fragments Hard Brown (TILL)		0.15	1	SS	100/150						
2		SHALE, highly weathered, weak to very weak, thinly bedded, grey, with medium strong to very strong limestone interbeds		158.03	2	SS	50/075						
3		Limestone layers (greater than 50mm): 150mm at 1.8m 125mm at 3.4m 150mm at 3.5m 100mm at 5.2m 175mm at 5.3m			1	NQ		TCR=85%, SCR=46%, RQD=0%					
4		Clay seams: 250mm at 2.1m 100mm at 3.0m			2	NQ		TCR=85%, SCR=36%, RQD=30%					
5		Rubble zones: 75mm at 2.4m 100mm at 2.6m 150mm at 3.1m 100mm at 3.7m			3	NQ		TCR=0%, SCR=0%, RQD=0% (Mechanical failure)					
6		Sub-vertical fractures at 3.1m, 3.2m, 3.7m and 5.5m Highly to moderately weathered			4	NQ		TCR=85%, SCR=67%, RQD=60%					
7		Moderately weathered											
8		Limestone layers (greater than 50mm): 75mm at 7.2m 75mm at 7.3m 50mm at 7.5m 100mm at 7.6m 125mm at 7.9m 50mm at 8.4m			5	NQ		TCR=100%, SCR=83%, RQD=83%					
9		Slightly weathered			6	NQ		TCR=100%, SCR=88%, RQD=88%					
10		Sub-vertical fractures at 6.4m, 6.8m, 7.0m, 7.3m, 8.5m, 9.1m, 9.2m and 9.6m			7	NQ							
		END OF BOREHOLE AT 10.1m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		149.52				TCR=100%, SCR=100%, RQD=100%					
		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 6.7 152.9 2009.05.05 6.0 153.6 2009.05.21 6.7 152.9		10.11				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'					

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : SL
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-018

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 5, 2009
 COMPLETED : April 5, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		158.33							
		TOPSOIL: (150mm)		150.90							
1		Silty CLAY, some sand, trace gravel Firm to Hard Grey (TILL)		0.15	1	SS	5				▽
					2	SS	33				
2		Occasional shale fragments			3	SS	76/ 225				
		END OF BOREHOLE AT 2.0m UPON AUGER REFUSAL. BOREHOLE OPEN AND WATER LEVEL AT 0.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		156.35 1.98							
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.05

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2(SREV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-019

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.19							
1		ORGANICS, black peat: (100mm) Silty CLAY, sandy, trace shale fragments Very Stiff to Hard Brown (TILL)		156.00	1	SS	27				
2		Limestone fragments		153.24	2	SS	43	Grain Size Analysis: Gr 5%/ Sa 22%/ Si 54%/ Cl 19%	UCS (MPa)	Point Load Test Axial (MPa)	Point Load Test Diametral (MPa)
	3				SS	50/100					
3	4				SS	50/125					
4		SHALE, highly weathered, thinly bedded, weak to very weak, with medium to very strong limestone interbeds		2.95	1	NQ		TCR=95%, SCR=83%, RQD=17%			
5		Limestone layers (greater than 50mm) 250mm at 5.8m 125mm at 6.2m 250mm at 7.6m		147.86	2	NQ		TCR=97%, SCR=92%, RQD=16%			
6					Clay seams: 75mm at 3.5m						
7		Rubble zone : 50mm at 3.9m 50mm at 4.4m			3	NQ		TCR=95%, SCR=92%, RQD=43%	72	167	
8		Vertical joint at 3.2 to 3.3m and 5.3 to 5.4m			4	NQ		TCR=100%, SCR=96%, RQD=70%		148	
9		END OF BOREHOLE AT 8.3m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		8.33				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			
9		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 4.6 151.6 2009.05.05 4.4 151.8 2009.05.21 4.7 151.5									

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : SL
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-020

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 6, 2009
 COMPLETED : April 6, 2009

Project No. 19-1351-160
 SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● Q - ✕ rem V - ● Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ○ wl			
		GROUND SURFACE		153.63								
		TOPSOIL: (200mm)	3.4	158.99								
1		Silty CLAY, some sand, trace gravel Stiff to Hard Brown (TILL) Occasional shale fragments	3.4	0.20	1	SS	8					
							2	SS	32			
2							3	SS	42			
							4	SS	50/100			
3		END OF BOREHOLE AT 2.6m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.										
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-021

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 6, 2009
 COMPLETED : April 6, 2009

Project No. 19-1351-160
 SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: C_u , kPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.01							
		TOPSOIL: (175mm) Black	3.6	150.09							
1		Silty CLAY, sandy, trace gravel Soft to Firm Brown (TILL)	0.18		1	SS	3				
2					2	SS	7				
3		Occasional shale fragments		148.42	3	SS	7				
3		END OF BOREHOLE AT 2.6m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.	2.59		4	SS	54/ 275				
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

THURBER2S(REV) 1160.GPJ 6/11/09

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



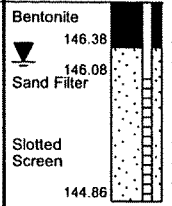
RECORD OF BOREHOLE 09-022

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 6, 2009
 COMPLETED : April 6, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		146.84							
1		TOPSOIL: (250mm) Black Silty CLAY, some sand, trace gravel, topsoil stained Very Stiff to Hard Brown (TILL) Occasional shale fragments		146.84 146.99 146.99 0.25	1	SS					
2					2	SS	23				
2				144.86	3	SS	40				
3		END OF BOREHOLE AT 2.0m UPON AUGER REFUSAL BOREHOLE OPEN AND WATER LEVEL AT SURFACE UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		1.98							
4		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 0.9 145.9 2009.05.05 0.6 146.2 2009.05.21 0.6 146.2									
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											



GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 DEEP/DUAL INSTALLATION
 WATER LEVEL (date) 2009.05.21 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2(S)(REV) 1160.GPJ 6/16/09

RECORD OF BOREHOLE 09-023

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 6, 2009
 COMPLETED : April 6, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲ 		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp -----w----- wl 10 20 30 40			
		GROUND SURFACE		155.65								
1		Clayey SILT, and broken SHALE Stiff to Very Stiff Grey (FILL)	[Hatched Pattern]	0.00								
	1			SS	17							
2	2			SS	13							
3	3			SS	12							
4		END OF BOREHOLE AT 3.4m UPON AUGER REFUSAL. MOVED TO BOREHOLE 09-023a.		152.30 3.35	4	SS	21					
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-023a

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 6, 2009
 COMPLETED : April 6, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲ 40 80 120 160		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40			
		GROUND SURFACE		145.97								
		TOPSOIL, trace roots Dark Brown		148.99 0.20								
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)										
	1			SS	21							
2				2	SS	26		Grain Size Analysis: Gr 3%/ Sa 32%/ Si 46%/ Cl 19%				
	2			3	SS	50/ .075						
3		Occasional shale fragments Grey										
	3			4	SS	50/ .075						
4		END OF BOREHOLE AT 4.1m UPON AUGER REFUSAL BOREHOLE OPEN AND WATER LEVEL AT 2.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 1.7m THEN CUTTINGS TO SURFACE.		141.83 4.14								
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.06

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-023B

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 10, 2009
 COMPLETED : July 10, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		155.13							
1		Clayey SILT and broken SHALE Very Stiff to Hard Brown and Grey (FILL) occasional rootlets and wood fibers		0.00	1	SS	27				
2	2			SS	75						
3	3			SS	27	Grain Size Analysis: Gr 5%/ Sa 25%/ Si 45%/ Cl 25%					
4	4			SS	48						
5	5			SS	70						
6	6			SS	30						
7		Silty CLAY, trace sand and gravel, with organics Hard Dark Brown (FILL)		149.49 5.64	7	SS	32				
8		Silty CLAY, sandy, trace gravel Hard Brown to Grey (TILL)		147.97 7.16	8	SS	35	Grain Size Analysis: Gr 0%/ Sa 27%/ Si 48%/ Cl 25%			
9					9	SS	50				
10		END OF BOREHOLE AT 9.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		145.38 9.75							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : LG
CHECKED : MF



THURBER2S(REV) 1160.GPJ 9/29/09

RECORD OF BOREHOLE 09-024

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 6, 2009
 COMPLETED : April 6, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		145.11							
		TOPSOIL (130mm)		148.08 0.13							
1		Silty CLAY, some sand to sandy, some gravel Very Stiff to Hard Brown (TILL)			1	SS	22				
2					2	SS	27				
3		Grey			3	SS	26				
4					4	SS	35	Grain Size Analysis: Gr 16%/ Sa 37%/ Si 31%/ Cl 15%			
5					5	SS	100/ 100				
6		END OF BOREHOLE AT 4.7m UPON AUGER REFUSAL. BOREHOLE OPEN AND WATER LEVEL AT 1.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.7m THEN CUTTINGS TO SURFACE.		140.43 4.67							
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.06

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR

THURBER2(S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-024A

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 9, 2009
 COMPLETED : July 9, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: C_u , KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		147.35								
1		Sandy SILT and broken SHALE Brown Moist (FILL)		0.00								
2		Silty CLAY, sandy, trace gravel Hard Brown to Grey (TILL) Grey		145.37	1	SS	7					
3				1.98	2	SS	48					
4					3	SS	52	Grain Size Analysis: Gr 1%/ Sa 36%/ Si 41%/ Cl 22%				
5					4	SS	69					
5				142.17	5	SS	59	Grain Size Analysis: Gr 2%/ Sa 35%/ Si 38%/ Cl 25%				
6		END OF BOREHOLE AT 5.2m. BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		5.18								
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MF



RECORD OF BOREHOLE 09-025

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 14, 2009
 COMPLETED : March 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ○		
		GROUND SURFACE		142.69							
		TOPSOIL (150mm)		142.00							
1		Silty CLAY, sandy, trace gravel, occasional cobbles Stiff to Hard Brown (TILL)		0.15	1	SS	34		○		
		With shale fragments			2	SS	9		○		
2					3	SS	20		○		
					4	SS	29		○		
3		SHALE, highly weathered, thinly bedded Grey		139.64	5	SS	88/ 200		○		
4				3.05	6	SS	50/ .050		○		
5		END OF BOREHOLE AT 4.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		137.99	7	SS	50/ .125		○		
6				4.70							
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-026

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 10, 2009
 COMPLETED : March 10, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ○ Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40			
		GROUND SURFACE		143.06								
		ASPHALT (50mm)		140.89								
1		Silty CLAY, trace sand, trace gravel Stiff to Very Stiff Brown (TILL)			1	AS						
					1	SS	9					
2		SHALE, highly to moderately weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds			2	SS	17					
					3	SS	100/.125					
3					4	SS	50/.050					
4					5	SS	50/.050					
5		Slightly weathered Limestone layers (greater than 50mm): 50mm at 5.0m 50mm at 5.4m			1	NQ						
					2	NQ						
6												
7												
8		END OF BOREHOLE AT 7.3m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO 0.05m THEN ASPHALT TO SURFACE.		135.74 7.32								
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-026A

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 8, 2009
 COMPLETED : July 8, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	rem V - ●	Q - ✕		
		GROUND SURFACE		142.98									
		ASPHALT: (175mm)		142.80									
		SAND, some gravel, trace to some silt Brown (FILL)		0.18	1	AS							
1		Silty CLAY, some sand, shale fragments Very Stiff Brown to Grey (TILL)		142.29 0.69	1	SS	20	Grain Size Analysis: Gr 3%/ Sa 12%/ Si 69%/ Cl 16%					
2		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds		141.53 1.45	2	SS	27						
					3	SS	100/150						
3		Moderately weathered			1	RUN		TCR=100%, SCR=88%, RQD=29%					FI
4		Limestone layers (greater than 50mm): 50mm at 3.4m 100mm at 4.8m 230mm at 5.1m			2	RUN		TCR=100%, SCR=97%, RQD=61%					
5		Slightly weathered to fresh			3	RUN		TCR=100%, SCR=98%, RQD=80%					
6													
7		Weathered zone at 7.0m to 7.2m			4	RUN		TCR=100%, SCR=98%, RQD=78%					
8		END OF BOREHOLE AT 7.6m. BOREHOLE BACKFILLED WITH BENTONITE TO 2.1m THEN ASPHALT TO SURFACE.		135.36 7.62				All UCS tests conducted on shale					

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : LG
CHECKED : MA



RECORD OF BOREHOLE 09-027

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 10, 2009
 COMPLETED : March 10, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	rem V - ●	Q - ✖		
		GROUND SURFACE		142.99									
		ASPHALT (50mm)		140.89									
1		Silty CLAY, some sand, trace gravel Firm to Very Stiff Brown (TILL)			1	AS							
					1	SS	7						
2					2	SS	22	Grain Size Analysis: Gr 0% / Sa 21% / Si 54% / Cl 25%					
		SHALE, highly to moderately weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds, clay seams		140.55	3	SS	50/ .150						
3				2.44	4	SS	50/ .150						
		Slightly to moderately weathered											
4		Limestone layers (greater than 50mm): 75mm at 3.6m 75mm at 5.0m 150mm at 5.3m			1	NQ		TCR=96%, SCR=88%, RQD=88%					
5		Vertical joints at 4.9m and 5.2m			2	NQ		TCR=100%, SCR=92%, RQD=80%					
6					3	NQ		TCR=100%, SCR=100%, RQD=100%					
7		END OF BOREHOLE AT 6.9m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		136.13				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'					
		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m)		6.86									
8		2009.04.14 1.3 141.7											
		2009.05.05 1.4 141.6											
		2009.05.21 1.6 141.4											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR



RECORD OF BOREHOLE 09-028

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 25, 2009
 COMPLETED : March 25, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			
		GROUND SURFACE		143.66								
1		TOPSOIL (100mm)		143.66								
		Silty SAND, some clay, trace gravel Compact Brown Damp		142.90	1	SS	21					
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)		142.90 0.76	2	SS	33					
2		Occasional sand pockets, trace rootlets Grey			3	SS	18	Grain Size Analysis: Gr 1%/ Sa 23%/ Si 57%/ Cl 19%				
		Occasional silt pockets, occasional oxide staining			4	SS	39					
3		SHALE, highly to moderately weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds		140.46 3.20	5	SS	50/125					
4		Limestone layers (greater than 50mm): 100mm at 4.2m 75mm at 5.6m 75mm at 5.9m			1	NQ		TCR=87%, SCR=50%, RQD=40%				
5		Rubble zones: 100mm at 4.0m 50mm at 4.2m										
6		Subvertical fractures at 4.2m, 5.8m and 5.9m Moderately to slightly weathered			2	NQ		TCR=100%, SCR=87%, RQD=87%				
7		END OF BOREHOLE AT 6.9m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		136.80 6.86								
8		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.14 3.5 140.2 2009.05.05 2.1 141.6 2009.05.21 2.5 141.2						All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by 'x'				
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION

▼ DEEP/DUAL INSTALLATION

WATER LEVEL (date) 2009.05.21

WATER LEVEL (date)

LOGGED : ES

CHECKED : RPR

THURBER2S(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-029

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 25, 2009
 COMPLETED : March 25, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES		COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER		TYPE	nat V - ● rem V - ●		
		GROUND SURFACE		143.16						
		TOPSOIL (100mm)		140.06						
1		Silty CLAY, some sand, trace gravel Stiff to Hard Brown (TILL)			1	SS	13			
		Occasional oxide staining Grey			2	SS	18			
2		Occasional shale fragments			3	SS	19			
		SHALE, highly to moderately weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds		140.42 2.74	4	SS	33			
3		Limestone layers (greater than 50mm): 75mm at 4.7m 75mm at 5.1m 50mm at 5.4m 50mm at 6.0m 50mm at 6.3m Rubble zone: 100mm at 3.9m			5	SS	50/ .150			
4		Subvertical fractures at 4.4m, 4.5m and 6.3m Moderately to slightly weathered			1	NQ	50/ .025			
5										
6					2	NQ				
7		END OF BOREHOLE AT 6.9m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		136.23 6.93						
8										
9										
10										
11										
12										
13										
14										

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



RECORD OF BOREHOLE 09-030

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 30, 2009
 COMPLETED : March 30, 2009

Project No. 19-1351-160
 SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		145.90							
1		TOPSOIL, clayey (100mm)		148.00	1	AS					
1		Silty CLAY, sandy, trace gravel, occasional cobble Very Stiff to Hard Brown to Grey (TILL)			1	SS	18				
2		Trace rootlets			2	SS	53/0.050	Cobble			
3					3	SS	21	Grain Size Analysis: Gr 1%/ Sa 38%/ Si 37%/ Cl 24%			
4					4	SS	16				
5					5	SS	55/0.100	Grain Size Analysis: Gr 2%/ Sa 30%/ Si 36%/ Cl 32%			
5								Cobble			
6		SHALE, highly weathered, thinly bedded, occasional limestone interbeds Grey		140.42 5.49	6	SS	100/0.100				
7											
8		END OF BOREHOLE AT 7.6m. BOREHOLE OPEN AND WATER LEVEL AT 3.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		138.28 7.62	7	SS	50/0.00				
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.03.30

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : RPR

RECORD OF BOREHOLE 09-031

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 30, 2009
 COMPLETED : March 30, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		144.51							
1		TOPSOIL (130mm) Silty CLAY, some sand to sandy, trace gravel Very Stiff to Hard Brown (TILL)		140.09 0.13	1	AS					
2					1	SS	26				
3					2	SS	75	Grain Size Analysis: Gr 4% / Sa 32% / Si 41% / Cl 23%			
4		Becoming grey, with shale and limestone fragments			3	SS	37				
5		SHALE, highly weathered, thinly bedded, with limestone interbeds Grey		140.09 4.42	4	SS	60	Grain Size Analysis: Gr 0% / Sa 17% / Si 54% / Cl 29%			
6					5	SS	50/.050				
7					6	SS	50/.000				
8		END OF BOREHOLE AT 7.6m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		136.89 7.62	7	SS	50/.000				
9		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 2.7 141.8 2009.05.05 2.1 142.4 2009.05.21 2.2 142.3									
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : RPR



THURBER2S(REV) 1160.GPJ 7/19/09

RECORD OF BOREHOLE 09-032

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 30, 2009
 COMPLETED : March 30, 2009

Project No. 19-1351-160
 SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		150.21								
		TOPSOIL: (100mm)		150.90	1	AS						
1		Silty CLAY, some sand to sandy, trace gravel, occasional cobbles Stiff to Hard Grey (TILL)			1	SS	31					
2					2	SS	30					
3					3	SS	16					
4					4	SS	13		Grain Size Analysis: Gr 1%/ Sa 21%/ Si 50%/ Cl 28%			
5					5	SS	53					
6		END OF BOREHOLE AT 5.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		145.03								
7				5.18								
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



RECORD OF BOREHOLE 09-033

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 30, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● O - ✕ rem V - ● Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- wl			
		GROUND SURFACE		153.18								
		TOPSOIL: (75mm)		150.88								
1		Clayey SILT, some gravel, occasional cobbles, possible broken shale Compact Grey (FILL)		1	AS	1						
	1			SS	22							
	2			SS	50/100							
2		Silty CLAY, some sand, some gravel, with limestone fragments Very Stiff to Hard Grey (FILL)		151.05								
	2			3	SS	54						
	3			4	SS	20						
	4			5	SS	34						
	5			6	SS	79						
6		Silty CLAY, some sand, some gravel, trace rootlets, occasional cobbles Very Stiff Grey (TILL)		147.69								
	6			6	SS	79						
7												
8												
9												
10												
11												
12												
13												
14												
		END OF BOREHOLE AT 8.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		144.95								
				8.23								

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



RECORD OF BOREHOLE 09-034

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		147.78							
		TOPSOIL: (100mm)		148.88	1	AS					
1		Silty CLAY, sandy, trace gravel Hard Brown (TILL)		148.88	1	SS	45				
2					2	SS	62				
3					3	SS	100/275	Grain Size Analysis: Gr 0%/ Sa 36%/ Si 44%/ Cl 20%			
4					4	SS	100				
5		Becoming grey			5	SS	100/250				
6					6	SS	100	Grain Size Analysis: Gr 4%/ Sa 43%/ Si 30%/ Cl 23%			
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		141.08 6.71							
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

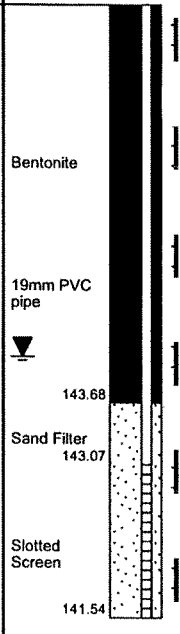
RECORD OF BOREHOLE 09-036

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		147.64							
		TOPOSIL: (75mm)		148.88	1	AS					
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)			1	SS	15				
2					2	SS	44				
3					3	SS	100/ 275				
4					4	SS	100/ 225				
5					5	SS	100				
6					6	SS	129				
7		END OF BOREHOLE AT 6.7m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		140.93 6.71							
8		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 3.6 144.9 2009.05.05 3.3 144.3 2009.05.21 3.5 144.1									
9											
10											
11											
12											
13											
14											



GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 DEEP/DUAL INSTALLATION
 WATER LEVEL (date) 2009.05.21 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-037

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		153.56							
		TOPSOIL: (100mm)		150.98	1	AS					
1		Clayey SILT, sandy, trace gravel, with numerous shale pieces Firm to Hard Grey (FILL)			1	SS	6				
2					2	SS	40				
3				150.66	3	SS	50/150	Grain Size Analysis: Gr 6% / Sa 26% / Si 45% / Cl 22%			
4		Silty CLAY, some sand, trace gravel Very Stiff to Hard Brown to Grey (TILL)		2.90	4	SS	33				
5					5	SS	25				
6		Silty SAND, some clay, trace gravel Dense to Very Dense Brown Moist (TILL)		147.76	6	SS	49				
7				5.79							
8					7	SS	47	Grain Size Analysis: Gr 3% / Sa 53% / Si 33% / Cl 11%			
9		Grey			8	SS	100/125				
10		END OF BOREHOLE AT 9.7m. BOREHOLE OPEN AND WATER LEVEL AT 7.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		143.80							
11				9.75							
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-038

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		151.74								
		TOPSOIL: (100mm)		150.88 0.10	1	AS						
1		Clayey SILT, sandy, trace to some gravel, with numerous shale and limestone pieces Very Stiff to Hard Grey Moist (FILL)			1	SS	21					
2					2	SS	50	Grain Size Analysis: Gr 9%/ Sa 39%/ Si 37%/ Cl 15%				
3					3	SS	15					
4					4	SS	50/075	Limestone fragment				
5		Silty CLAY, sandy, trace gravel, occasional shale fragments Hard Brown Moist (TILL)		147.47 4.27	5	SS	63	Grain Size Analysis: Gr 5%/ Sa 32%/ Si 37%/ Cl 26%				
6					6	SS	56					
7												
8					7	SS	63					
9		END OF BOREHOLE AT 8.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		143.51 8.23								
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



RECORD OF BOREHOLE 09-039

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 9, 2009
 COMPLETED : July 9, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			Q - ✕
		GROUND SURFACE		150.59								
1		Clayey SILT, some sand, trace gravel Stiff to Very Stiff Brown (FILL)		0.00	1	SS	14					
2		Silty CLAY, sandy, trace gravel Hard Brown (TILL)		148.38	2	SS	14					
3		Grey With shale fragments		2.21	3	SS	22					
4		Silty SAND, some clay, trace gravel Very Dense Grey Wet			4	SS	46	Grain Size Analysis: Gr 0%/ Sa 35%/ Si 44%/ Cl 21%				
5		Silty SAND, some clay, trace gravel Very Dense Grey Wet			5	SS	66					
6		Silty SAND, some clay, trace gravel Very Dense Grey Wet			6	SS	100/ .300	Grain Size Analysis: Gr 2%/ Sa 26%/ Si 49%/ Cl 23%				
7		Silty SAND, some clay, trace gravel Very Dense Grey Wet		143.69	7	SS	100/ .100					
8		Silty SAND, some clay, trace gravel Very Dense Grey Wet		6.90	8	SS	100/ .175	Grain Size Analysis: Gr 8%/ Sa 57%/ Si 24%/ Cl 11%				
9		END OF BOREHOLE AT 7.9m. BOREHOLE BACKFILLED WITH BENTONITE TO 2.2m, THEN CUTTINGS TO SURFACE.		142.64								
10				7.95								
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S 1160.GPJ 12/15/09

RECORD OF BOREHOLE 09-040

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 3, 2009
 COMPLETED : April 3, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●		
		GROUND SURFACE		148.59								
		ASPHALT (100mm)		148.98								
1		Gravelly SAND Dense Brown Damp (FILL)		147.83	1	SS	40					
		Silty CLAY sandy, trace gravel Very Stiff to Hard Grey (TILL)		147.076	2	SS	22					
2					3	SS	35	Grain Size Analysis: Gr 5%/ Sa 42%/ Si 34%/ Cl 19%				
					4	SS	42					
3					5	SS	50					
4												
5		Occasional silt seams, occasional cobble			6	SS	93					
6		Sandy SILT, some clay, trace gravel Very Dense Grey (TILL)		142.96				Grain Size Analysis: Gr 3%/ Sa 28%/ Si 54%/ Cl 15%				
				5.63	7	SS	55					
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.4m, THEN CUTTINGS TO 0.1m, THEN ASPHALT TO SURFACE.		141.89								
				6.71								
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-041

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 3, 2009
 COMPLETED : April 3, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		148.21							
		ASPHALT (130mm)		148.00 0.13							
1		Gravelly SAND Dense Brown Damp (FILL)		147.45 0.76	1	SS	39				
		Clayey SILT, some sand, trace gravel, occasional cobble Very Stiff to Hard Brown (FILL)			2	SS	21				
2		Silty CLAY, sandy, trace gravel, occasional cobble Hard Grey (TILL)		146.23 1.98	3	SS	44				
3					4	SS	65	Grain Size Analysis: Gr 6% / Sa 32% / Si 40% / Cl 23%			
4					5	SS	28	Auger refusal at 3.0m. Redrilled at 2.0m east.			
5					6	SS	49				
6					7	SS	100/ 125				
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND WATER LEVEL AT 2.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.3m THEN CUTTINGS TO 0.1m THEN ASPHALT TO SURFACE.		141.53 6.68							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-042

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● Q - ✕ rem V - ● Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ○ w wl		
		GROUND SURFACE		149.79							
		TOPSOIL (150mm) Brown Moist		148.89 0.15	1	SS	3				
1		Silty CLAY, trace sand, trace gravel, some organics staining Soft to Firm Grey (FILL)			2	SS	5				
2		Silty CLAY, sandy, trace gravel Very Stiff to Hard Grey (TILL)(CL)		148.27 1.52	3	SS	19				
3					4	SS	36				
4					5	SS	30	Grain Size Analysis: Gr 2%/ Sa 33%/ Si 39%/ Cl 26%			
5				144.78 5.03	6	SS	50/ 150				
6		END OF BOREHOLE AT 5.0m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.									
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : LG
CHECKED : RPR



RECORD OF BOREHOLE 09-043

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		149.21							
1		TOPSOIL (75mm) Brown Moist Silty CLAY, trace sand, trace gravel, occasional organics, rootlets Firm to Stiff Brown to Black (FILL)		148.88	1	SS	6				
2		Sandy, trace gravel Stiff (CI)		147.00	3	SS	14				Bentonite
3		Silty CLAY, sandy, trace gravel Hard Grey (TILL)		2.21	4	SS	32	Grain Size Analysis: Gr 1% / Sa 29% / Si 44% / Cl 26%			
4				145.10	5	SS	36				
5		SAND and SILT, trace to some clay, trace gravel Very Dense Grey Moist (TILL)		4.11	6	SS	68				144.64
6					7	SS	100/ .175	Grain Size Analysis: Gr 6% / Sa 45% / Si 41% / Cl 8%			
7					8	SS	100/ .125				141.59
8					9	SS	100/ .125	Grain Size Analysis: Gr 3% / Sa 45% / Si 36% / Cl 16%			
9				139.94							140.07
10		END OF BOREHOLE AT 9.3m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 2.9 146.3 2009.05.05 2.4 146.8 2009.05.21 2.7 146.5		9.27							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION

▼ DEEP/DUAL INSTALLATION

WATER LEVEL (date) 2009.05.21

WATER LEVEL (date)

LOGGED : LG

CHECKED : RPR



RECORD OF BOREHOLE 09-044

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		154.88							
		ASPHALT (150mm)		154.00							
		SAND and GRAVEL		0.15							
1		Dense Brown Damp (FILL)		154.12	1	SS	43				
		Silty CLAY, sandy, trace gravel Firm to Stiff Brown (FILL)(CL)		0.76	2	SS	7				
2					3	SS	8	Grain Size Analysis: Gr 3%/ Sa 34%/ Si 39%/ Cl 25%			
					4	SS	8				
3					5	SS	10				
4											
5		Silty CLAY, some sand, trace gravel Stiff to Hard Brown to Grey (TILL)(CI)		150.61	6	SS	9				
6											
7		Occasional sand pockets			7	SS	17	Grain Size Analysis: Gr 0%/ Sa 19%/ Si 51%/ Cl 30%			
8					8	SS	59				
9		Occasional vertical fissures									
10					9	SS	42				
11		SAND and SILT, trace to some gravel, trace clay, occasional sand seams Very Dense Grey Moist (TILL)		144.97	10	SS	110				
		Auger grinding from 11.3m to 12.2m.		9.91							
12					11	SS	100/150				
13											
14					12	SS	100/125				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.02

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



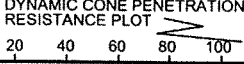
THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-044

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●			Q - ▲
16		Grading to silty sand	[Strata Plot]	139.36 15.52	13	SS	100/ .125	Grain Size Analysis: Gr 12%/Sa 51%/Si 28%/ Cl 8% DYNAMIC CONE PENETRATION RESISTANCE PLOT 	○				
17		DRAFT											
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.02

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



RECORD OF BOREHOLE 09-045

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		154.20							
		ASPHALT (130mm)		159.09							
		SAND and GRAVEL		0.13							
1		Dense Brown Damp (FILL)		153.44	1	SS	34				
		Silty CLAY, sandy, trace gravel Very Stiff to Firm Brown (FILL)(CI)		0.76	2	SS	19				
2					3	SS	11				
3					4	SS	5	Grain Size Analysis: Gr 0%/ Sa 34%/ Si 40%/ Cl 26%			
4					5	SS	9				
5		Silty CLAY, sandy, trace gravel, occasional sand pockets Very Stiff to Hard Brown (TILL)(CL) Occasional cobble		150.24	6	SS	23				
6				3.96							
7					7	SS	28				
8		Becoming grey			8	SS	39	Grain Size Analysis: Gr 1%/ Sa 44%/ Si 37%/ Cl 18%			
9		SAND and SILT, trace clay, trace gravel Compact to Very Dense Grey Damp (TILL)		145.82	9	SS	29				
10				8.38							
11					10	SS	65				
12					11	SS	29				
13											
14					12	SS	100/050	Grain Size Analysis: Gr 5%/ Sa 40%/ Si 46%/ Cl 9%			

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.03.31

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR

THURBER2(S)(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-045

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●	Q - ✕	Cpen ▲		
16			[Pattern]											
17		END OF BOREHOLE AT 16.8m. BOREHOLE OPEN TO 13.7m AND WATER LEVEL AT 7.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 1.8m, THEN CUTTINGS TO 0.1m THEN ASPHALT TO SURFACE.		137.36 16.84			13 SS 100/ .125							
18														
19														
20														
21														
22														
23														
24														
25														
26														
27														
28														
29														

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 ▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date) 2009.03.31 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-046

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 2, 2009
 COMPLETED : April 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		148.69							
1		TOPSOIL (100mm) Brown Moist		148.88 148.98	1	SS	12				
		Silty CLAY, trace sand, trace gravel Stiff Mottled Brown Grey (FILL)		147.93 0.76	2	SS	19				
2		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)(CL)			3	SS	26	Grain Size Analysis: Gr 3%/ Sa 37%/ Si 36%/ Cl 23%			
3					4	SS	68				
4		Becoming grey			5	SS	50/ 0.75				
5		SAND and SILT, trace clay, trace gravel Very Dense Grey (TILL)		144.12 4.57	6	SS	81				
6					7	SS	68	Grain Size Analysis: Gr 7%/ Sa 45%/ Si 40%/ Cl 8%			
7					8	SS	80				
8		Silty CLAY, sandy, trace gravel Hard Grey (TILL)(CL)		140.77 7.92	9	SS	100/ 0.175	Grain Size Analysis: Gr 7%/ Sa 38%/ Si 39%/ Cl 17%			
9					10	SS	100/ 0.075				
10					11	SS	100/ 0.075				
11		Gravelly SAND, some silt Very Dense Grey Wet		138.02 10.67							
12					12	SS	100/ 0.100				
13		END OF BOREHOLE AT 12.2m. BOREHOLE OPEN AND WATER LEVEL AT 10.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		136.45 12.24							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.02

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-047

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp -----w wl		
		GROUND SURFACE		154.34							
		ASPHALT (150mm)		154.90							
		SAND and GRAVEL Dense Brown Damp (FILL)		0.15	1	SS	40				
1		Silty CLAY, sandy, trace gravel Stiff to Firm Brown (FILL)(Cl)		153.58	2	SS	10				
2				0.76	3	SS	7				
3					4	SS	9	Grain Size Analysis: Gr 1%/ Sa 34%/ Si 41%/ Cl 24%			
4					5	SS	9				
4		Silty CLAY, sandy, trace gravel, occasional oxide staining Very Stiff to Hard Brown (TILL)		150.51	6	SS	15				
5				3.83	7	SS	41				
6											
7		Occasional sand and silt lenses									
7				147.24							
8		SAND and SILT, trace to some clay, trace gravel, occasional cobble Dense to Very Dense Grey (TILL)		7.10	8	SS	36	Grain Size Analysis: Gr 3%/ Sa 43%/ Si 37%/ Cl 17%			
9											
10					9	SS	43				
11					10	SS	100/ 150				
12											
13					11	SS	37				
14											
14					12	SS	62	Grain Size Analysis: Gr 12%/ Sa 32%/ Si 47%/ Cl 9%			

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) : 2009.04.01

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR

THURBER2S(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-047

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ●, rem V - ●, Q - ✕, Cpen - ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40		
16			137.88 16.46	13	SS	100/ 125		○			
17		SHALE, highly weathered, thinly bedded Grey		14	SS	100/ 100		○			
18		END OF BOREHOLE AT 17.5m UPON AUGER REFUSAL. BOREHOLE OPEN TO 15.8m AND WATER LEVEL AT 7.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m, THEN CUTTINGS TO 0.1m AND THEN ASPHALT TO SURFACE.									
19			136.81 17.53								
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.01

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR



RECORD OF BOREHOLE 09-048

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 30, 2009
 COMPLETED : March 30, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		153.54							
		ASPHALT (110mm)		153.99							
1		SAND and GRAVEL Dense Brown Damp (FILL)		152.63	1	SS	47				
		Silty CLAY, sandy, trace gravel Firm to Stiff Brown (FILL)(CI)		150.34	2	SS	6				
2				0.91	3	SS	8	Grain Size Analysis: Gr 1%/ Sa 35%/ Si 39%/ Cl 25%			
					4	SS	11				
3											
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown to Brownish Grey (TILL)(CL)		150.34	5	SS	15				
4				3.20							
		Occasional sand pockets, occasional silt seams			6	SS	30				
5											
					7	SS	30	Grain Size Analysis: Gr 4%/ Sa 39%/ Si 34%/ Cl 23%			
6											
					8	SS	36				
7											
		Silty SAND, some gravel, trace clay, occasional sand pockets Dense to Very Dense Grey Moist (TILL)		145.16	9	SS	32	Grain Size Analysis: Gr 10%/ Sa 55%/ Si 26%/ Cl 8%			
8				8.38							
					10	SS	82				
9											
					11	SS	67				
10											
					12	SS	100/ .125				
11											
12											
13											
14											
		SAND, medium to fine grained, some silt to silty, trace gravel, trace clay		138.91							
				14.63							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR

THURBER2S(REV) 1160.GPJ 7/9/09

138.91



RECORD OF BOREHOLE 09-048

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 30, 2009
 COMPLETED : March 30, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
16		Very Dense Grey Moist		137.54 16.00	13	SS	125/ .225					138.22
		Silty CLAY, some sand, trace gravel Hard Grey (TILL)		136.70 16.84	14	SS	100/ .075	Grain Size Analysis: Gr 6% / Sa 64% / Si 21% / Cl 9%				136.70
17		END OF BOREHOLE AT 16.8m UPON AUGER REFUSAL. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 7.9 145.6 2009.05.05 7.0 146.5 2009.05.21 7.0 146.5										
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : RPR

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-049

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ○		
		GROUND SURFACE		149.62							
1		TOPSOIL (150mm) Brown Moist Silty CLAY, trace sand, trace gravel Firm Mottled Brown Grey (FILL)		149.00 0.15	1	SS	6				
2		Silty SAND, some clay, trace gravel Compact Grey Moist		147.79 1.83	3	SS	19	Grain Size Analysis: Gr 1%/ Sa 65%/ Si 25%/ Cl 9%			
3		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown to Grey (TILL)(CL)		147.41 2.21	4	SS	19				
4											
5											
6		END OF BOREHOLE AT 5.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		144.44 5.18	6	SS	56	Grain Size Analysis: Gr 2%/ Sa 41%/ Si 37%/ Cl 19%			
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-050

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: C_u , KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		150.13								
1		SAND, some silt, trace gravel Loose Brown Moist Mottled Brown Grey (TILL) Silty CLAY, some sand to sandy, trace gravel Very Stiff to Hard		0.00								
	149.82			1	SS	9						
	0.30											
				2	SS	22						
2				3	SS	30		Grain Size Analysis: Gr 0% / Sa 21% / Si 51% / Cl 27%				
				4	SS	29						
3												
4												
5												
6		END OF BOREHOLE AT 5.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		144.94								
				5.18								
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-051

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 1, 2009
 COMPLETED : April 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		149.62							
1		SAND, some silt, trace gravel Compact Brown Moist	0.00	1	SS	21					
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Mottled Brown Grey (TILL)	148.86 0.76	2	SS	16					
2				3	SS	23	Grain Size Analysis: Gr 0% / Sa 27% / Si 49% / Cl 24%				
3				4	SS	52					
4		Grey		5	SS	63					
5				6	SS	33					
6		SAND and SILT, trace gravel, trace to some clay Very Dense Grey Moist (TILL)	143.52 6.10	7	SS	50/ .075					
7				8	SS	69	Grain Size Analysis: Gr 7% / Sa 51% / Si 35% / Cl 7%				
8											
9		END OF BOREHOLE AT 8.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.	141.41 8.21								
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-052

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 13, 2009
 COMPLETED : March 13, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.48							
		ASPHALT (100mm)		150.98							
1		SAND and GRAVEL, some silt Brown (FILL)		150.72	1	AS					
		Silty CLAY, some sand, trace gravel Very Stiff Brown Moist (FILL)		149.27	1	SS	15				
2					2	SS	17				19mm PVC Pipe
		Silty CLAY, sandy, trace gravel, occasional cobbles Stiff to Firm Brown (TILL)		148.27	3	SS	8	Grain Size Analysis: Gr 1%/ Sa 26%/ Si 47%/ Cl 26%			
3					4	SS	7				
4		Becoming hard			5	SS	39	Grain Size Analysis: Gr 3%/ Sa 24%/ Si 53%/ Cl 20%			Bentonite
5					6	SS	28				
6					7	SS	37	Grain Size Analysis: Gr 5%/ Sa 26%/ Si 45%/ Cl 24%			
7					8	SS	50/ .075				
8					9	SS	50/ .100	Grain Size Analysis: Gr 4%/ Sa 37%/ Si 49%/ Cl 10%			
9					10	SS	50/ .075				
10											
11		SAND and SILT, some clay, trace gravel, occasional cobbles Very Dense Grey Moist (TILL)		140.82							
12		Wet									
13		END OF BOREHOLE AT 12.6m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.21 3.5 148.0		138.91							
14				12.57							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR

THURBER2S(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-053

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 12, 2009
 COMPLETED : March 12, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.34							
		ASPHALT (50mm)		150.00	1	AS					
		SAND and GRAVEL Brown Moist (FILL)		150.58							
1		Silty CLAY, some sand, trace gravel Stiff to Firm Mottled Brown Grey (FILL)		0.76	1	SS	10				
2					2	SS	14				
3					3	SS	6				
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)		148.37							
				2.97	4	SS	15	Grain Size Analysis: Gr 0% / Sa 25% / Si 45% / Cl 30%			
5					5	SS	35				
6					6	SS	42				
8					7	SS	28	Grain Size Analysis: Gr 0% / Sa 25% / Si 46% / Cl 29%			
9		Occasional rock pieces									
					8	SS	53				
		SAND and SILT, trace gravel, trace clay Very Dense Grey Moist (TILL)		140.67							
				10.67	9	SS	50/ 125				
					10	SS	50/ .075				
					11	SS	50/ .075	Grain Size Analysis: Gr 9% / Sa 38% / Si 48% / Cl 5%			
14		Wet Occasional coarse sand seams									

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.03.12

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR

THURBER2S(REV) 1160.GPJ 6/11/09



RECORD OF BOREHOLE 09-053

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 12, 2009
 COMPLETED : March 12, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV.		NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT		
DEPTH (m)	TOP			wp	wl							
-16		END OF BOREHOLE AT 15.4m. BOREHOLE OPEN AND WATER LEVEL AT 15.4m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.	c s	135.95 15.39	12	SS	50/ .025		○		▽	
-17												
-18												
-19												
-20												
-21												
-22												
-23												
-24												
-25												
-26												
-27												
-28												
-29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.03.12

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR

THURBER2S(REV) 1160.GPJ 6/11/09



RECORD OF BOREHOLE 09-054

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 12, 2009
 COMPLETED : March 12, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		151.34							
		ASPHALT (100mm)		150.08 0.10							
1		SAND and GRAVEL Brown Moist (FILL)		150.73 0.61	1	AS					
		Silty CLAY, some sand, occasional rootlets Stiff Mottled Brown (FILL)			1	SS	12				
2					2	SS	13				
		Silty CLAY, sandy, trace gravel Stiff to Very Stiff Mottled Brown (TILL)(CI to CL)		149.13 2.21	3	SS	8				
3					4	SS	15	Grain Size Analysis: Gr 0% / Sa 39% / Si 45% / Cl 16%			
4											
5					5	SS	27				
6		Becoming grey			6	SS	18				
7											
8		Becoming hard			7	SS	52	Grain Size Analysis: Gr 5% / Sa 37% / Si 42% / Cl 16%			
9											
10					8	SS	71				
11		SAND and SILT, some gravel, trace clay Very Dense Grey Moist (TILL)		140.68 10.67	9	SS	100/ 250				
12					10	SS	50/ 125	Grain Size Analysis: Gr 13% / Sa 48% / Si 31% / Cl 8%			
13											
14		END OF BOREHOLE AT 13.9m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 0.1m THEN ASPHALT TO SURFACE.		137.40 13.94	11	SS	50/ 075				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG

CHECKED : RPR



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-055

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 11, 2009
 COMPLETED : March 11, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.29							
1		SAND and GRAVEL Brown Wet (FILL)		0.00	1	AS					
		Silty CLAY, some sand, trace gravel Firm to Stiff Mottled Brown (FILL)		150.68	1	SS	8				
2		Some gravel		0.61	2	SS	10				
					3	SS	14				
3		Silty CLAY, sandy, trace gravel Stiff to Hard Mottled Grey Brown (TILL)(CL)		148.31	4	SS	11				
4				2.97							
5					5	SS	38	Grain Size Analysis: Gr 2%/ Sa 25%/ Si 53%/ Cl 20%			
6					6	SS	35				
7					7	SS	34				
8					8	SS	46	Grain Size Analysis: Gr 3%/ Sa 39%/ Si 46%/ Cl 12%			
9											
10											
11		SAND and SILT, trace clay, trace gravel Compact to Very Dense Grey Wet (TILL)		140.62	9	SS	21				
12				10.67							
13					10	SS	100/ 125	Grain Size Analysis: Gr 8%/ Sa 49%/ Si 34%/ Cl 9%			
14					11	SS	50/ 025				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR

THURBER2(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-055

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 11, 2009
 COMPLETED : March 11, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
16		Silty CLAY, some sand, trace gravel, with fragments and slabs of shale and limestone Grey (TILL) Occasional rock fragments		136.02	12	08	50/	O			
17	15.26			1	NQ	TCR=3%, SCR=0%, RQD=0%	134.52				
18				2	NQ	TCR=20%, SCR=0%, RQD=0%					
19					3	NQ	TCR=100%, SCR=0%, RQD=0%			133.00	
20		END OF BOREHOLE AT 19.8m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.09 3.4 147.9 2009.05.21 3.6 147.7		131.47							131.47
21				19.81							
22											
23											
24											
25											
26											
27											
28											
29											

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : RPR



RECORD OF BOREHOLE 09-056

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 8, 2009
 COMPLETED : April 8, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ○		
		GROUND SURFACE		148.33							
		TOPSOIL: (100mm)		148.00	1	AS					
1		SILT, some sand, some clay, trace gravel Compact to Very Dense Brown Moist		148.00 0.10	1	SS	19				
2				146.19	2	SS	100/ 250				
3		Silty CLAY, sandy, trace gravel, occasional sand lenses Hard Brown (TILL)		146.19 2.13	3	SS	100/ 225				
4		Grey			4	SS	89	Grain Size Analysis: Gr 7% / Sa 35% / Si 36% / Cl 22%			
5					5	SS	47				
6		SAND and SILT, trace clay, trace gravel Very Dense Grey Moist (TILL)		142.69 5.64	6	SS	50/ .075	Grain Size Analysis: Gr 2% / Sa 47% / Si 42% / Cl 9%			
7											
8					7	SS	100/ .075				
9											
10					8	SS	100/ 100	Grain Size Analysis: Gr 3% / Sa 47% / Si 42% / Cl 8%			
11					9	SS	100/ .100				
12		Sandy GRAVEL, some silt Very Dense Grey Wet		136.44 11.89	10	SS	189				
13		END OF BOREHOLE AT 12.8m. BOREHOLE OPEN AND WATER LEVEL AT 7.0m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		135.52 12.80							
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.08

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-057

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 4, 2009
 COMPLETED : April 4, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V -		
		GROUND SURFACE		157.21							
		TOPSOIL (50mm)		150.00	1	AS					
1		SHALE fragments and slabs, occasional limestone pieces Grey (FILL)			1	SS	10				
					2	SS	23/200				
2					3	SS	13				
3				154.16	4	SS	50/100				
		Silty CLAY, some sand, trace gravel, frequent fragments and slabs of shale and limestone Stiff Grey (FILL)		3.05							
4					5	SS	13				
5					6	SS	14				
6					7	SS	12				
7					8	SS	15	Grain Size Analysis: Gr 23%/ Sa 48%/ Si 18%/ Cl 11%			
8					9	SS	92	Grain Size Analysis: Gr 3%/ Sa 36%/ Si 40%/ Cl 21%			
9				147.69							
10		Silty CLAY, sandy, trace gravel, occasional oxide staining, occasional cobble Hard Brown (TILL)		9.53							
11		Occasional sand pockets									
12		Grey									
13				144.41	10	SS	60				
		END OF BOREHOLE AT 12.8m. BOREHOLE OPEN TO 10.7m AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		12.80							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-058

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 8, 2009
 COMPLETED : April 8, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		147.43								
		TOPSOIL (100mm)		149.00 148.10	1	AS						
1		Silty CLAY, sandy, trace gravel, occasional cobbles Hard Brown (TILL) Grey			1	SS	41					
2					2	SS	90					
3					3	SS	100/200					
4					4	SS	100/200		Grain Size Analysis: Gr 4%/ Sa 34%/ Si 37%/ Cl 25%			
5					5	SS	62					
6		SILT and SAND, some clay, trace gravel Very Dense Grey Moist (TILL)		141.94 5.49	6	SS	100/150					
7												
8					7	SS	100/075					
9												
10				137.67 9.75	8	SS	177					
11		END OF BOREHOLE AT 9.8m. BOREHOLE OPEN AND WATER LEVEL AT 5.5m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.										
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.08

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-059

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 8, 2009
 COMPLETED : April 8, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: C_u , KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		144.63							
		TOPSOIL (125mm)		148.80 0.13	1	AS					
1		Silty CLAY, sandy, trace gravel, occasional cobbles Hard Brown (TILL)									
2		Grey			1	SS	42				
3					2	SS	100				
4					3	SS	100/ .200				
5					4	SS	100/ .250	Grain Size Analysis: Gr 3%/ Sa 37%/ Si 44%/ Cl 16%			
6					5	SS	100/ .125				
7		END OF BOREHOLE AT 6.2m. BOREHOLE OPEN AND WATER LEVEL AT 4.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		138.46 6.17	6	SS	100/ .075				
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.08

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



RECORD OF BOREHOLE 09-060

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 7, 2009
 COMPLETED : April 7, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		153.37								
		TOPSOIL: (150mm)		150.00								
1		Silty CLAY, sandy, trace gravel, occasional cobbles Stiff to Hard Mottled Brown Grey (FILL)		150.00 - 0.15	1	SS	7					
2		Occasional shale pieces			2	SS	33					
					3	SS	25					
3					4	SS	20	Grain Size Analysis: Gr 8% / Sa 34% / Si 34% / Cl 24%				
4					5	SS	11					
5		Silty CLAY, sandy, trace gravel Hard Brown-Grey (TILL)		148.19 - 5.18	6	SS	100/ 275				19mm PVC Pipe	
6		Grey			7	SS	39					
8					8	SS	62	Grain Size Analysis: Gr 5% / Sa 33% / Si 39% / Cl 23%				Bentonite
9					9	SS	55					
11		Silty SAND, some silt, trace to some clay Very Dense Grey Moist (TILL)		142.70 - 10.67	10	SS	100					
12		Occasional shale fragments			11	SS	100/ 225	Grain Size Analysis: Gr 14% / Sa 53% / Si 27% / Cl 6%				141.18
13												
14					12	SS	100/ 150					Sand Filter

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-060

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 7, 2009
 COMPLETED : April 7, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT			
									wp			wl
16		Silty SAND, some silt, trace to some clay Very Dense Grey Moist (TILL)		13	SS	100/.150					138.13 Slotted Screen 136.61 	
17		END OF BOREHOLE AT 16.9 BOREHOLE OPEN AND WATER LEVEL AT 7.6m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 10.1 143.3 2009.05.05 8.0 145.4 2009.05.21 2.3 151.1		14	SS	100/.100						
18				136.51								
19				16.86								
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-061

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 7, 2009
 COMPLETED : April 7, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		149.36								
		TOPSOIL: (150mm)		149.08								
1		Silty CLAY, sandy, trace gravel, occasional cobbles Hard to Stiff Brown (FILL)	[Hatched Pattern]	149.08 0.15	1	SS	50/075					
2					2	SS	31					
3					3	SS	14					
4		Silty CLAY, sandy, trace gravel, occasional cobbles Hard Brown (TILL)	[Hatched Pattern]	145.86 3.51	5	SS	51					
5					6	SS	50					
6												
7					7	SS	43					
8					8	SS	100/200					
9		SAND and SILT, trace gravel, trace clay Very Dense Grey Moist to Wet (TILL)	[Dotted Pattern]	140.98 8.38	9	SS	100/125					
10					10	SS	100/100					
11												
12												
13		END OF BOREHOLE AT 12.3m. BOREHOLE OPEN AND WATER LEVEL AT 9.1m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 6.1m THEN CUTTINGS TO SURFACE.		137.07 12.29	11	SS	100/100					
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.07

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-062

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 9, 2009
 COMPLETED : April 9, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wf		
		GROUND SURFACE		143.73							
1		Silty CLAY, trace sand, trace gravel, rootlets Stiff to Very Stiff Mottled Brown Grey		0.00	1	SS	10				
2		Silty CLAY, sandy, trace gravel Hard Mottled Brown Grey (TILL)		142.36 1.37	2	SS	16				
3					3	SS	39				
4					4	SS	39				
5		Grey			5	SS	37	Grain Size Analysis: Gr 2% / Sa 36% / Si 39% / Cl 23%			
6		SAND and SILT, some clay, trace gravel Dense to Compact Grey Moist (TILL)		139.47 4.27	6	SS	32	Grain Size Analysis: Gr 9% / Sa 40% / Si 40% / Cl 11%			
7				137.03 6.71	7	SS	17				
8		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.									
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER25(REV) 1180.GPJ 6/19/09

RECORD OF BOREHOLE 09-063

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		143.83							
		TOPSOIL: (150mm)		140.88							
1		Silty CLAY, some sand to sandy, trace gravel, rootlets Soft to Hard Brown to Grey (TILL)		140.15	1	SS	3				
	141.54			2	SS	15					
2				141.54	3	SS	30		Grain Size Analysis: Gr 1%/ Sa 19%/ Si 52%/ Cl 28%		
3		Silty SAND, some gravel, trace to some clay Compact to Very Dense Grey Moist (TILL)		141.54	4	SS	10				
				141.54	5	SS	42				
5				141.54	6	SS	56/ .150				
6				141.54	7	SS	59/ .125	Grain Size Analysis: Gr 16%/ Sa 44%/ Si 31%/ Cl 9%			
7				141.54	8	SS	65/ .150				
8		Silty CLAY, some sand, trace gravel Hard Grey (TILL)		136.21	8	SS	65/ .150				
9				136.21							
10		END OF BOREHOLE AT 9.1m. BOREHOLE SIDEWALLS CAVED AT 1.5m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		134.69							
11				9.14							
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-064

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 9, 2009
 COMPLETED : April 9, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		141.81							
1		Silty CLAY, some sand, trace gravel, trace rootlets Firm to Stiff Mottled Black Brown Grey		0.00	1	SS	7				
	2			SS	9						
2	3			SS	11						
		Silty CLAY, sandy, trace gravel Hard Brown (TILL)		139.60							
	2.21			4	SS	38					
3				5	SS	46					
4				6	SS	29		Grain Size Analysis: Gr 8% / Sa 34% / Si 41% / Cl 17%			
5		Grey Occasional silt and coarse sand lenses			7	SS	89				
6											
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		135.16 6.65							
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-065

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 31, 2009
 COMPLETED : March 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl			
		GROUND SURFACE		142.58								
1		Silty CLAY, trace sand, trace gravel, rootlets Firm Brown (FILL)		0.00 141.97 0.61	1	SS	7		○			
2		Silty CLAY, some sand to sandy, trace gravel Very Stiff Mottled Brown Grey (TILL)			2	SS	23		○			
3					3	SS	24		○			
4					4	SS	29	Grain Size Analysis: Gr 1% / Sa 20% / Si 51% / Cl 28%	○			
5					5	SS	26		○		19mm PVC Pipe	
6					6	SS	18		○		Bentonite	
7		Silty SAND, some clay, some gravel, occasional cobbles Very Dense Grey Moist (TILL)		136.48 6.10	7	SS	54	Grain Size Analysis: Gr 10% / Sa 48% / Si 29% / Cl 13%	○			
8					8	SS	50/ .125		○			
9					9	SS	80/ .225		○		Sand Filter	
10									○		Slotted Screen	
11		END OF BOREHOLE AT 10.8m. BOREHOLE OPEN AND WATER LEVEL AT 6.1m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 2.2 140.4 2009.05.05 2.0 140.6 2009.05.21 2.2 140.4		131.76 10.82	10	SS	50/ .150	Grain Size Analysis: Gr 12% / Sa 44% / Si 34% / Cl 10%	○			134.20 133.28 131.76
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-066

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 9, 2009
 COMPLETED : April 9, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		142.64							
1		Silty CLAY, some sand, trace gravel, rootlets Firm to Very Stiff Mottled Brown Grey		0.00	1	SS	7				
	2			SS	23						
2	3			SS	25						
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)		140.43							
	3			4	SS	19	Grain Size Analysis: Gr 1%/ Sa 24%/ Si 43%/ Cl 32%				
	4			5	SS	40					
5	6			SS	18						
	7			7	SS	20					
		Grey		140.43							
	8			8	SS	25	Grain Size Analysis: Gr 2%/ Sa 40%/ Si 35%/ Cl 23%				
	9										
	10			132.89	9	SS	29				
		END OF BOREHOLE AT 9.8m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		9.75							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-067

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 9, 2009
 COMPLETED : April 9, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		141.14								
1		Silty CLAY, some sand, trace gravel, rootlets Firm to Very Stiff Brown		0.00	1	SS	6					
2		Silty CLAY, sandy, trace gravel Hard Brown (TILL)		139.69 1.45	2	SS	21					
3					3	SS	30					
4					4	SS	34					
5		Clayey SILT and SAND, trace gravel Hard Grey Moist (TILL)		136.57 4.57	5	SS	53					
6					6	SS	68	Grain Size Analysis: Gr 7% / Sa 40% / Si 38% / Cl 15%				
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		134.43 6.71	7	SS	50					
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-068

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 19, 2009
 COMPLETED : March 19, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V -		
		GROUND SURFACE		139.74							
		TOPSOIL: (125mm)		139.00							
1		Silty CLAY, trace to some sand, trace gravel, trace rootlets Firm Brown		138.97	1	SS	4				
2		Silty CLAY, some sand to sandy, trace gravel Very Stiff to Hard Mottled Brown Grey (TILL)(CL)		138.76	2	SS	15				
3					3	SS	20				
4					4	SS	40	Grain Size Analysis: Gr 3%/ Sa 26%/ Si 47%/ Cl 24%			
5					5	SS	76				
5		SILT and SAND, some clay to clayey, trace gravel Compact Grey (TILL)		135.16	6	SS	26	Grain Size Analysis: Gr 4%/ Sa 41%/ Si 46%/ Cl 9%			
6											
7					7	SS	24				
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND WATER LEVEL AT 6.4m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		133.03							
8				6.71							
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



RECORD OF BOREHOLE 09-069

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 8, 2009
 COMPLETED : April 8, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		139.51							
		TOPSOIL: (250mm)		139.26							
1		Silty CLAY, some sand, trace gravel Firm to Very Stiff Mottled Brown Grey		139.00 0.25	1	SS	7				
					2	SS	20				
2		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown to Grey (TILL)		137.99 1.52	3	SS	22				
					4	SS	53				
3					5	SS	61	Grain Size Analysis: Gr 5% / Sa 33% / Si 45% / Cl 17%			
4											
5		Grey			6	SS	41				
6											Bentonite
7					7	SS	31				
8		SAND and SILT, trace to some clay, trace gravel Very Dense Grey (TILL)		131.89 7.62	8	SS	100				19mm PVC Pipe
9					9	SS	102	Grain Size Analysis: Gr 9% / Sa 47% / Si 38% / Cl 6%			
10											
11					10	SS	54				
12											127.62
13					11	SS	100/ 200				
14					12	SS	100/ 150				Sand Filter
											124.57

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 6/11/09



RECORD OF BOREHOLE 09-069

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 8, 2009
 COMPLETED : April 8, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES		COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	NUMBER	TYPE		nat V	Q -		
16		SAND and SILT, some clay, trace gravel Very Dense Grey (TILL)		13	SS	100/200				Slotted Screen 123.05
17				14	SS	100/225				
17.15		END OF BOREHOLE AT 17.1m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.								
18		WATER LEVEL READINGS:								
		DATE DEPTH (m) ELEV. (m)								
		2009.04.16 2.6 136.9								
		2009.05.05 0.2 ags 139.7								
		2009.05.21 0.6 ags 140.1								
		ags = above ground surface								

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-070

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 18, 2009
 COMPLETED : March 18, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Open ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		138.99							
		TOPSOIL: (100mm)		138.89 0.10	1	SS	5				
1		Silty CLAY, some sand, trace gravel, rootlets Firm Brown		138.23 0.76	2	SS	12				
2		Silty CLAY, some sand to sandy, trace gravel Stiff to Hard Mottled Brown Grey (TILL)(CL)			3	SS	20				
3		Brown			4	SS	22	Grain Size Analysis: Gr 2% / Sa 23% / Si 46% / Cl 29%			
					5	SS	32	Grain Size Analysis: Gr 0% / Sa 26% / Si 50% / Cl 24%			
4					6	SS	14				
5					7	SS	15	Sampler wet			
8		SILT and SAND, trace clay to clayey, trace gravel Dense to Very Dense Grey Wet (TILL)		131.37 7.62	8	SS	29	Grain Size Analysis: Gr 3% / Sa 37% / Si 45% / Cl 15%			
9		Occasional cobbles and boulders			9	SS	76				
10					10	SS	59				
11					11	SS	73	Grain Size Analysis: Gr 4% / Sa 44% / Si 45% / Cl 7%			
12					12	SS	62				
13											
14					13	SS	59				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG

CHECKED : MA

THURBER2(S)(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-070

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 18, 2009
 COMPLETED : March 18, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ●, rem V - ●, Q - ✕, Cpen - ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		WATER CONTENT, PERCENT wp — w — wt			
16		SILT and SAND, trace to some clay, trace gravel Dense to Very Dense Grey Wet (TILL)	[Strata Plot]				14	SS	50/ .125	○		
17			[Strata Plot]				15	SS	84/ .250	○		
18			[Strata Plot]				16	SS	50/ .150	○		
19		END OF BOREHOLE AT 18.6m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.			120.40 18.59							
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER25(REV) 1160.GPJ 6/11/09



RECORD OF BOREHOLE 09-071

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 19, 2009
 COMPLETED : March 19, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		139.26							
		ASPHALT (150mm)		130.00							
		SAND and GRAVEL (crushed limestone) Very Dense		0.15							
1		Brown Dry (FILL)		138.55	1	SS	54				
		Silty CLAY, sandy, trace gravel Very Stiff to Hard		0.71	2	SS	18				
2		Brown (TILL)(CL)									
					3	SS	19				
3											
					4	SS	23				
4											
					5	SS	72				
5		SAND and GRAVEL, trace silt Dense Grey Wet		134.69	6	SS	50	Grain Size Analysis: Gr 39%/ Sa 51%/ Si & Cl 10%			
6				4.57							
		Clayey SILT and SAND, trace gravel Hard Grey (TILL)(CL)		133.16	7	SS	79	Grain Size Analysis: Gr 3%/ Sa 36%/ Si 43%/ Cl 18%			
7				6.10							
					8	SS	50/150				
8		END OF BOREHOLE AT 7.9m. BOREHOLE OPEN AND WATER LEVEL AT 4.6m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 0.5m, THEN CONCRETE TO 0.2m, THEN ASPHALT TO SURFACE.		131.33							
9				7.92							
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



RECORD OF BOREHOLE 09-072

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		138.42							
		TOPSOIL: (75mm)		138.08							
1		Silty CLAY, some sand, trace gravel, topsoil stained Firm to Stiff Brown			1	SS	8				
					2	SS	13				
2		Silty CLAY, sandy, trace gravel, occasional oxide staining Stiff to Hard Brown (TILL)		136.97 1.45							
					3	SS	9				
					4	SS	32				
					5	SS	43				
5		Grey			6	SS	42	Grain Size Analysis: Gr 3%/ Sa 37%/ Si 42%/ Cl 18%			
6		SILT and SAND, some clay, trace gravel Dense Grey Moist (TILL)		132.78 5.64							
					7	SS	42				
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND WATER LEVEL AT 2.1m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.7m THEN CUTTINGS TO SURFACE.		131.71 6.71							
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.14

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-073

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - \bullet rem V - \bullet		
		GROUND SURFACE		138.37							
		TOPSOIL: (75mm)		138.00							
1		Clayey SILT, some sand, trace gravel Stiff Brown (FILL)		137.99 0.38 137.61 0.76	1	SS	9				
2		SAND, fine grained, some gravel Loose Brown Moist (FILL)		136.54 1.83	2	SS	12				
3		Silty CLAY, some sand, trace gravel Stiff Brown			3	SS	17				
4		Silty CLAY, sandy, trace gravel, occasional oxide staining, occasional cobble Very Stiff to Hard Brown (TILL)			4	SS	20				
5					5	SS	27				
6		SILT and SAND, some clay, trace gravel Very Dense Grey Moist (TILL)		133.19 5.18	6	SS	85	Grain Size Analysis: Gr 6%/ Sa 40%/ Si 38%/ Cl 17%			
7				131.69 6.68	7	SS	77				
8		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 4.0 134.4 2009.05.21 1.9 136.5									19mm PVC Pipe Bentonite Sand Filler Slotted Screen

GROUNDWATER ELEVATIONS

∇ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

\blacktriangledown DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-074

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 21, 2009
 COMPLETED : April 21, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		138.47								
		TOPSOIL: (100mm)		138.00								
1		Silty CLAY, sandy, trace gravel, occasional cobbles Very Stiff to Hard Brown (TILL)		0.10	1	SS	7					
							2	SS	23			
2							3	SS	20			
3							4	SS	25	Grain Size Analysis: Gr 7% / Sa 24% / Si 46% / CI 23%		
4							5	SS	69/ 250			
5		Grey			6	SS	24	Grain Size Analysis: Gr 5% / Sa 29% / Si 45% / CI 21%				
6		Clayey SILT and SAND, trace gravel Hard Grey (TILL)		133.13 5.33	7	SS	83					
7		END OF BOREHOLE AT 6.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 1.5m THEN CUTTINGS TO SURFACE.		132.22 6.25	8	SS	50/ 150					
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-075

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 21, 2009
 COMPLETED : April 21, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		138.13								
		TOPSOIL: (75mm)		138.08								
1		Silty CLAY, sandy, trace gravel, occasional cobble Very Stiff to Hard Brown (TILL) Grey			1	SS	7					
					2	SS	27					
2					3	SS	30					
					4	SS	32					
3					5	SS	45		Grain Size Analysis: Gr 1%/ Sa 41%/ Si 28%/ Cl 30%			
4					6	SS	33					
5					7	SS	50/150					
6		END OF BOREHOLE AT 6.4m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		131.73								
7		WATER LEVEL READINGS:		6.40								
8		DATE DEPTH (m) ELEV. (m)										
		2009.05.05 0.8 137.3										
		2009.05.21 1.5 136.6										
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-076

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		137.45							
		TOPSOIL (75mm)		138.88							
1		Clayey SILT, some sand, trace gravel, trace roots Stiff Brown (FILL)		136.76	1	SS	8		○		
2		Silty CLAY, sandy, trace gravel, occasional oxide staining Stiff to Very Stiff Brown (TILL)		0.69	2	SS	13		○		
3		Occasional silt pockets			3	SS	11		○		
4					4	SS	22		○		
5		Occasional sand pockets			5	SS	22	Grain Size Analysis: Gr 4%/ Sa 30%/ Si 39%/ Cl 27%	○	—	
6		Hard			6	SS	26		○		
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.7m THEN CUTTINGS TO SURFACE.		130.74 6.71	7	SS	57		○		
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-077

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 17, 2009
 COMPLETED : March 17, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		136.48							
		ASPHALT (150mm)		136.00							
1		SAND and GRAVEL Dense Brown Moist (FILL)		136.00 0.15	1	AS					
					1	SS	34				
2		Clayey SILT, some sand, trace gravel Soft to Firm Brown (FILL)		134.96 1.52	2	SS	4				
3		Silty CLAY, sandy, trace gravel, occasional cobbles Stiff to Very Stiff Brown to Grey (TILL)		134.19 2.29	3	SS	9				
					4	SS	10				
5					5	SS	20				
								Grain Size Analysis: Gr 3% / Sa 24% / Si 51% / Cl 22%			
6											
7		Silty SAND, trace clay Very Dense Grey Moist		130.08 6.40	6	SS	56				
8		Silty CLAY, some sand, trace gravel Hard Grey (TILL)		128.86 7.62	7	SS	46				
								Grain Size Analysis: Gr 4% / Sa 14% / Si 61% / Cl 21%			
9		END OF BOREHOLE AT 8.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS AND BENTONITE TO 0.2m THEN ASPHALT TO SURFACE.		128.25 8.23							
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-077A

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 31, 2009
 COMPLETED : July 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		136.75							
		TOPSOIL: (75mm)		136.88							
1		Clayey SILT, some sand, trace gravel, trace roots and rootlets Firm to Very Stiff Brown (FILL)			1	SS	6				
					2	SS	19				
2					3	SS	14				
		Silty CLAY, trace gravel, occasional shale fragments, occasional decayed wood Stiff Grey to Black (FILL)		134.46							
				2.29	4	SS	9				
3					5	SS	19				
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Grey (TILL)		133.40							
				3.35	6	SS	20	Grain Size Analysis: Gr 0%/ Sa 25%/ Si 43%/ Cl 32%			
4					7	SS	44				
					8	SS	68				
5					9	SS	64	Grain Size Analysis: Gr 3%/ Sa 38%/ Si 46%/ Cl 13%			
6		SAND and SILT, some clay, trace gravel Very Dense Grey (TILL)		130.65							
				6.10							
7		END OF BOREHOLE AT 6.6m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 4.9m, THEN CUTTINGS TO SURFACE.		130.20							
				6.55							
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-078

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 13, 2009
 COMPLETED : April 13, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●				Q - ✕ Cpen - ▲
		GROUND SURFACE		136.73									
		TOPSOIL: (250mm)		136.48									
1		Silty CLAY, sandy, trace gravel, occasional oxide staining, occasional cobble Firm to Hard Brown (TILL) Grey		0.25	1	SS	10						
							2	SS	6				
2							3	SS	32				
3							4	SS	39				
4							5	SS	83	Grain Size Analysis: Gr 0%/ Sa 37%/ Si 46%/ Cl 17%			
5					6	SS	73						
6		Silty SAND, trace to some gravel Very Dense Grey Moist		131.09 5.64									
7					7	SS	59	Grain Size Analysis: Gr 8%/ Sa 57%/ Si 25%/ Cl 10%					
8		Clayey SILT, some sand, trace gravel Hard Grey (TILL)		129.57 7.16									
8				128.68 8.05	8	SS	103/ 275						
9		END OF BOREHOLE AT 8.1m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.4m THEN CUTTINGS TO SURFACE.											
10													
11													
12													
13													
14													

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : ES
CHECKED : MA



RECORD OF BOREHOLE 09-079

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 13, 2009
 COMPLETED : April 13, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		137.72							
		TOPSOIL (50mm)		138.88							
1		Clayey SILT, some sand, trace gravel, occasional sand pockets Firm to Stiff Brown	[Strata Plot: Diagonal Hatching]		1	SS	6				
					2	SS	12				
2		Silty CLAY, sandy, trace gravel, occasional oxide staining, occasional cobble Very Stiff to Hard Brown (TILL)	[Strata Plot: Vertical Hatching]	136.20 1.52							
					3	SS	23				
3		Occasional clay seam and sand pockets			4	SS	26	Grain Size Analysis: Gr 2%/ Sa 25%/ Si 43%/ Cl 30%			
					5	SS	35				
4											
5		Grey			6	SS	21				
6					7	SS	23				
7											
8					8	SS	56				
9		END OF BOREHOLE AT 8.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.1m THEN CUTTINGS TO SURFACE.		129.49 8.23							
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-080

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		135.08							
		TOPSOIL: (130mm)		138.08 0.13							
1		Clayey SILT, some sand, trace gravel, occasional cobbles, sand pockets and wood fibers Stiff to Firm Brown (FILL)			1	SS	11				
					2	SS	11				
2					3	SS	8				
		Sand layer at 2.6m			4	SS	7				
3											
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Grey (TILL)		131.90 3.18	5	SS	27	Grain Size Analysis: Gr 5%/ Sa 38%/ Si 36%/ Cl 21%			
4											
5					6	SS	54				
6											
7					7	SS	78				
8											
9		Gravelly SAND, medium to fine grained, trace silt Very Dense to Loose Grey Wet		126.39 8.69	9	SS	65	Grain Size Analysis: Gr 35%/ Sa 57%/ Si & Cl 8%			
10											
11					10	SS	8				
12											
13					11	SS	53				
14		Sandy SILT, trace gravel, trace clay Very Dense Grey Damp (TILL)		121.23 13.84	12	SS	100/ 125				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.14

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

THURBERZ(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-080

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲ 40 80 120 160		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		WATER CONTENT, PERCENT wp ----- wl 10 20 30 40			
16		Sandy SILT, trace gravel, trace clay Very Dense Grey Damp (TILL)	[Strata Plot]		13	SS	100/ .125		○			
17		END OF BOREHOLE AT 16.9m. BOREHOLE OPEN TO 11.9m AND WATER LEVEL AT 2.1m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		118.21 16.86	14	SS	100/ .100		○			
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.14

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 6/11/09



RECORD OF BOREHOLE 09-081

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 16, 2009
 COMPLETED : March 16, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		135.95							
		ASPHALT (150mm)		136.80							
		SAND and GRAVEL Brown Moist		135.19	1	AS					
1		Silty CLAY, some sand, trace gravel Firm to Stiff Mottled Brown Grey (FILL)		135.19	1	SS	8				
2					2	SS	14				
		Clayey SILT, some sand, trace gravel Firm Mottled Brown Grey		133.74							
				2.21	3	SS	5				
3					4	SS	7				
4											
		Silty CLAY, sandy, trace gravel Hard Grey (TILL)		131.84							
				4.11	5	SS	34				
5											
					6	SS	49				Bentonite
6											
7											
8					7	SS	42				19mm PVC Pipe
9											
10											
11		SAND, fine to coarse grained, some gravel, trace silt Very Dense Grey Wet		125.28							
				10.67	9	SS	65				125.28
12											
13					10	SS	78/ 250				Sand Filter
14					11	SS	77/ 225				122.23
											Slotted Screen

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) : 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-081

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 16, 2009
 COMPLETED : March 16, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● Q - ✕ rem V - ● Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		WATER CONTENT, PERCENT wp --- w --- wl			
16		END OF BOREHOLE AT 15.3m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 0.6 135.3 2009.05.21 0.7 135.2	120.69 15.26	12	SS	50/ .025		O				120.71
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-082

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 9, 2009
 COMPLETED : April 9, 2009

Project No. 19-1351-160
 SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		137.05							
		TOPSOIL: (125mm)		136.99	1	AS					
1		Clayey SILT, some sand, trace gravel, occasional cobbles Stiff to Very Stiff Brown		136.99 0.13							
					1	SS	14				
2					2	SS	23				
		Silty CLAY, sandy, trace gravel Hard Brown (TILL)		134.84							
				2.21							
3					3	SS	56				
					4	SS	57				
4		END OF BOREHOLE AT 3.7m. BOREHOLE OPEN AND WATER LEVEL AT 2.4m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		133.40							
				3.66							

DRAFT

DRAFT

DRAFT

DRAFT

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.09

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : WB
 CHECKED : MA



RECORD OF BOREHOLE 09-083

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160
 SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● Q - ✕ rem V - ● Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp w wl		
		GROUND SURFACE		141.18							
1		Sandy SILT, trace to some shale fragments, occasional gravel Very Dense to Compact Brown to Grey Dry (FILL)		0.00	1	SS	50/150		○		
				139.66	2	SS	24		○		
2		SAND, trace silt, trace shale fragments Compact Mottled Brown Grey Moist (FILL)		1.52	3	SS	28		○		
				138.92							
3		Silty CLAY, sandy, trace gravel, occasional oxide staining Very Stiff to Hard Mottled Brown Grey (TILL)(CL)		2.26	4	SS	26	Grain Size Analysis: Gr 4% / Sa 24% / Si 48% / Cl 24%	○		
					5	SS	38		○		
5					6	SS	50/150		○		
6											
7		END OF BOREHOLE AT 6.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		6.20	7	SS	50/100		○		
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



RECORD OF BOREHOLE 09-084

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		138.55							
		TOPSOIL (130mm)		138.82 0.13	1	SS	7				
1		Clayey SILT, some sand, occasional rootlets Firm Dark Brown		137.79 0.76	2	SS	15				
2		Silty CLAY, sandy, trace gravel, occasional cobbles Very Stiff to Hard Mottled Brown Grey (TILL)			3	SS	46				
					4	SS	84				
3					5	SS	50/ .125	Grain Size Analysis: Gr 3%/ Sa 33%/ Sl 34%/ Cl 30%			
4					6	SS	38				
5		END OF BOREHOLE AT 5.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		133.37 5.18							
6		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 4.1 134.4 2009.05.21 2.4 136.1									
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-085

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		144.45							
1		Silty CLAY, trace to some sand, trace gravel Stiff Brown (FILL)(CL)		0.00	1	SS	9				
				142.98	2	SS	8				
2		Silty CLAY, sandy, trace gravel, occasional iron oxide staining Stiff to Hard Brown to Mottled Brown Grey (TILL)		1.47	3	SS	14				
					4	SS	45				
3					5	SS	50/150	Grain Size Analysis: Gr 0% / Sa 40% / Si 34% / Cl 26%			
					6	SS	82				
4					7	SS	42				
5					8	SS	84				
6											
7											
8											
9		END OF BOREHOLE AT 8.1m. BOREHOLE OPEN TO 7.6m AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 7.6 136.9 2009.05.21 6.8 137.6		136.37 8.08							
10											
11											
12											
13											
14											

Bentonite

19mm PVC Pipe

138.66
Sand Filter

136.83
Slotted Screen

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-086

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		144.06								
		TOPSOIL (130mm)		140.00								
1		Silty CLAY, sandy, trace gravel, occasional rootlets Stiff to Hard Mottled Brown Grey (TILL) Grey		0.13	1	SS	14					
							2	SS	26			
2							3	SS	44			
							4	SS	43			
3							5	SS	50			
4												
5							6	SS	36	Grain Size Analysis: Gr 5% / Sa 37% / Si 34% / Cl 24%		
6												
7		END OF BOREHOLE AT 6.6m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		137.51 6.55	7	SS	86					
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : GA
CHECKED : MA

THURBER25(REV) 1160.GPJ 6/11/09



RECORD OF BOREHOLE 09-087

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		147.13							
1		TOPSOIL (100mm) Silty CLAY, some sand to sandy, trace gravel, occasional rootlets Very Stiff to Hard Brown (TILL)(CL)		148.98	1	SS	10				
2					2	SS	25				
3					3	SS	40				
4					4	SS	81				
5		Becoming grey			5	SS	44				
6					6	SS	67				
7					7	SS	84	Grain Size Analysis: Gr 3%/ Sa 39%/ Si 35%/ Cl 23%			
8		END OF BOREHOLE AT 7.8m. BOREHOLE OPEN TO 7.6m AND WATER LEVEL AT 3.0m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		139.36	8	SS	50/				
9		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 2.1 145.0 2009.05.21 2.2 144.9		7.77			.150				
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-088

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

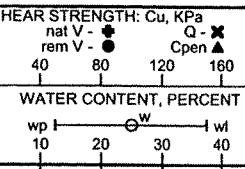
SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		149.51								
		TOPSOIL: (75mm)		148.88								
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Mottled Brown Grey (TILL) Grey			1	SS	16					
						2	SS	29				
2						3	SS	32				
						4	SS	79				
3						5	SS	86				
						6	SS	43				
4						7	SS	38				
5						8	SS	51				
6						9	SS	84				
7												
8												
9												
10		END OF BOREHOLE AT 9.6m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		139.91 9.60								
11												
12												
13												
14												

DRAFT

Grain Size Analysis:
Gr 6% / Sa 34% / Si 37% / Cl 23%



GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 DEEP/DUAL INSTALLATION
 WATER LEVEL (date) WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-089

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 14, 2009
 COMPLETED : April 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES		COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER		TYPE	nat V - ●			Q - ✕	rem V - ●
		GROUND SURFACE		148.32								
		TOPSOIL: (100mm)		148.00								
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)(CL)			1	SS	18					
					2	SS	21					
2					3	SS	55					
					4	SS	50/ .150	Grain Size Analysis: Gr 3%/ Sa 30%/ Si 41%/ Cl 26%				
3					5	SS	50/ .150					
4					6	SS	50/ .150					
5					7	SS	50/ .150					
6												
7												
8		END OF BOREHOLE AT 7.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		140.60 7.72	8	SS	50/ .100					
9		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 1.3 147.0 2009.05.21 1.5 146.8										
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



RECORD OF BOREHOLE 09-090

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		149.91							
		TOPSOIL (100mm)		148.88							
1		Silty CLAY, sandy, trace gravel Stiff to Hard Brown (TILL)(CL)		0.10	1	SS	12				
					2	SS	20				
2					3	SS	28				
					4	SS	50/ 150				
3					5	SS	89	Grain Size Analysis: Gr 0%/ Sa 20%/ Si 49%/ Cl 31%			
4											
5		Grey			6	SS	51				
6											
7					7	SS	50/ 150				
8											
9					8	SS	57				
10		Silty SAND, trace gravel Dense Grey Dry (TILL)		140.77 9.14	9	SS	79	Grain Size Analysis: Gr 4%/ Sa 62%/ Si 26%/ Cl 8%			
11		END OF BOREHOLE AT 9.6m. BOREHOLE OPEN TO 9.1m AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		140.31 9.60							
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : GA
CHECKED : MA



RECORD OF BOREHOLE 09-091

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 14, 2009
 COMPLETED : March 14, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.04							
1		Clayey SILT, some gravel, trace sand, trace roots Firm Brown to Dark Brown (FILL)		0.00	1	SS	8				
					2	SS	6				
2		Silty CLAY, some sand to sandy, trace gravel Stiff to Hard Brown (TILL)(CL)		150.44 1.60	3	SS	9				
					4	SS	20	Grain Size Analysis: Gr 1% / Sa 27% / Si 49% / Cl 23%			
3					5	SS	29				
4					6	SS	35				
5		Grey			7	SS	57				
6					8	SS	85/275	Grain Size Analysis: Gr 6% / Sa 41% / Si 38% / Cl 15%			
7					9	SS	20				
8		SAND and SILT, trace to some clay, trace gravel Very Dense to Compact Grey Moist (TILL)		144.85 7.19	10	SS	81				
9					11	SS	50/125	Grain Size Analysis: Gr 2% / Sa 49% / Si 40% / Cl 9%			
10					12	SS	50/150				
11											
12		Cobbles									
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : JM
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/12/09

RECORD OF BOREHOLE 09-091

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 14, 2009
 COMPLETED : March 14, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV.		NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT			
				DEPTH (m)	TOP					wp			wl
16		Wet	d	136.67	13	SS	50/125		0			Sand F136.67	
17		END OF BOREHOLE AT 15.4m. BOREHOLE OPEN AND WATER LEVEL AT 13.1m UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.05 4.1 147.9 2009.05.21 4.3 147.7											
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : JM
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 6/12/09



RECORD OF BOREHOLE 09-092

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 14, 2009
 COMPLETED : March 14, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.23							
1		TOPSOIL: (100mm) Dark Brown Clayey SILT, some sand, trace gravel, with wood fragments and organics Firm Brown (FILL)		150.98	1	SS	8				
2					2	SS	6				
3		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)(CL)		149.94	3	SS	7				
4				2.29	4	SS	28				
5		5			5	SS	29	Grain Size Analysis: Gr 1% / Sa 27% / Si 47% / Cl 25%			
6		6			6	SS	43				
7		7			7	SS	39	Grain Size Analysis: Gr 1% / Sa 32% / Si 48% / Cl 20%			
8		SAND and SILT, trace to some clay, trace gravel Compact to Very Dense Grey Moist (TILL)		144.61	8	SS	50/ 150				
9				7.62	9	SS	22				
10					10	SS	50/ 150	Grain Size Analysis: Gr 9% / Sa 44% / Si 41% / Cl 6%			
11					11	SS	50/ 150				
12					12	SS	50/ 125	Grain Size Analysis: Gr 27% / Sa 59% / Si & Cl 14%			
13				138.82							
14		Gravelly SAND, some silt Very Dense Grey Moist to Wet		13.41							
				137.37							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : JM
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-092

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 14, 2009
 COMPLETED : March 14, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●		
16		SAND and SILT, trace clay, trace gravel Very Dense Grey Moist (TILL)		14.86 136.74 15.49	50/	100/						
17		END OF BOREHOLE AT 15.5m. BOREHOLE OPEN TO 15m AND WATER LEVEL AT 12.3m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.6M THEN CUTTINGS TO SURFACE.										
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : JM
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-093

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 13, 2009
 COMPLETED : March 13, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.73							
		TOPSOIL: (150mm)		152.00							
1		Clayey SILT, some sand, some gravel Firm to Stiff Brown to Grey (FILL)		0.15	1	SS	11				
					2	SS	7				
2					3	SS	10				
		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)(CL)		150.52							
				2.21	4	SS	23	Grain Size Analysis: Gr 0%/ Sa 23%/ Si 51%/ Cl 26%			
3					5	SS	23				
4											
5					6	SS	39	Grain Size Analysis: Gr 3%/ Sa 36%/ Si 44%/ Cl 17%			
6											
7		END OF BOREHOLE AT 6.7m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		146.03	7	SS	27				
				6.71							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-094

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		150.72							
		TOPSOIL: (75mm)		150.08							
1		Silty CLAY, sandy, trace gravel Stiff to Hard Brown (TILL)(CL)	[Strata Plot: Diagonal Hatching]		1	SS	10				
					2	SS	12				
2		Occasional iron oxide staining			3	SS	9				
					4	SS	32	Grain Size Analysis: Gr 4%/ Sa 33%/ Si 40%/ Cl 23%			
					5	SS	74				
5					6	SS	85				
6					7	SS	89				
7		Silty SAND, trace gravel, occasional cobble Very Dense Grey Dry to Damp (TILL)	[Strata Plot: Stippled]	143.71 7.01							
8		END OF BOREHOLE AT 7.7m. BOREHOLE OPEN TO 7.6m AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		142.97 7.75	8	SS	50/ .125				
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : GA
CHECKED : MA



RECORD OF BOREHOLE 09-095

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.71							
		TOPSOIL: (75mm)		150.00							
1		Silty CLAY, sandy, trace gravel, occasional cobbles Stiff to Hard Brown (TILL)			1	SS	9				
					2	SS	21				
2					3	SS	37				
					4	SS	45				
3					5	SS	50/150				
4											
5		Grey			6	SS	89	Grain Size Analysis: Gr 5% / Sa 35% / Si 37% / Cl 23%			
6											
7					7	SS	50/025				
8		END OF BOREHOLE AT 7.8m. BOREHOLE OPEN TO 7.6m AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		143.94	8	SS	50/150				
9		WATER LEVEL READINGS:		7.77							
		DATE DEPTH (m) ELEV. (m)									
		2009.05.05 1.4 150.3									
		2009.05.21 1.9 149.8									
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-096

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.36							
		TOPSOIL: (150mm)		150.09							
1		Silty CLAY, some sand, trace gravel, trace roots, occasional cobble Stiff Brown (FILL)		0.15	1	SS	9				
2		Silty CLAY, sandy, trace gravel, occasional sand pockets, occasional oxide staining Very Stiff to Hard Brown (TILL)		149.68	3	SS	26				
3				1.68	4	SS	53				
4		Becoming grey			5	SS	43				
5					6	SS	32	Grain Size Analysis: Gr 12%/Sa 45%/Si 24%/Cl 19%			
6					7	SS	64				
7					8	SS	34				
8				143.13							
9		END OF BOREHOLE AT 8.2m. BOREHOLE OPEN AND WATER LEVEL AT 4.9m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 1.8m THEN CUTTINGS TO SURFACE.		8.23							
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.04.15

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-097

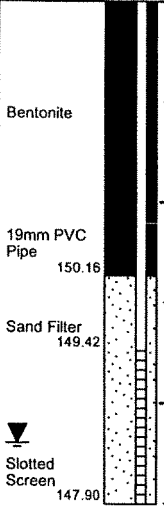
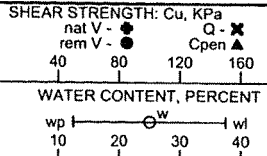
PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		152.91								
		TOPSOIL (200mm)		152.90								
1		Silty CLAY, sandy, trace gravel, occasional cobble Very Stiff to Hard Brown (TILL)		0.20	1	SS	32					
							2	SS	23			
2							3	SS	54			
							4	SS	83			
3							5	SS	52			
4							6	SS	91/275			
5		END OF BOREHOLE AT 5.0m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		147.90 5.00								
6				WATER LEVEL READINGS:								
7				DATE DEPTH (m) ELEV. (m)								
8				2009.05.05 4.0 148.9								
9				2009.05.21 4.4 148.5								
10												
11												
12												
13												
14												

Grain Size Analysis:
 Gr 4% / Sa 36% / Si 43% / Cl 17%



GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 ▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date) 2009.05.21 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-098

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲ 40 80 120 160		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40		
		GROUND SURFACE		153.28							
		TOPSOIL: (150mm)		150.00							
1		Silty CLAY, some sand, trace gravel, trace roots Stiff Brown (FILL)		0.15 152.74 0.53	1	SS	10				
2		Silty CLAY, sandy, trace gravel, occasional oxide staining Hard Brown (TILL)			2	SS	36				
3		SAND and SILT, some clay, trace gravel Dense Brown Damp (TILL)		150.99 2.29	3	SS	34				
					4	SS	42	Grain Size Analysis: Gr 5%/ Sa 43%/ Si 39%/ Cl 13%			
				150.00	5	SS	50/ 075				
4		END OF BOREHOLE AT 3.3m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		3.28							
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-099

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ○		
		GROUND SURFACE		152.86							
		TOPSOIL: (150mm)		152.86 0.15	1	SS	7				
1		Silty CLAY, some sand, trace gravel, trace roots Stiff to Very Stiff Brown (FILL) Occasional silt pockets			2	SS	21				
2		SILT and SAND, some clay, trace gravel, occasional cobble, occasional sand pockets Dense Brown Moist (TILL)		151.14 1.52	3	SS	30	Grain Size Analysis: Gr 3%/ Sa 42%/ Si 44%/ Cl 11%			
3					4	SS	50/ .025				
4					5	SS	50/ .150				
5		Grey		147.79 4.88	6	SS	50/ .150				
6		END OF BOREHOLE AT 4.9m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.7m THEN CUTTINGS TO SURFACE.									
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-100

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 15, 2009
 COMPLETED : April 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.49							
		TOPSOIL (130mm)		150.66							
1		Clayey SILT and SAND, trace gravel, trace roots Stiff Dark Brown to Brown (FILL) Brown to Grey		150.13	1	SS	11				
	2			SS	13						
2	3			SS	14	Grain Size Analysis: Gr 8% / Sa 39% / Si 39% / Cl 14%					
3		SAND and SILT, some gravel, occasional cobble Very Dense Brown Moist (TILL)		148.90	4	SS	11				
	5			SS	50/ 100	Grain Size Analysis: Gr 15% / Sa 41% / Si 35% / Cl 9%					
5	6			SS	50/ 125						
6		END OF BOREHOLE AT 6.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.3m THEN CUTTINGS TO SURFACE.		145.24	7	SS	55/ 150				
7	6.25										
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-101

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 23, 2009
 COMPLETED : April 24, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.53							
1		TOPSOIL (40mm) Silty CLAY, trace sand, trace gravel Very Stiff to Stiff Brown (FILL)		158.89	1	SS	15				
2		Dark Grey to Greyish Brown			2	SS	22				
3					3	SS	9				
4					4	SS	12				
5		SILT and SAND, some clay to clayey, trace gravel, occasional cobbles, occasional oxide staining Very Dense Brown (TILL)		148.56 2.97	5	SS	81	Grain Size Analysis: Gr 7%/ Sa 40%/ Si 39%/ Cl 14%			
6					6	SS	50/ .100				
7		SHALE, highly weathered, thinly bedded, weak to very weak shale, grey with medium strong to very strong limestone interbeds		144.68 6.86	7	SS	50/ .050				
8		Becoming moderately weathered			8	SS	50/ .075				
9		Limestone layers (greater than 50mm): 75mm at 9.9m 50mm at 10.9m 75mm at 11.3m			1	NQ		TCR=78%, SCR=63%, RQD=55%	UCS (MPa) 7	Point Load Test Axial (MPa) 48	Point Load Test Diametral (MPa) 5
10		Clay seams: 50mm at 9.5m Sub-vertical fractures at 9.7m and 11.2m			2	NQ		TCR=90%, SCR=90%, RQD=83%			
11		Becoming slightly weathered									
12		END OF BOREHOLE AT 11.4m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		140.10 11.43				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			
13		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 4.4 147.1 2009.05.05 4.4 147.1 2009.05.21 4.7 146.8									
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-102

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 10, 2009
 COMPLETED : March 10, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		150.98							
		ASPHALT (150mm)		150.80							
		SAND and GRAVEL		150.88	1	AS					
		Brown Moist (FILL)		0.38	2	AS					
1		Gravelly SAND		150.16	1	SS	21				
		Brown Moist (FILL)		0.81							
2		Silty CLAY, trace gravel, topsoil stained, occasional limestone fragments			2	SS	30				
		Very Stiff to Hard Brown (FILL)									
3					3	SS	22				
				147.98							
4		SAND, some gravel, some silt		3.00	4	SS	92	Probable sewer trench backfill. Moved 5m west and redrilled.			
		Very Dense Brown Dry (FILL)									
5				146.18							
		Silty CLAY, some sand, trace gravel		4.80	5	SS	88				
		Hard Grey (TILL)									
6											
7				144.58							
		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with medium strong to very strong limestone interbeds, with clay seams		6.40	6	SS	58				
8					7	SS	50/ .025				
9					1	NQ		TCR=95%, SCR=25%, RQD=0%		FI	>25
											>25
10					2	NQ		TCR=67%, SCR=0%, RQD=0%			>20
											>20
11					3	NQ		TCR=100%, SCR=60%, RQD=28%			>10
											>10
12		Becoming moderately weathered			4	NQ		TCR=100%, SCR=91%, RQD=30%			>5
											>5
13		END OF BOREHOLE AT 12.6m. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m, THEN CUTTINGS TO 0.9m AND ASPHALT TO SURFACE.		138.41							5
				12.57							0
14											0

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : SL/ES

CHECKED : MA



THURBER2(S)(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-103

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 11, 2009
 COMPLETED : March 11, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. (m)	NUMBER	TYPE		BLOWS/0.3m	nat V		
		GROUND SURFACE		151.14							
		ASPHALT (100mm)		150.08							
		SAND and GRAVEL		150.68	1	AS					
		Brown Moist (FILL)		0.46	2	AS					
1		Gravelly SAND		150.23	1	SS	17				
		Light Brown Damp (FILL)		0.91							
2		SAND, some gravel and Silty CLAY, some sand, trace gravel			2	SS	29				
		Compact / Very Stiff Brown to Grey (mixed Fill)			3	SS	27				
3											
4		SAND, fine grained, trace gravel, occasional cobble		147.64	4	SS	30				
		Dense to Very Dense Brown Damp (FILL)		3.51							
5					5	SS	50/0.075				
6		SHALE, highly weathered, thinly bedded, weak to very weak, grey		145.35	6	SS	50/0.025				
				5.79							
7		Occasional medium to very strong limestone interbeds			3	AS					
8					7	SS	50/0.150				
9					8	SS	50/0.100				
10					1	NQ					
11					2	NQ					
12		Becoming moderately weathered									
13		Sub-vertical fracture at 12.9 to 13.0m			3	NQ					
				137.71							
14		END OF BOREHOLE AT 13.4m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		13.44							
		WATER LEVEL READINGS:									
		DATE	DEPTH (m)	ELEV. (m)							
		2009.04.16	4.5	146.6							
		2009.05.05	4.4	146.7							
		2009.05.21	4.6	146.5							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/09/09

RECORD OF BOREHOLE 09-103A

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : August 4, 2009
 COMPLETED : August 5, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp -----w wl 10 20 30 40		
		GROUND SURFACE		150.20							
		TOPSOIL: (125mm)		150.00 0.13	1	SS	37				
1		Clayey SILT, some sand, trace gravel Hard Brown (FILL)		149.44 0.76							
2		Silty CLAY, sandy, trace gravel, occasional oxide staining Stiff to Hard Brown (TILL) Cobble at 1.6m			2	SS	12				
					3	SS	58	Grain Size Analysis: Gr 1%/ Sa 32%/ Si 45%/ Cl 22%			
3		SAND and SILT, some clay, trace gravel Very Dense Brown Dry (TILL) Occasional oxide staining		147.91 2.29	4	SS	50/ 150				
					5	SS	50/ 125	Grain Size Analysis: Gr 3%/ Sa 42%/ Si 40%/ Cl 15%			
4											
5		SHALE, highly weathered, grey, weak, thinly bedded, occasional strong limestone interbeds		145.78 4.42	6	SS	100/ 100				
6		Highly broken zone (100mm) at 5.4m									FI >10 10 2 >25
7		Limestone layers (greater than 50mm): 50mm at 6.9m 75mm at 8.8m 50mm at 8.9m 75mm at 12.8m 50mm at 13.1m 75mm at 13.2m			1	NQ		TCR=94%, SCR=28%, RQD=28%			7 4 3 1 >5 >5 >10 >5
8											
9					3	NQ		TCR=73%, SCR=67%, RQD=60%			
10					4	NQ		TCR=0%, SCR=0%, RQD=0%			
11					5	NQ		TCR=0%, SCR=0%, RQD=0%			
12		Slightly weathered to fresh			6	NQ		TCR=48%, SCR=48%, RQD=48%			>5 2 2 0 0 0 0 0
13											
14		END OF BOREHOLE AT 14.0m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		136.18 14.02	7	NQ		TCR=100%, SCR=100%, RQD=100%			
								All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : ES
CHECKED : MA



THURBER2(S(REV) 1160.GPJ 9/29/09

RECORD OF BOREHOLE 09-104

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 24, 2009
 COMPLETED : March 24, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - rem V -		
		GROUND SURFACE		150.85							
		TOPSOIL (50mm)		150.00							
1		Silty CLAY, some sand, trace gravel Very Stiff Brown			1	SS	24				
					2	SS	25				
2		Silty CLAY, sandy, trace gravel, occasional oxide staining Hard Brown (TILL)		149.41 1.45	3	SS	32				
					4	SS	85	Grain Size Analysis: Gr 1%/ Sa 23%/ Si 52%/ Cl 24%			
3		Occasional shale fragments									
				147.50 3.35	5	SS	130/ 225				
4		SHALE, highly weathered, occasional limestone interbeds Grey			6	SS	100/ .075				
5		END OF BOREHOLE AT 4.6m. BOREHOLE OPEN AND WATER LEVEL AT 4.4m UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m THEN CUTTINGS TO SURFACE.		146.23 4.62	7	SS	100/ .050				▽
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION DEEP/DUAL INSTALLATION
 WATER LEVEL (date) 2009.03.24 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2(SREV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-105

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 27, 2009
 COMPLETED : March 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, kPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		151.62								
		TOPSOIL (150mm)		159.88								
		Silty CLAY, trace sand, occasional limestone fragments, trace rootlets		0.15	1	SS	10					
		Dark Brown		150.75	2	SS	50/					
		END OF BOREHOLE AT 0.9m UPON AUGER REFUSAL ON PROBABLE BEDROCK. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		0.86			100					
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-106

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 26, 2009
 COMPLETED : March 26, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	rem V - ○	wp		
		GROUND SURFACE		153.93									
1		Silty CLAY, sandy, trace gravel, trace organics, trace roots and rootlets Firm to Stiff Mottled Brown Grey (TILL)		0.00	1	SS	7						
					2	SS	15	Grain Size Analysis: Gr 6%/ Sa 27%/ Si 49%/ Cl 18%					
2		SHALE, highly weathered, weak to very weak, thinly bedded, with strong to very strong limestone interbeds Grey		151.95	3	SS	50/150						
3				1.98	1	HQ		TCR=100%, SCR=40%, RQD=17%					
4		Vertical fractures at 3.1m, 3.7m and 4.3m Limestone layers (greater than 50mm): 75mm at 2.2m 50mm at 2.3m 100mm at 2.5m 100mm at 2.7m 100mm at 2.8m 50mm at 3.8m 150mm at 4.3m			2	HQ		TCR=100%, SCR=75%, RQD=75%					
5		Clay seams: 125mm at 2.4m 50mm at 2.6m			3	HQ		TCR=100%, SCR=92%, RQD=83%					
6		Rubble zone: 100mm at 2.1m 75mm at 4.3m Becoming slightly weathered			4	HQ		TCR=100%, SCR=100%, RQD=100%					
7					5	HQ		TCR=100%, SCR=100%, RQD=100%					
8					6	HQ		TCR=100%, SCR=100%, RQD=92%					
9		Limestone layers (greater than 50mm): 50mm at 10.3m 50mm at 10.8m			7	HQ		TCR=100%, SCR=100%, RQD=100%					
10													
11													
12		END OF BOREHOLE AT 12.0m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		141.89									
13				12.04				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'					
14													

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-107

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 12, 2009
 COMPLETED : March 12, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		155.39								
		ASPHALT (100mm)		158.00								
1		SAND and GRAVEL Compact Brown Dry (FILL)		158.10	1	AS					Cuttings	
					1	SS	12				154.48	
2		Silty CLAY, sandy, trace gravel, trace rootlets Stiff to Very Stiff Brown (TILL) Occasional cobbles		153.79	2	SS	14	Grain Size Analysis: Gr 5%/ Sa 28%/ Si 34%/ Cl 33%				Bentonite
				1.60								
3		Soft			3	SS	24					152.80
					4	SS	2					152.57
4		SHALE, highly weathered Grey		151.58	5	SS	50/125					Sand Filter
				3.81								151.05
5		END OF BOREHOLE AT 4.3m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 4.0 151.4 2009.05.05 4.0 151.4 2009.05.21 4.0 151.4		151.05								Slotted Screen
				4.34								
6												
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-108

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 12, 2009
 COMPLETED : March 12, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.12							
		ASPHALT: (90mm)		156.00							
		SAND and GRAVEL		155.35	1	AS					
1		Brown Dry (FILL)		0.76							
		Silty CLAY, some sand, trace gravel, occasional cobbles, trace rootlets			1	SS	10				
		Stiff Brown (FILL)									
2					2	SS	8				
		Silty CLAY, sandy, trace gravel, occasional sand pockets		153.83							
		Very Stiff Brown (TILL)		2.29	3	SS	21	Grain Size Analysis: Gr 1%/ Sa 21%/ Si 42%/ Cl 36%			
3		Occasional shale fragments			4	SS	23				
		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with strong to very strong limestone interbeds		152.31							
				3.81	1	NQ	50/075	TCR=100%, SCR=33%, RQD=33%			FI
5		Limestone layers (greater than 50mm): 375mm at 3.9m 100mm at 4.3m 50mm at 4.5m 300mm at 4.8m 210mm at 5.8m 50mm at 7.3m 50mm at 10.9m			2	NQ		TCR=63%, SCR=32%, RQD=20%			>5
		Clay seams: 50mm at 4.7m									>10
		Subvertical fractures at 4.3m, 6.1m, 7.3m, 8.0m and 8.9m			3	NQ		TCR=100%, SCR=73%, RQD=28%			>5
		Becoming slightly weathered									>10
8					4	NQ		TCR=100%, SCR=100%, RQD=100%			0
		Becoming fresh									0
9											0
					5	NQ		TCR=100%, SCR=100%, RQD=100%			0
10											0
											0
11											0
					6	NQ		TCR=100%, SCR=100%, RQD=100%			0
12		END OF BOREHOLE AT 11.9m. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0, THEN CUTTINGS TO 0.1m AND THEN ASPHALT TO SURFACE.		144.23				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			0
				11.89							0

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-109

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 27, 2009
 COMPLETED : March 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		155.48							
1		Silty CLAY, sandy, trace gravel Firm to Hard Mottled Brown Grey		0.00	1	SS	8				
					2	SS	26				
2		With shale fragments			3	SS	33	Grain Size Analysis: Gr 7% / Sa 30% / Si 34% / Cl 29%			
3		SHALE, highly weathered Grey		152.89	4	SS	69				
		END OF BOREHOLE AT 2.9m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		152.81 2.87							
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-110

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 27, 2009
 COMPLETED : March 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ● rem V - ●	Q - ✕ Cpen ▲		
		GROUND SURFACE		156.39								
		TOPSOIL (150mm)	▨	156.24 0.15								
1		Silty CLAY, trace to some sand, trace gravel, trace roots and rootlets Brown to Grey Firm to Very Stiff	▨		1	SS	7	Grain Size Analysis: Gr 2% / Sa 7% / Si 55% / Cl 38%				
					2	SS	20					
2		SHALE, highly weathered, occasional limestone interbeds Grey	▨	154.56 1.83	3	SS	77/ 250					
				153.98 2.41	4	SS	50/ 125					
3		END OF BOREHOLE AT 2.4m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.										
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-111

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 18, 2009
 COMPLETED : March 18, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		157.57							
		TOPSOIL (100mm)		158.89							
1		Silty CLAY, some sand, trace gravel, occasional cobbles Firm to Very Stiff Brown to Grey		158.10	1	SS	5				
	158.10			2	SS	10					
2				155.15	3	SS	26				
3		SHALE, highly weathered, thinly bedded Grey		2.41	4	SS	50/ .125				
4		END OF BOREHOLE AT 3.9m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		153.61	5	SS	50/ .150				
5				3.96							
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : ES
CHECKED : MA



RECORD OF BOREHOLE 09-112

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 18, 2009
 COMPLETED : March 18, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● Q - x rem V - ● Cpen ▲ 160		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ○ wl 10 20 30 40		
		GROUND SURFACE		157.42							
		TOPSOIL (50mm)		156.88							
1		Silty CLAY, trace sand, trace gravel, trace roots Firm Brown (FILL)		156.65	1	SS	5				
		Silty CLAY, trace sand, trace gravel Stiff to Very Stiff Brown		0.76	2	SS	11				
2					3	SS	28				
		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with medium strong to very strong limestone interbeds		155.21	4	SS	92/ .175				
3					5	SS	50/ .125				
4		Moderately weathered									
5		Limestone layers (greater than 50mm): 75mm at 4.7m 75mm at 5.6m 75mm at 5.9m 125mm at 6.1m 225mm at 6.6m 100mm at 7.3m 60mm at 7.6m 50mm at 7.9m 50mm at 9.1m			1	NQ		TCR=90%, SCR=37%, RQD=25%			
6											
7		Becoming slightly weathered			2	NQ		TCR=100%, SCR=100%, RQD=87%			
8		Rubble zone: 150mm at 4.6m 150mm at 5.0m									
9					3	NQ		TCR=100%, SCR=100%, RQD=98%			
10											
11		Subvertical fracture at 9.0m Becoming fresh			4	NQ		TCR=100%, SCR=100%, RQD=100%			
12					5	NQ		TCR=100%, SCR=100%, RQD=100%			
13		END OF BOREHOLE AT 12.2m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 5.8 151.6 2009.05.05 5.8 151.6 2009.05.21 5.7 151.7		145.22 12.19				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-113

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 18, 2009
 COMPLETED : March 18, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.83							
		ASPHALT (100mm)		156.80							
		SAND and GRAVEL, (crushed limestone) Brown (FILL)		156.07	1	SS	66				
1		SHALE, highly weathered, thinly bedded Grey		0.76	2	SS	50/ .150				
2					3	RUN	50/ .150				
3		END OF BOREHOLE AT 2.3m UPON AUGER REFUSAL. BOREHOLE DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 0.2m AND THEN ASPHALT TO SURFACE.		154.57 2.26							
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MA



RECORD OF BOREHOLE 09-114

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 27, 2009
 COMPLETED : March 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: C_u , KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		158.84							
		TOPSOIL (50mm)		158.00							
1		Silty CLAY, trace sand and gravel, occasional oxide staining and shale fragments Very Stiff to Hard Brown			1	SS	19	Grain Size Analysis: Gr 2% / Sa 7% / Si 55% / Cl 36%			
					2	SS	47				
					3	SS	82				
2					4	SS	100/ .125				
					5	SS	100/ .100				
3		SHALE, occasional limestone interbeds, highly weathered, thinly bedded Grey		156.40 2.44							
4											
5		END OF BOREHOLE AT 4.6m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.1m AND THEN CUTTINGS TO SURFACE.		154.25 4.60	6	SS	100/ .025				
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-115

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 16, 2009
 COMPLETED : April 16, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	Q - ✕	rem V - ●		
		GROUND SURFACE		160.07									
		TOPSOIL (150mm)		159.02									
1		Silty CLAY, trace sand, trace gravel Firm to Very Stiff Brown		0.15	1	SS	5						
					2	SS	16						
2					3	SS	23	Grain Size Analysis: Gr 3% Sa 9% Si 59% Cl 29%					
					4	SS	75/250						
3		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds, occasional clay seams		157.56 2.51									
					5	SS	95/225						
5		Moderately weathered			1	HQ		TCR=92%, SCR=0%, RQD=0%					
		Limestone layers (greater than 50mm): 50mm at 5.1m 75mm at 5.3m 100mm at 5.6m 175mm at 6.0m 50mm at 6.9m 75mm at 7.6m 125mm at 8.1m 75mm at 8.5m Becoming slightly weathered			2	HQ		TCR=100%, SCR=83%, RQD=48%					
6													
7		Rubble zone (75mm) at 5.2m											
					3	HQ		TCR=100%, SCR=93%, RQD=83%					
8		Subvertical fractures at 5.5m, 5.6m, 8.6m, 8.9m and 9.3m											
					4	HQ		TCR=100%, SCR=93%, RQD=87%					
9													
					5	HQ		TCR=100%, SCR=100%, RQD=100%					
10													
11		Becoming fresh											
		Limestone layers (greater than 50mm): 50mm at 9.5m 50mm at 10.0m 50mm at 10.3m 50mm at 10.4m 50mm at 10.5m 125mm at 10.6m 350mm at 11.3m 50mm at 11.7m 75mm at 12.2m 50mm at 13.6m 50mm at 13.9m			6	HQ		TCR=100%, SCR=100%, RQD=100%					
12													
13													
					7	HQ		TCR=100%, SCR=100%, RQD=100%					
14		END OF BOREHOLE AT 14.0m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m)		146.15 13.92				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'					

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

THURBERGS(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-115

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 16, 2009
 COMPLETED : April 16, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: C_u , KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●		
16		2009.05.21 4.9 155.2										
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/11/09

RECORD OF BOREHOLE 09-116

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 17, 2009
 COMPLETED : April 17, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		160.71							
		TOPSOIL (150mm)		160.66							
1		Silty CLAY, trace sand, trace gravel Firm to Hard Brown		0.15	1	SS	7				
					2	SS	11				
2					3	SS	46				
3		Occasional limestone fragments			4	SS	43	Grain Size Analysis: Gr 5%/ Sa 6%/ Si 69%/ Cl 20%			
4		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with medium strong to very strong limestone interbeds		157.53 3.18	5	SS	50/ .075				
5		Highly to moderately weathered Limestone layers (greater than 50mm): 50mm at 5.4m 50mm at 5.5m 75mm at 5.9m 50mm at 6.2m 100mm at 6.3m 50mm at 6.8m 150mm at 7.2m 75mm at 8.2m 200mm at 9.2m			1	HQ		TCR=100%, SCR=33%, RQD=33%			
6					2	HQ		TCR=100%, SCR=97%, RQD=90%			
7		Subvertical fractures at 5.4m, 6.2m, 6.5m, 7.1m and 9.2m			3	HQ		TCR=100%, SCR=95%, RQD=83%			
8		Becoming slightly weathered			4	HQ		TCR=100%, SCR=93%, RQD=93%			
9											
10		Limestone layers (greater than 50mm): 50mm at 9.4m 100mm at 10.7m 75mm at 10.8m 250mm at 11.0m 200mm at 12.5m 100mm at 12.9m 50mm at 13.0m 100mm at 13.5m			5	HQ		TCR=100%, SCR=98%, RQD=98%			
11											
12					6	HQ		TCR=100%, SCR=100%, RQD=100%			
13		Becoming fresh									
14		END OF BOREHOLE AT 14.0m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		146.69 14.02	7	HQ		TCR=100%, SCR=100%, RQD=100%			

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-117

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 16, 2009
 COMPLETED : March 16, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		161.25								
		ASPHALT (125mm)		160.99								
1		SAND and GRAVEL Brown Damp (FILL)		160.26	1	AS						
		Silty CLAY, some sand, trace gravel Stiff to Hard Brown		160.26	1	SS	13					
2		Occasional shale fragments			2	SS	41	Grain Size Analysis: Gr 4% / Sa 11% / Si 66% / Cl 19%				
					3	SS	73					
3		SHALE, highly weathered, thinly bedded, weak, occasional medium to very strong limestone interbeds, grey		158.21	4	SS	50/ 100					
4		Limestone layers (greater than 50mm): 50mm at 4.8m 100mm at 4.9m 150mm at 5.1m 100mm at 5.4m 125mm at 5.7m 100mm at 5.9m 175mm at 6.2m 100mm at 7.2m 75mm at 8.0m 125mm at 9.1m Clay seams: 200mm at 4.6m 50mm at 9.0m		158.21	5	SS	50/ 075					
5					1	NQ		TCR=100%, SCR=58%, RQD=38%				
6		Becoming moderately weathered			2	NQ		TCR=100%, SCR=93%, RQD=85%				
7		Sub-vertical fractures at 7.0m and 7.2m			3	NQ		TCR=100%, SCR=95%, RQD=95%				
8		Becoming slightly weathered to fresh			4	NQ		TCR=100%, SCR=100%, RQD=98%				
9					5	NQ		TCR=100%, SCR=100%, RQD=100%				
10		Limestone layers (greater than 50mm): 50mm at 9.2m 250mm at 10.7m 125mm at 11.0m 50mm at 11.2m 50mm at 12.0m 50mm at 12.5m			6	NQ		TCR=100%, SCR=100%, RQD=100%				
11												
12												
13												
14		END OF BOREHOLE AT 13.8m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 5.5 155.8		147.46 13.79				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-117

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 16, 2009
 COMPLETED : March 16, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS	nat V - ● rem V - ●		
		2009.05.05	3.8	157.5							
		2009.05.21	3.9	157.4							
		2009.06.04	7.5	153.8							
-16											
-17											
-18											
-19											
-20											
-21											
-22											
-23											
-24											
-25											
-26											
-27											
-28											
-29											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-118

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 16, 2009
 COMPLETED : March 16, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		161.54							
		ASPHALT (130mm)		169.99							
1		SAND and GRAVEL, trace silt Compact Brown Damp (FILL)		169.03	1	AS					
					1	SS	26				
2		Gravelly SAND, occasional cobbles Compact to Loose Brown Wet (FILL)		160.02	2	SS	12				
					3	SS	8				
3		SHALE, highly to moderately weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds		158.72	4	SS	50/ 100				
					5	SS	50/ .075				
5					1	NQ		TCR=93%, SCR=78%, RQD=48%			
6		Limestone layers (greater than 50mm): 75mm at 7.1m 75mm at 8.0m Becoming slightly weathered			2	NQ		TCR=100%, SCR=92%, RQD=87%			
7		Sub-vertical fractures at 6.0m, 7.0m and 8.7m									
8		Clay seams: 75mm at 4.7m			3	NQ		TCR=100%, SCR=97%, RQD=97%			
9		Becoming fresh									
10		Limestone layers (greater than 50mm): 50mm at 9.7m 225mm at 9.9m 225mm at 10.1m 75mm at 10.3m 125mm at 10.7m 75mm at 10.9m 75mm at 11.1m 60mm at 11.2m 50mm at 11.5m 125mm at 11.9m 75mm at 12.8m 50mm at 13.2m			4	NQ		TCR=100%, SCR=100%, RQD=100%			
11					5	NQ		TCR=100%, SCR=100%, RQD=100%			
12											
13					6	NQ		TCR=100%, SCR=100%, RQD=100%			
14		END OF BOREHOLE AT 13.4m. BOREHOLE BACKFILLED WITH BENTONITE AND CUTTINGS TO SURFACE.		148.18 13.36				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : ES
CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-119

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 15, 2009
 COMPLETED : March 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	rem V - ●	Q - ✕		
		GROUND SURFACE		161.90									
		ASPHALT (150mm)		161.90 0.15									
1		SAND and GRAVEL Brown Moist (FILL)		161.14 0.76	1	AS							
2		Silty CLAY, trace sand, trace gravel, with highly weathered shale layers Very Stiff to Hard Brown			1	SS	18						
						2	SS	36					
						3	SS	44					
3		SHALE, highly to moderately weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds		158.93 2.97	4	SS	50/ 125						
5		Slightly weathered			5	SS	50/ 025						
6		Becoming fresh			1	NQ							
7		Limestone layers (greater than 50mm thick): 100mm at 4.8m 50mm at 6.7m 50mm at 7.4m 100mm at 7.6m 100mm at 8.6m 50mm at 9.1m			2	NQ							
8		Rubble zone (50mm) at 7.9m			3	NQ							
9													
10		20mm thick clay seams at 9.9m, 10.0m and 10.1m			4	NQ							
11		Limestone layers (greater than 50mm): 350mm at 10.6m 175mm at 11.0m 50mm at 11.3m 300mm at 11.7m 200mm at 12.0m 175mm at 12.8m			5	NQ							
12													
13					6	NQ							
14		END OF BOREHOLE AT 13.7m. BOREHOLE BACKFILLED WITH CUTTINGS TO 0.9m, THEN BENTONITE TO 0.1m AND ASPHALT TO SURFACE.		148.18 13.72	7	NQ							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2(SREV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-120

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 15, 2009
 COMPLETED : March 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES		COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		162.28						
		ASPHALT (150mm)		162.90						
1		SAND and GRAVEL, trace silt Compact Dark Brown Moist (FILL)		0.15	1 AS					
2		Silty CLAY, trace sand, trace gravel, with shale fragments Hard Brown		1.17	1 SS 17					
3		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with medium strong to very strong limestone interbeds		1.17	2 SS 35					
					1.17	3 SS 50				
					1.17	4 SS 50/.075				
					1.17	5 SS 50/.025				
5		Limestone layers (greater than 50mm): 100mm at 8.0m 60mm at 8.4m 60mm at 9.5m 125mm at 13.4m		2.97	1 NQ 025	TCR=100%, SCR=0%, RQD=0%				F1 >10
6		Clay seams: 50mm at 4.8m 50mm at 4.9m 60mm at 5.7m 75mm at 7.2m 60mm at 7.3m 75mm at 7.4m 100mm at 10.3m		2.97	2 NQ	TCR=100%, SCR=0%, RQD=0%				>5 >10
7					2.97	3 NQ	TCR=100%, SCR=67%, RQD=67%			3 0 >10 >10
8					2.97	4 NQ	TCR=100%, SCR=20%, RQD=20%			>5 >5 >10 >10
9		Subvertical fractures at 5.0, 5.2, 6.9, 7.8, 8.3, 8.8, 9.4, 10.2, 12.7 and 13.2m		2.97	5 NQ	TCR=100%, SCR=83%, RQD=83%				0 >5 >5 >10 >10
10					2.97	6 NQ	TCR=100%, SCR=58%, RQD=58%			>5 >5 >10 >10
11					2.97	7 NQ	TCR=100%, SCR=43%, RQD=43%			71 >5 >5 >10 >10
13				2.97	8 NQ	TCR=100%, SCR=83%, RQD=83%				>5 >5 >10 >10
14		END OF BOREHOLE AT 13.9m. BOREHOLE BACKFILLED WITH BENTONITE TO 10.8m, THEN CUTTINGS TO 2.8m AND THEN ASPHALT TO SURFACE.		13.87		All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'				>5 >5

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : JM
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-121

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 15, 2009
 COMPLETED : March 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●				rem V - ●
		GROUND SURFACE		161.91									
		ASPHALT (175mm)		169.98									
1		SAND and GRAVEL, trace silt Compact Brown Moist (FILL)		0.18	1	AS							
					1	SS	26						
2		Silty CLAY, trace sand, trace gravel Hard Brown		160.39									
				1.52	2	SS	32						
3		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with strong to very strong limestone interbeds		159.62									
				2.29	3	SS	50/150						
					4	SS	50/150						
5					5	SS	50/125						
					1	NQ		TCR=100%, SCR=36%, RQD=36%					Fi >10
6		Becoming highly to moderately weathered			2	NQ		TCR=100%, SCR=70%, RQD=70%					>10
7													>10
8		Limestone layers (greater than 50mm): 100mm at 7.5m 50mm at 9.1m 75mm at 10.0m			3	NQ		TCR=100%, SCR=33%, RQD=33%	UCS (MPa) 73	Point Load Test Axial (MPa) 196	Point Load Test Diametral (MPa) 146		>10
9		Clay seams: 60mm at 5.6m Subvertical fractures at 6.3m, 6.5m, 8.1m, 8.3m, 9.0m and 9.9m			4	NQ		TCR=100%, SCR=83%, RQD=83%		99	105		>10
10		Becoming slightly weathered											0
11		Limestone layers (greater than 50mm): 300mm at 10.6m 50mm at 11.8m 60mm at 11.9m 50mm at 13.4m			5	NQ		TCR=100%, SCR=92%, RQD=92%			167		>10
12		Sub-vertical fracture at 11.2m									102		0
13					6	NQ		TCR=100%, SCR=83%, RQD=83%					5
14		END OF BOREHOLE AT 13.8m. BOREHOLE BACKFILLED WITH BENTONITE TO 10.8m, THEN CUTTINGS TO 2.8m AND THEN ASPHALT TO SURFACE.		148.06 13.84	7	NQ		TCR=100%, SCR=100%, RQD=100%					0

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : JM
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-122

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 15, 2009
 COMPLETED : March 15, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		162.25							
		ASPHALT (150mm)		162.00							
1		SAND and GRAVEL Loose Brown Moist (FILL)		160.15	1	AS					
					1	SS	9				
2		Silty CLAY, with shale fragments Hard Grey		160.73	2	SS	36				Bentonite
					3	SS	41				
3		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with strong to very strong limestone interbeds		159.35	4	SS	50/ .075				Sand Filter 159.51 159.20
					5	SS	50/ .150				Slotted Screen 157.68
5		Moderately to slightly weathered									FI
		Limestone layers (greater than 50mm): 50mm at 5.2m 75mm at 7.2m 50mm at 7.4m 100mm at 7.8m 50mm at 8.2m 50mm at 9.0m 100mm at 9.8m			1	NQ		TCR=83%, SCR=83%, RQD=75%			7
6											3
		Clay seam at 5.9m Rubble zone at 6.4m			2	NQ		TCR=100%, SCR=97%, RQD=92%			1
7											0
											2
8											4
											0
9											4
		Becoming slightly weathered to fresh									3
		Limestone layers (greater than 50mm): 1000mm at 11.0m 75mm at 10.7m 50mm at 12.2m 75mm at 12.3 200mm at 12.5m 100mm at 12.8m			4	NQ		TCR=100%, SCR=100%, RQD=83%			4
10											0
											4
11											4
					5	NQ		TCR=100%, SCR=97%, RQD=90%			2
12											78
											1
13											192
											0
					6	NQ		TCR=100%, SCR=100%, RQD=98%			113
											2
											0
14		END OF BOREHOLE AT 13.5m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 3.7 158.6 2009.05.05 3.5 158.8		148.69 13.56				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			0

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-122

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 15, 2009
 COMPLETED : March 15, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●		
		2009.05.21	3.6	158.7								
		2009.06.04	4.6	157.7								
-16												
-17												
-18												
-19												
-20												
-21												
-22												
-23												
-24												
-25												
-26												
-27												
-28												
-29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-123

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 30, 2009
 COMPLETED : April 30, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●		
		GROUND SURFACE		164.05							
1		Silty CLAY, trace sand, trace gravel Firm Brown (FILL)		0.00	1	SS	7				
		Silty CLAY, trace to some sand, trace gravel, with shale fragments Hard Grey		163.28 0.76	2	SS	37				
2		SHALE, highly weathered, occasional clay interbeds		161.84 2.21	3	SS	43	Grain Size Analysis: Gr 0% / Sa 3% / Si 52% / Cl 45%			
3					4	SS	100/ 200				
4		END OF BOREHOLE AT 3.8m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.7m THEN CUTTINGS TO SURFACE.		160.24 3.81	5	SS	100/ 150				
5					6	SS	50/ .00				
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-124

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 30, 2009
 COMPLETED : April 30, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			
		GROUND SURFACE		163.73								
1		Silty CLAY, trace sand, trace gravel, rootlets Stiff to Firm Brown (FILL)		0.00	1	SS	9					
2		Silty CLAY, some sand, trace gravel Hard Brown to Grey (TILL)		162.21 1.52	3	SS	53	Grain Size Analysis: Gr 1%/ Sa 17%/ Si 51%/ Cl 31%				
3		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with medium to very strong limestone interbeds		161.45 2.29	4	SS	82					
4					5	SS	100/125					
5					6	SS	50/0.00					
6		Moderately weathered Limestone layers (greater than 50mm thick): 150mm at 5.2m 50mm at 7.0m 300mm at 8.4m 75mm at 10.3m 50mm at 10.7m 50mm at 11.4m			1	HQ		TCR=100%, SCR=33%, RQD=0%				
7					2	HQ		TCR=100%, SCR=50%, RQD=33%				
8		Subvertical fractures at 10.7m and 11.4m			3	HQ		TCR=100%, SCR=87%, RQD=77%				
9					4	HQ		TCR=100%, SCR=97%, RQD=97%				
10		Slightly weathered			5	HQ		TCR=100%, SCR=100%, RQD=93%				
11					6	HQ		TCR=100%, SCR=100%, RQD=97%				
12		Fresh			7	HQ		TCR=100%, SCR=100%, RQD=100%				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-124

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 30, 2009
 COMPLETED : April 30, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ●, rem V - ●, Q - ✕, Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40		
16					8	HQ	TCR=100%, SCR=100%, RQD=100%		16	0	
17				9	HQ	TCR=100%, SCR=100%, RQD=100%		12	0		
18		END OF BOREHOLE AT 17.5m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.21 4.7 159.0 2009.06.04 4.8 158.9	146.26 17.47				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			0	
19										0	
20										0	
21										0	
22										0	
23										0	
24										0	
25										0	
26										0	
27										0	
28										0	
29										0	

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-125

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 30, 2009
 COMPLETED : April 30, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			rem V - ●
		GROUND SURFACE		161.02								
1		Silty CLAY, trace sand, trace gravel, rootlets Firm Brown (FILL)		0.00	1	SS	8					
2		Silty CLAY, some sand, trace gravel, with shale fragments Hard Brown to Grey (TILL)		159.95 1.07	2	SS	29					
3					3	SS	60					
4		SHALE, highly weathered, occasional clay layers Grey		157.82 3.20	4	SS	69	Grain Size Analysis: Gr 2%/ Sa 12%/ Si 55%/ Cl 31%				
5					5	SS	84					
6					6	SS	100/ 175					
7		END OF BOREHOLE AT 4.6m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.7m THEN CUTTINGS TO SURFACE.		156.37 4.65	7	SS	100/ 075					
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
WATER LEVEL (date)

LOGGED : LG
CHECKED : MA

THURBER2S(REV) 1160.GPJ 6/11/09



RECORD OF BOREHOLE 09-125A

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : August 6, 2009
 COMPLETED : August 6, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ●, rem V - ●, Q - ✕, Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40		
16		Limestone (100mm) with vertical fractures at 16.4m		140.05	10	NQ	TCR=100%, SCR=100%, RQD=93%			0	
17				17.07							0
17		END OF BOREHOLE AT 17.1m. BOREHOLE BACKFILLED WITH BENTONITE TO 1.5m, THEN ASPHALT TO SURFACE.					All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			0	
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER25 1160.GPJ 12/15/09

RECORD OF BOREHOLE 09-126

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 5, 2009
 COMPLETED : May 6, 2009

Project No. 19-1351-160

SHEET 1 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	rem V - ○	Q - ●		
		GROUND SURFACE		155.83									
		ASPHALT (150mm)		158.00	1	AS							
		SAND and GRAVEL		0.15									
		Grey Dry (FILL)		155.37									
1		Silty CLAY, some sand, trace gravel, shale fragments		0.46	1	SS 21							
		Very Stiff to Hard Brown Grey (TILL)			2	SS 100/225	Grain Size Analysis: Gr 0%/ Sa 19%/ Si 52%/ Cl 29%						
2		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with strong to very strong limestone interbeds		153.54	1	SS 100/100							
		Limestone layers (greater than 50mm): 300mm at 3.8m 100mm at 4.5m		2.29	4	SS 100/100							
3					1	HQ	TCR=100%, SCR=100%, RQD=50%						
4					2	HQ	TCR=63%, SCR=56%, RQD=19%						
5					3	HQ	TCR=20%, SCR=20%, RQD=10% (Mechanical malfunction)						
6					4	HQ	TCR=100%, SCR=50%, RQD=17% (Possible mechanical breakage)						
7					5	HQ	TCR=89%, SCR=89%, RQD=89%						
8		Moderately weathered			6	HQ	TCR=100%, SCR=100%, RQD=93%						
9					7	HQ	TCR=100%, SCR=100%, RQD=100%						
10					8	HQ	TCR=100%, SCR=100%, RQD=85%						
11		Slightly weathered to fresh											
12													
13													
14		END OF THE BOREHOLE AT 14.2m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		141.65									
				14.17									

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2(SREV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-126

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 5, 2009
 COMPLETED : May 6, 2009

Project No. 19-1351-160

SHEET 2 OF 2

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV.	NUMBER	TYPE	BLOWS/0.3m		nat V		rem V			
DEPTH (m)	wp			w				wl						
				DATE	DEPTH(m)	ELEVATION(m)								
				2009.05.21		Damaged								
-16														
-17														
-18														
-19														
-20														
-21														
-22														
-23														
-24														
-25														
-26														
-27														
-28														
-29														

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-127

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : April 30, 2009
 COMPLETED : April 30, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.98							
1		Silty CLAY, trace sand, trace gravel, rootlets Stiff Brown (FILL)		0.00	1	SS	11				
					2	SS	14				
2		Silty CLAY, sandy, trace gravel, occasional cobble Hard Brown (TILL)		155.53 1.45	3	SS	100/ 150	Striking cobble			
					4	SS	39				
3		Shale fragments									
					5	SS	100/ 250	Grain Size Analysis: Gr 0% / Sa 27% / St 47% / Cl 26%			
4		END OF BOREHOLE AT 3.5m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.4m THEN CUTTINGS TO SURFACE.		153.47 3.51							
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-129

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 12, 2009
 COMPLETED : May 12, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		WATER CONTENT, PERCENT wp ----- w ----- wl	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	40			
		GROUND SURFACE		153.29								
		ASPHALT: (115mm)		150.99								
1		SAND and GRAVEL Brown Moist (FILL)		152.53	1	AS						
		Silty CLAY, sandy, trace gravel, occasional shale and limestone fragments		0.76	1	SS	65/275					
2		Hard Brown (TILL)			2	SS	50/150					
3		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with strong to very strong limestone interbeds		151.23	3	SS	50/075					
4		Limestone layers (greater than 50mm): 50mm at 2.8m 50mm at 3.1m 50mm at 4.0m			1	HQ						FI >15
5		Subvertical fractures at 2.8m, 3.0m, 3.6m, 3.8m and 4.0m			2	HQ						13
6		Slightly weathered			3	HQ						6
7					4	HQ						8
8												5
9												0
10												0
11												0
12												0
13												0
14												0
		END OF BOREHOLE AT 5.8m. BOREHOLE BACKFILLED WITH BENTONITE TO 0.1m THEN ASPHALT TO SURFACE.		147.50								
				5.79								

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-130

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 11, 2009
 COMPLETED : May 12, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		153.49							
		ASPHALT: (130mm)		150.00							
		SAND and GRAVEL Brown Damp (FILL)		152.73	1	AS					
1		Silty CLAY, sandy, trace gravel, occasional shale and limestone fragments Hard Brown (TILL)		151.51	1	SS	62/225				
2		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with strong to very strong limestone interbeds		151.51	2	SS	50/125				
3		Becoming moderately weathered		1.98	3	SS	50/100				
4		Limestone layers (greater than 50mm): 50mm at 3.1m 50mm at 3.5m 50mm at 4.0m			1	HQ		TCR=100%, SCR=0%, RQD=0%			
5		Rubble zone: 225mm at 2.7m 150mm at 3.0m 50mm at 3.5m 125mm at 3.8m 50mm at 4.1m			2	HQ		TCR=100%, SCR=0%, RQD=0%			
6		Subvertical fractures at 3.5m, 3.6m, 4.1m, 4.2m and 4.3m Becoming slightly weathered to fresh			3	HQ		TCR=100%, SCR=52%, RQD=52%			
7		Limestone layers (greater than 50mm): 75mm at 6.6m 50mm at 9.2m 50mm at 9.7m 50mm at 11.4m			4	HQ		TCR=100%, SCR=100%, RQD=100%			
8		Subvertical fractures at 7.0m, 7.8m, 9.0m, 9.2m and 9.6m			5	HQ		TCR=100%, SCR=97%, RQD=97%			
9					6	HQ		TCR=100%, SCR=97%, RQD=93%			
10					7	HQ		TCR=100%, SCR=100%, RQD=98%			
11		END OF BOREHOLE AT 11.4m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		142.06							
12		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.05.21 8.0 145.5 2009.06.04 8.0 145.5		11.43							
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION

▼ DEEP/DUAL INSTALLATION

WATER LEVEL (date) 2009.06.04

WATER LEVEL (date)

LOGGED : ES

CHECKED : MA



RECORD OF BOREHOLE 09-131

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 7, 2009
 COMPLETED : May 7, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		153.87							
		TOPSOIL (150mm)		150.00							
1		Silty CLAY, trace sand, trace gravel, black staining Very Stiff Brown		0.15	1	SS	15				
					2	SS	28				
2		Silty CLAY, sandy, trace gravel Hard Mottled Brown Grey (TILL)		152.35							
				1.52	3	SS	70				
3					4	SS	61	Grain Size Analysis: Gr 5%/ Sa 26%/ Si 42%/ Cl 27%			
					5	SS	100				
4					6	SS	100				
5		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with strong limestone interbeds		149.45							
				4.42	7	SS	100/125				
6		Slightly weathered			8	SS	100/100				
7					1	HQ		TCR=100%, SCR=100%, RQD=100%			
8					2	HQ		TCR=100%, SCR=100%, RQD=100%			
9		Limestone layers (greater than 50mm): 50mm at 8.8m 150mm at 9.4m 100mm at 9.7m 125mm at 10.4m 125mm at 11.5m									
					3	HQ		TCR=100%, SCR=77%, RQD=77%			
10		Subvertical fractures at 9.2m, 9.4m, 9.7m and 11.5m									
					4	HQ		TCR=100%, SCR=100%, RQD=88%			
11											
12		END OF BOREHOLE AT 11.7m. BOREHOLE BACKFILLED WITH BENTONITE TO 1.8m THEN CUTTINGS TO SURFACE.		142.14							
				11.73							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER25(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-132

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 13, 2009
 COMPLETED : July 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.53							
		TOPSOIL: (50mm)		150.88							
1		Silty CLAY, sandy, trace gravel, occasional cobble Very Stiff to Hard Brown (TILL)			1	SS	8				
					2	SS	30	Grain Size Analysis: Gr 1%/ Sa 25%/ Si 45%/ Cl 29%			
2		Occasional oxide staining			3	SS	27				Cuttings
					4	SS	42	Grain Size Analysis: Gr 0%/ Sa 29%/ Si 45%/ Cl 26%			
3					5	SS	50/ .150				149.48
4		SHALE, highly weathered, grey, weak, thinly bedded, with strong limestone interbeds		148.87 3.66							
5					6	SS	50/ .100				Bentonite
6		Limestone layers (greater than 50mm): 50mm at 7.6m 50mm at 10.1m 50mm at 10.4m 50mm at 10.9m 50mm at 11.0m 50mm at 11.2m			7	SS	50/ .075				19mm PVC Pipe
7					1	RUN		TCR=100%, SCR=20%, RQD=20%			FI >25
8		Becoming highly to moderately weathered									7 4
9		Clay seams: 50mm at 6.7m 300mm at 7.1m 100mm at 8.4m			2	RUN		TCR=100%, SCR=40%, RQD=30%			>25
10											5 7 3 1 2
11		Slightly weathered			3	RUN		TCR=100%, SCR=83%, RQD=83%			>5 >5
12					4	RUN		TCR=100%, SCR=95%, RQD=95%			>5 2 2
13		Sub-vertical fracture at 12.8m (50mm)			5	RUN		TCR=100%, SCR=100%, RQD=100%			141.56 Sand Filter 2 2 0 1 2
14		END OF BOREHOLE AT 13.6m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.09.30 1.94 150.59		138.97 13.56				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			140.49 Slotted Screen 0 0 0 0 138.97

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-133

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 13, 2009
 COMPLETED : July 13, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ○ Q - ✕ Open ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp 10 20 30 40 wl		
		GROUND SURFACE		152.93							
		TOPSOIL: (75mm)		150.88							
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)			1	SS	13		○		
					2	SS	21	Grain Size Analysis: Gr 1%/ Sa 24%/ Si 46%/ Cl 29%	○		
2					3	SS	38		○		
		Occasional cobble			4	SS	68/ .225		○		
3					5	SS	125/ .200	Grain Size Analysis: Gr 4%/ Sa 15%/ Si 63%/ Cl 18%	○		
4		SHALE, highly weathered, thinly bedded, with limestone interbeds Grey		149.58 3.35							
5					6	SS	50/ .150		○		
6				146.76 6.17	7	SS	100/ .075		○		
7		END OF BOREHOLE AT 6.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m THEN CUTTINGS TO SURFACE.									
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-134

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 27, 2009
 COMPLETED : March 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. (m)	DEPTH (m)	NUMBER		TYPE	BLOWS/0.3m		
		GROUND SURFACE		152.28							
1		Silty CLAY, sandy, trace gravel Firm to Stiff Mottled Brown/Grey (TILL)(CL-ML)		0.00	1	SS	8				
					2	SS	10				
2				150.21	3	SS	5	Grain Size Analysis: Gr 1%/ Sa 27%/ Si 44%/ Cl 28%			Bentonite
		Sandy SILT, some clay, trace gravel Loose to Compact Brown/Grey Moist Occasional shale and limestone fragments		2.07	4	SS	5				
3					5	SS	11	Grain Size Analysis: Gr 8%/ Sa 33%/ Si 47%/ Cl 12%			19mm PVC Pipe
4											
5		SAND, fine to medium grained, some silt Loose Brown Moist		147.40	6	SS	4	Grain Size Analysis: Gr 5%/ Sa 82%/ Si & Cl 13%			
				4.88							
6		SHALE, highly weathered, thinly bedded, weak to very weak, grey, with occasional red staining, with strong limestone interbeds Becoming moderately weathered		146.64	7	SS	50/125				146.49
				5.64							
7		Limestone layers (greater than 50mm): 450mm at 7.5m			1	HQ		TCR=89%, SCR=33%, RQD=22%			FI
		Rubble zone: 100mm at 7.1m 50mm at 7.4m 275mm at 8.4m 75mm at 8.7m			2	HQ		TCR=100%, SCR=75%, RQD=75%			20
8											4
9		Clay seams: 100mm at 8.1m 50mm at 8.3m Vertical fracture at 9.8m			3	HQ		TCR=100%, SCR=80%, RQD=80%			1
											2
10		Becoming slightly weathered									2
		Limestone layers: 15 to 25mm at 150mm spacing			4	HQ		TCR=100%, SCR=100%, RQD=95%			1
11											1
		Limestone layers (greater than 50mm): 75mm at 12.0m Thin interbeds at 25 to 50mm spacing from 12.4 to 13.0m Vertical fractures at 12.0m and 12.3m			5	HQ		TCR=100%, SCR=100%, RQD=87%			0
12											1
											1
13		END OF BOREHOLE AT 13.0m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		139.33				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			0
				12.95							141.61
14											140.09
											139.33

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 6/19/09

RECORD OF BOREHOLE 09-135

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 14, 2009
 COMPLETED : July 14, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.42							
		TOPSOIL: (50mm)		150.00							
1		Clayey SILT, some sand, trace gravel, trace roots Very Stiff Brown		151.58	1	SS	18				
		SAND and SILT, trace gravel, trace clay Dense Brown Damp		150.90	2	SS	34	Grain Size Analysis: Gr 4%/ Sa 40%/ Si 46%/ Cl 10%			
2		Silty CLAY, some sand, trace gravel Hard Greyish Brown (TILL)		150.21	3	SS	39	Grain Size Analysis: Gr 1%/ Sa 14%/ Si 69%/ Cl 16%			
3		SHALE, highly weathered, thinly bedded, with limestone interbeds Grey		150.21	4	SS	50/ .100				
4					5	SS	50/ .100				
5					6	SS	50/ .075				
5		END OF BOREHOLE AT 5.1m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 2.7m THEN CUTTINGS TO SURFACE.		147.29 5.13							
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 9/29/09



RECORD OF BOREHOLE 09-136

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 15, 2009
 COMPLETED : July 15, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES		COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		153.26							
1		Silty CLAY, sandy, trace gravel, rootlets, occasional shale fragments Stiff to Hard Brown (FILL)		0.00	1	SS	31				
	2			SS	26	Grain Size Analysis: Gr 1%/ Sa 22%/ Si 55%/ Cl 22%					
2	3			SS	9						
3		Silty CLAY, some sand, trace gravel, occasional shale fragments Stiff to Hard Brown Grey (TILL)		151.05	4	SS	14				
	5			SS	100/ 275	Grain Size Analysis: Gr 1%/ Sa 14%/ Si 63%/ Cl 22%					
4		SHALE, highly to moderately weathered, with limestone interbeds Grey		149.26	6	SS	100/ .050				
5				6	SS	100/ .050					
6		END OF BOREHOLE AT 6.1m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m THEN CUTTINGS TO SURFACE.		147.12	7	SS	100/ .050				
7				7	SS	100/ .050					

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 9/29/09



RECORD OF BOREHOLE 09-137

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 15, 2009
 COMPLETED : July 16, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.59							
1		Silty CLAY, some sand, trace gravel, occasional shale fragments Very Stiff to Stiff Mottled Brown to Grey (FILL)		0.00	1	SS	20				
					2	SS	11	Grain Size Analysis: Gr 6%/ Sa 17%/ Si 49%/ Cl 28%			
2					3	SS	14				
		Silty CLAY, some sand, oxide staining Hard Brown Grey (TILL)		150.38	4	SS	52	Grain Size Analysis: Gr 0%/ Sa 13%/ Si 66%/ Cl 21%			
3		SHALE, highly weathered, thinly bedded, weak, grey, with limestone interbeds		149.69	5	SS	100/125				
4											
5					1	RUN		TCR=0%, SCR=0%, RQD=0%			FI
		becoming highly to moderately weathered			2	RUN		TCR=100%, SCR=52%, RQD=27%			>7
6											8
		Limestone layers (greater than 50mm): 50mm at 3.1m 150mm at 6.2m 100mm at 6.5m 300mm at 6.7m 100mm at 7.8m									3
7					3	RUN		TCR=65%, SCR=13%, RQD=7%			4
8											7
9											>15
					4	RUN		TCR=100%, SCR=58%, RQD=32%			5
10											5
		moderately to slightly weathered									4
11											5
		Limestone layers (greater than 50mm): 100mm at 9.7m 330mm at 10.1m 400mm at 10.5m 250mm at 11.0m 225mm at 14.0m 250mm at 14.5m									3
12					6	RUN		TCR=100%, SCR=83%, RQD=70%			6
											3
13		vertical fracture at 12.8m (225mm)									2
											2
14					7	RUN		TCR=100%, SCR=67%, RQD=53%			6
											6
											2
					8	RUN		TCR=100%, SCR=63%, RQD=50%			2
											5

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

HURBER2S(REV) 1180.GPJ 10/19/09



RECORD OF BOREHOLE 09-137

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 15, 2009
 COMPLETED : July 16, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● Q - ✕ rem V - ● Cpen - ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ○ w wl 10 20 30 40		
16		END OF BOREHOLE AT 15.5m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.09.30 3.09 149.50	137.05 15.54								
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-138

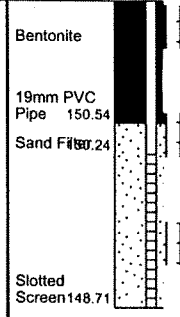
PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 16, 2009
 COMPLETED : July 16, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl 10 20 30 40		
		GROUND SURFACE		151.76							
1		Silty CLAY, some sand, trace gravel, occasional shale fragments Very Stiff to Firm Brown (FILL)		0.00	1	SS	24				
					2	SS	15				
					3	SS	7				
2		Silty CLAY, sandy, trace gravel Very Stiff Mottled Brown Grey (TILL)		149.55							
				2.21	4	SS	19	Grain Size Analysis: Gr 1% Sa 21% Si 48% Cl 30%			
3		SHALE, highly to moderately weathered Grey		148.56	5	SS	100/ 200				
				3.20							
4					6	SS	100/ 100				
5											
6											
7		END OF BOREHOLE AT 6.1m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m THEN CUTTINGS TO SURFACE. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.09.30 Dry -		145.62	7	SS	100/ 050				
				6.14							
8											
9											
10											
11											
12											
13											
14											



GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-139

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 30, 2009
 COMPLETED : March 30, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. (m)	DEPTH (m)	NUMBER		TYPE	BLOWS/0.3m			nat V - ●
		GROUND SURFACE		151.10								
1		Clayey SILT, trace sand, trace gravel, occasional cobbles Firm to Stiff Brown to Grey (FILL)		0.00	1	SS	9					
					2	SS	7					
2		Silty CLAY, sandy, trace gravel Firm Mottled Brown Grey (TILL)		149.58	3	SS	6				19mm PVC Pipe	
				1.52	4	SS	9					
3		Becoming hard			5	SS	47	Grain Size Analysis: Gr 5%/ Sa 27%/ Si 48%/ Cl 20%			Bentonite	
4		With shale fragments			6	SS	56					
5				145.92	7	SS	81/250					
6		SHALE, highly weathered, thinly bedded, very weak to weak, grey, with strong limestone interbeds		5.18							145.31	
7		Becoming slightly weathered			1	HQ		TCR=92%, SCR=92%, RQD=83%	UCS (MPa)	Point Load Test Axial (MPa)	Point Load Test Diametral (MPa)	FI
8		Limestone layers: (greater than 50mm): 125mm at 7.6m 175mm at 8.4m 75mm at 9.1m 50mm at 10.1m 50mm at 10.8m 75mm at 11.6m 175mm at 12.0m Clay seams: 50mm at 8.2m 50mm at 9.5m Subvertical fractures at 9.1m, 9.5m and 11.6m			2	HQ		TCR=100%, SCR=97%, RQD=97%			91	Sand Filter
9					3	HQ		TCR=100%, SCR=100%, RQD=100%				
10					4	HQ		TCR=100%, SCR=100%, RQD=100%				
11											140.44	
12												
13		END OF BOREHOLE AT 12.2m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		138.91				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'				Slotted Screen
14				12.19								138.91

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-140

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 20, 2009
 COMPLETED : July 20, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		151.32							
		TOPSOIL: (50mm)		150.88							
1		Silty CLAY, some sand, trace gravel, trace roots and rootlets, occasional cobble Very Stiff to Firm Brown (FILL)			1	SS	17				
					2	SS	15				
2		Grey			3	SS	6				
				149.03							
3		Silty CLAY, sandy, trace gravel, oxide staining Stiff Mottled Brown Grey (TILL)		2.29	4	SS	11	Grain Size Analysis: Gr 1%/ Sa 28%/ Si 44%/ Cl 27%			
				148.12							
4		SAND and SILT, trace clay, trace gravel Compact Brown Moist (TILL)		3.20	5	SS	28	Grain Size Analysis: Gr 2%/ Sa 49%/ Si 40%/ Cl 9%			
				147.20							
5		Clayey SILT, some sand, trace gravel, occasional shale fragments Hard Grey (TILL)		4.11							
				146.44							
6		SHALE, highly weathered Grey		4.88	6	SS	70				
				145.07							
7		END OF BOREHOLE AT 6.2m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.09.30 3.91 147.41		6.25	7	SS	50/050				

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



THURBER2S(REV) 1160.GPJ 10/7/09

RECORD OF BOREHOLE 09-141

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 20, 2009
 COMPLETED : July 20, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - rem V		
		GROUND SURFACE		151.59							
		TOPSOIL: (50mm)		150.88							
1		Silty CLAY, some sand, trace gravel, trace roots, occasional cobble Very Stiff to Hard Brown (FILL)		1.98	1	SS	20				Cuttings
				149.61							150.98
				149.30							Bentonite
2		Silty SAND, trace gravel, occasional cobble Compact Brown (FILL)		2.29	2	SS	32				150.07
				148.34							Sand Filter
3		SAND and SILT, trace clay, trace gravel Very Dense Brown Moist (FILL)		3.25	4	SS	48	Grain Size Analysis: Gr 6% / Sa 56% / Si 32% / Cl 6%			149.61
											19mm PVC Pipe
4		SHALE, highly weathered, thinly bedded, very weak to weak, grey, with strong limestone interbeds			5	SS	85/275				Slotted Screen
											148.08
5		Highly broken zones at: 50mm at 4.1m 50mm at 5.3m 50mm at 5.5m 50mm at 5.8m			1	RUN		TCR=100%, SCR=29%, RQD=29%			FI
											>10
6		Moderately to slightly weathered			2	RUN		TCR=97%, SCR=40%, RQD=22%			>5
											>10
7		Limestone layers (greater than 50mm): 50mm at 5.9m 50mm at 6.0m 130mm at 8.5m 50mm at 8.7m 75mm at 9.9m 50mm at 10.0m 50mm at 11.6m 100mm at 12.1m Vertical fractures at 6.9m, 11.6m and 12.1m			3	RUN		TCR=100%, SCR=90%, RQD=83%			>5
											>5
8											1
											0
9					4	RUN		TCR=100%, SCR=93%, RQD=93%			4
											3
10		Slightly weathered			5	RUN		TCR=100%, SCR=95%, RQD=95%			2
											2
11											3
											3
12					6	RUN		TCR=100%, SCR=83%, RQD=83%			2
											>5
13		END OF BOREHOLE AT 12.4m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.09.30 3.57 148.02		139.15 12.44							>15
14											2

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-142

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 17, 2009
 COMPLETED : July 17, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.93							
		TOPSOIL: (100mm)		150.88							
1		Silty CLAY, trace to some sand, trace gravel, rootlets, shale fragments Very Stiff to Stiff Brown (FILL)		150.90	1	SS	30	Grain Size Analysis: Gr 3% / Sa 47% / Si 38% / Cl 12%			
	150.90			2	SS	19					
2				150.72	3	SS	8				
		SAND and SILT, some clay, trace gravel, shale fragments Dense to Very Dense Brown Moist (TILL)		2.21	4	SS	44				
3					5	SS	100/ .275				
				149.27	6	SS	152/ .200				
4		SHALE, moderately weathered Grey		3.66	6	SS	152/ .200				
5		END OF BOREHOLE AT 4.6m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 1.5m THEN CUTTINGS TO SURFACE.		148.28	7	SS	100/ .075				
6				4.65							
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-143

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 17, 2009
 COMPLETED : July 17, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		154.20							
		TOPSOIL: (75mm)		153.88							
1		Silty CLAY, some sand, trace gravel, rootlets Very Stiff to Firm Brown (FILL)			1	SS	22				
					2	SS	30				
2					3	SS	7				
		SAND and SILT, clayey, trace gravel Very Stiff to Hard Brown to Grey (TILL)		151.99							
3				2.21	4	SS	19	Grain Size Analysis: Gr 4%/ Sa 39%/ Si 41%/ Cl 16%			
					5	SS	100	Grain Size Analysis: Gr 3%/ Sa 44%/ Si 38%/ Cl 16%			
4		SHALE, highly weathered, thinly bedded, weak, grey, with limestone interbeds		150.24							
5		Limestone layers (greater than 50mm): 225mm at 7.3m 75mm at 8.6m 75mm at 9.9m 75mm at 10.9m 75mm at 11.3m 250mm at 11.8m		3.96	6	SS	118				
6					7	SS	100/0.075				FI
7					1	RUN		TCR=100%, SCR=37%, RQD=15%			>6
8					2	RUN		TCR=100%, SCR=67%, RQD=37%			>10
9											>10
10					3	RUN		TCR=100%, SCR=32%, RQD=25%			5
11									10		4
12		Highly to moderately weathered			4	RUN		TCR=100%, SCR=75%, RQD=50%			4
13		END OF BOREHOLE AT 12.3m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		141.93				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			4
14				12.27							4

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA



RECORD OF BOREHOLE 09-144

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 16, 2009
 COMPLETED : July 16, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ●			Q - ✕ Cpen ▲
		GROUND SURFACE		154.24								
		TOPSOIL: (150mm)		159.00 0.15								
1		Silty CLAY, some sand, trace gravel, occasional shale fragments Hard to Firm Brown (FILL)			1	SS	35					
						2	SS	16				
2						3	SS	6				
3		SAND and SILT, some clay to clayey, trace gravel, occasional oxide staining Hard Brown Moist (TILL)		152.03 2.21								
						4	SS	37				
4		SHALE, moderately weathered Grey Dry										
5						5	SS	69	Grain Size Analysis: Gr 4%/ Sa 41%/ Si 41%/ Cl 14%			
						150.13 4.11						
6					6	SS	100/ 050					
7				148.12 6.12	7	SS	100/ 025					
7		END OF BOREHOLE AT 6.1m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO 3.0m THEN CUTTINGS TO SURFACE.										
8												
9												
10												
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : LG
 CHECKED : MA

URBER2S(REV) 1160.GPJ 9/29/09



RECORD OF BOREHOLE 09-145

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 18, 2009
 COMPLETED : March 18, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		154.57							
		ASPHALT (115mm)		153.99							
1		SAND and GRAVEL Brown Moist (FILL)		0.11	1	AS					55
2		Silty CLAY, sandy, trace gravel, occasional oxide staining Stiff Brown (CL)(TILL)		1.14	1	SS	8				
				153.42							
				152.28							
3		Sandy SILT, trace gravel, trace clay, oxide staining Dense to Compact Brown to Grey Moist		2.29	3	SS	32				
				150.00							
5		Sandy SILT, some clay, trace gravel, occasional shale fragments Dense Grey Damp (TILL)		4.57	5	SS	35	Grain Size Analysis: Gr 2%/ Sa 30%/ Si 57%/ Cl 11%			
				148.47							
6		SHALE, highly weathered, thinly bedded, grey, weak to very weak, with medium strong limestone interbeds Becoming moderately weathered		6.10	6	SS	50/150				
7					1	NQ		TCR=100%, SCR=38%, RQD=38%			
8		Limestone layers (greater than 50mm): 50mm at 9.2m 50mm at 10.8m 50mm at 12.4m Subvertical fracture at 12.2m			2	NQ		TCR=100%, SCR=100%, RQD=100%			146.95
9											
10		Becoming slightly weathered to fresh			3	NQ		TCR=100%, SCR=100%, RQD=100%			
11					4	NQ		TCR=100%, SCR=100%, RQD=100%			
12											
13					5	NQ		TCR=100%, SCR=100%, RQD=95%			
14		END OF BOREHOLE AT 13.4m Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 1.6 153.0 2009.05.05 4.0 150.6 2009.05.21 4.1 150.5		13.39				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			141.18

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

THURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-145

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 18, 2009
 COMPLETED : March 18, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●		
		2009.06.04	Damaged									
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.05.21

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

HURBER2(REV) 1160.GPJ 6/19/09



RECORD OF BOREHOLE 09-146

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 27, 2009
 COMPLETED : May 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		154.86							
		TOPSOIL: (100mm)		153.86							
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)		153.10	1	SS	25				
	152.90			2	SS	20					
2				152.70	3	SS	66				
				152.50	4	SS	86				
3		SAND, some silt, trace gravel, trace clay Dense to Very Dense Brown to Grey Dry to Wet		151.81				Grain Size Analysis: Gr 2%/ Sa 24%/ Si 46%/ Cl 28%			
				151.81	5	SS	43		Grain Size Analysis: Gr 0%/ Sa 88%/ Si & Cl 12%		
4				151.81							
5		SHALE, highly weathered Grey		149.98	6	SS	50/.150				
				149.98							
7		END OF BOREHOLE AT 6.7m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		148.15	7	SS	50/.075				
				148.15							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-147

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 27, 2009
 COMPLETED : May 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		155.24							
		TOPSOIL: (100mm)		156.98							
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown (TILL)		158.00	1	SS	19				
					2	SS	21				
2					3	SS	25				
					4	SS	89				
3		SAND, trace to some silt, trace gravel, trace clay Very Dense Grey Dry		152.19	5	SS	50/150				
4				3.05							
5					6	SS	50/150	Grain Size Analysis: Gr 7% / Sa 71% / Si 16% / Cl 6%			
6		SHALE, highly weathered Grey		150.06							
				5.18							
7		END OF BOREHOLE AT 6.2m. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.06.04 Dry		149.07	7	SS	50/1075				
				6.17							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



RECORD OF BOREHOLE 09-148

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 28, 2009
 COMPLETED : May 29, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.07							
1		TOPSOIL: (75mm) Silty CLAY, trace to some sand, trace gravel, occasional rootlets Stiff to Firm Brown (FILL)		150.88	1	SS	10				
					2	SS	7				
2		Silty CLAY, some sand, trace gravel Very Stiff to Hard Brown to Grey (TILL)		154.57							
				1.50	3	SS	20				
3					4	SS	25	Grain Size Analysis: Gr 0%/ Sa 16%/ Si 48%/ Cl 36%			
					5	SS	38				
5		Silty SAND, trace clay, trace gravel Very Dense Grey Wet		151.50							
				4.57	6	SS	50/ .150	Grain Size Analysis: Gr 2%/ Sa 71%/ Si & Cl 27%			
6					7	SS	50/ .150	Grain Size Analysis: Gr 4%/ Sa 55%/ Si 32%/ Cl 9%			
8		SAND and SILT, some clay, trace gravel, trace shale fragments Very Dense Grey (TILL)		148.45							
				7.62	8	SS	50/ .150				
9		SHALE, highly weathered, thinly bedded, grey, weak, with strong limestone interbeds		147.84							
				8.23							
10		Becoming moderately to slightly weathered Limestone layers (greater than 50mm): 50mm at 9.7m			1	NQ		TCR=100%, SCR=88%, RQD=88%	UCS (MPa) 14	Point Load Test Axial (MPa)	Point Load Test Diametral (MPa) FI 5 >5 0 0 0 0 0 0
11		Rubble zones: 125mm at 9.1m 75mm at 9.4m									
12		Becoming slightly weathered to fresh Limestone layers (greater than 50mm): 75mm at 11.0m 50mm at 11.9m			2	NQ		TCR=100%, SCR=100%, RQD=93%	12		
13					3	NQ		TCR=100%, SCR=100%, RQD=100%	15		
14		END OF BOREHOLE AT 12.8m. BOREHOLE OPEN TO 12.8m AND WATER LEVEL AT 5.5m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		143.24							
				12.83							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION

▼ DEEP/DUAL INSTALLATION

WATER LEVEL (date) 05/28/2009

WATER LEVEL (date)

LOGGED : GA

CHECKED : MF

HURBERS(REV) 1160.GPJ 7/9/09



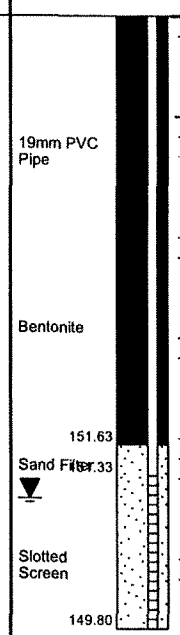
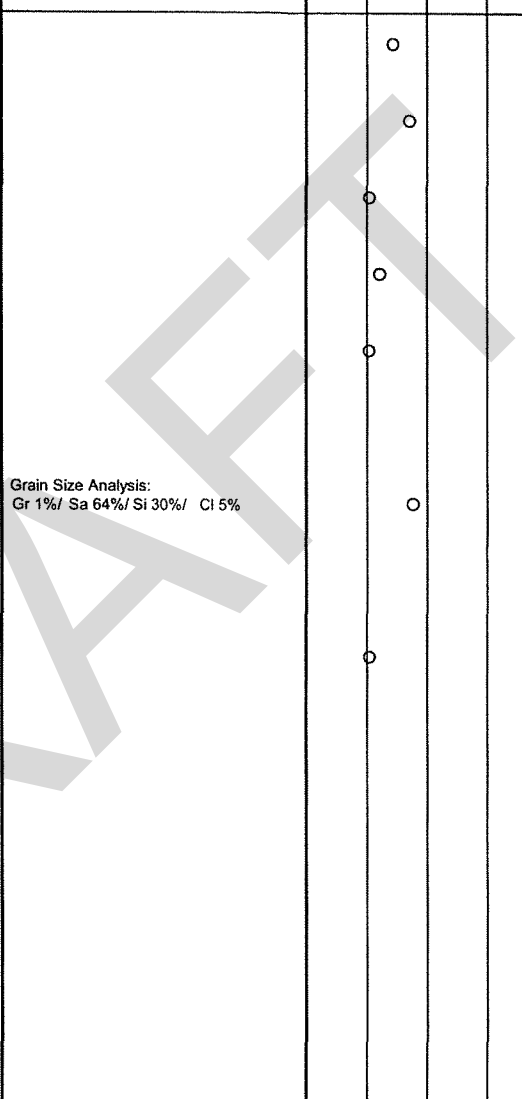
RECORD OF BOREHOLE 09-149

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 27, 2009
 COMPLETED : May 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		155.90							
		TOPSOIL: (100mm)		158.90							
1		Silty CLAY, sandy, trace gravel Very Stiff to Hard Brown to Grey (TILL)		1	SS	11					
	2			SS	24						
2				3	SS	37					
	4			SS	56						
3		Silty SAND, trace clay, trace gravel Very Dense Grey Wet		5	SS	50					
4				6	SS	71					
5		SILT and SAND, some clay, trace gravel, occasional shale fragments Very Dense Grey Dry (TILL)		7	SS	50/ 150					
6				7	SS	50/ 150					
7		END OF BOREHOLE AT 7.0m UPON AUGER REFUSAL. BOREHOLE OPEN AND WATER LEVEL AT 6.0m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.06.04 4.8 151.1									
8											
9											
10											
11											
12											
13											
14											



GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



RECORD OF BOREHOLE 09-150

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 28, 2009
 COMPLETED : May 28, 2009

Project No. 19-1351-160

SHEET 1 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		157.48							
		TOPSOIL: (75mm)		158.88							
1		Silty CLAY, trace to some sand, trace gravel, occasional rootlets Stiff Mottled Brown / Grey (FILL)		156.72	1	SS	11				
		CONCRETE: (150mm) (FILL)		156.98	2	SS	50/.075				
2		Silty CLAY, sandy, trace gravel, Very Stiff to Hard Brown (TILL)		156.91	3	SS	28				
					4	SS	50/.150	Grain Size Analysis: Gr 2%/ Sa 25%/ Si 48%/ Cl 25%			
3					5	SS	50/.150				
4		SAND, trace silt Very Dense Grey Dry		153.52	6	SS	50/.150				
5											
6		SILT and SAND, some clay Very Dense Grey Wet		151.99	7	SS	50/.150	Grain Size Analysis: Gr 0%/ Sa 38%/ Si 57%/ Cl 5%			
7											
8					8	SS	69				
9		SHALE, highly weathered, thinly bedded, grey, weak with strong to very strong limestone interbeds		148.79	9	SS	50/0.0				
10		Becoming moderately to slightly weathered Limestone layers (greater than 50mm): 100mm at 11.0m Rubble zones: 75mm at 9.8m		8.69	1	RUN		TCR=100%, SCR=97%, RQD=67%			
11											
12		Becoming slightly weathered to fresh Limestone layers (greater than 50mm): 100mm at 12.9m 100mm at 13.7m 125mm at 14.1m Rubble zones: 50mm at 14.0m			2	RUN		TCR=100%, SCR=100%, RQD=82%			
13											
14					3	RUN		TCR=100%, SCR=100%, RQD=100%			
		END OF BOREHOLE AT 14.3m. BOREHOLE OPEN AND WATER LEVEL AT 2.1m. BOREHOLE BACKFILLED WITH		143.15							
				14.33							

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION

▽ DEEP/DUAL INSTALLATION

WATER LEVEL (date) 05/28/2009

WATER LEVEL (date)

LOGGED : GA

CHECKED : MF

HURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-150

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 28, 2009
 COMPLETED : May 28, 2009

Project No. 19-1351-160

SHEET 2 OF 2
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE			SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m		nat V - ●	rem V - ●		
				BENTONITE TO SURFACE.								40 80 120 160 10 20 30 40
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 05/28/2009

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



THURBER2S(REV) 1160.GPJ 6/29/09

RECORD OF BOREHOLE 09-151

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 27, 2009
 COMPLETED : May 27, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: C_u , KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		158.17							
		TOPSOIL: (75mm)		158.08							
1		Silty CLAY, trace to some sand, trace gravel, occasional rootlets Stiff Brown (FILL)		157.41 0.76	1	SS	13				
2		Silty CLAY, sandy, trace gravel Hard Mottled Brown Grey (TILL)			2	SS	32				
					3	SS	59				
3					4	SS	50/150	Grain Size Analysis: Gr 0%/ Sa 31%/ Si 47%/ Cl 22%			
					5	SS	50/150				
4											
5		SAND, trace silt Very Dense Grey Wet		153.90 4.27	6	SS	50/150				
6		Gravelly SAND, some silt, trace clay Very Dense Grey Wet		152.68 5.49							
					7	SS	50/150				
7											
		SHALE, highly weathered Grey		150.85 7.32							
8		END OF BOREHOLE AT 7.7m. BOREHOLE OPEN TO 7.6m AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		150.50 7.67	8	SS	50/050				
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



RECORD OF BOREHOLE 09-152

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 19, 2009
 COMPLETED : March 19, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		155.44							
		ASPHALT (100mm)		156.00 0.10							
1		SAND and GRAVEL Brown Damp (FILL)		154.44 0.99	1	AS					
2		Silty CLAY, sandy, trace gravel, occasional oxide staining Stiff to Hard Brown (TILL)			1	SS	14				
					2	SS	28	Grain Size Analysis: Gr 2% / Sa 38% / Si 43% / Cl 17%			
3		Occasional shale fragments Grey		152.69 2.74	3	SS	31				
		SHALE, highly weathered, thinly bedded, grey, weak to very weak, occasional strong limestone interbeds			4	SS	50/ 075				
5					5	SS	50/ 125				
6		Moderately weathered			1	NQ		TCR=100%, SCR=65%, RQD=65%			
		Limestone layers (greater than 50mm): 90mm at 5.4m 50mm at 6.4m			2	NQ		TCR=100%, SCR=77%, RQD=77%			
7		Becoming slightly weathered to fresh									
8					3	NQ		TCR=100%, SCR=100%, RQD=100%	7		
9									6		
10					4	NQ		TCR=100%, SCR=100%, RQD=100%			
11											
12				143.55 11.89	5	NQ		TCR=100%, SCR=95%, RQD=95%			
13		END OF BOREHOLE AT 11.9m Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 2.8 152.6 2009.05.05 2.8 152.6 2009.05.21 2.8 152.6 2009.06.04 3.0 152.4						All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA

HURBER2S(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-153

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 1, 2009
 COMPLETED : June 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✕ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp 20 30 40 wl		
		GROUND SURFACE		156.81							
		TOPSOIL: (100mm)		156.81							
1		Silty CLAY, trace sand, trace gravel Very Stiff to Stiff Brown (FILL)		158.10	1	SS	16		○		
					2	SS	9		○		
2		Mixed with crusher run limestone, occasional black staining, occasional asphalt pieces, hydrocarbon odour		154.60	3	SS	61		○		
				2.21							
3		Silty CLAY, sandy, trace gravel Stiff to Hard Brown to Grey (TILL)			4	SS	13	Grain Size Analysis: Gr 0%/ Sa 36%/ Si 38%/ Cl 26%	○	-----	
4		Occasional iron oxide staining			5	SS	31		○		
5		Occasional shale fragments		151.93	6	SS	50/	Grain Size Analysis: Gr 0%/ Sa 18%/ Si 60%/ Cl 22%	○		
		SHALE, highly to moderately weathered Grey		4.88			.150				
6		END OF BOREHOLE AT 6.1m. BOREHOLE OPEN AND DRY. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		150.71	7	SS	50/				
				6.10			.00				
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



RECORD OF BOREHOLE 09-153A

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : July 31, 2009
 COMPLETED : July 31, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ● rem V - ○		
		GROUND SURFACE		156.85							
		TOPSOIL: (50mm)		158.88							
1		Silty CLAY, some sand, trace gravel, trace roots and rootlets Stiff to Very Stiff Brown (FILL)			1	SS	8				
				155.48							
2		Gravelly SAND, some silt, slight odour Compact Brown to Black Damp (FILL)		1.37	3	SS	30	Grain Size Analysis: Gr 30%/ Sa 51%/ Si & Cl 19%			
				154.79							
3		Silty CLAY, sandy, trace gravel, occasional oxide staining Stiff Grey (TILL)		2.06	4	SS	12				
				153.19							
4		END OF BOREHOLE AT 3.6m. BOREHOLE OPEN AND DRY UPON COMPLETION. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		3.66	6	SS	14	Grain Size Analysis: Gr 0%/ Sa 24%/ Si 52%/ Cl 24%			
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : ES
 CHECKED : MA



RECORD OF BOREHOLE 09-154

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 1, 2009
 COMPLETED : June 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.83							
		TOPSOIL: (75mm)		156.08							
1		Silty CLAY, some sand, trace gravel, occasional rootlets Brown to Grey Stiff to Hard (TILL)			1	SS	15				
		Occasional iron oxide staining			2	SS	12				
2					3	SS	28	Grain Size Analysis: Gr 0%/ Sa 17%/ Si 45%/ Cl 38%			
					4	SS	30				
3					5	SS	53				
4											
5		SILT and SAND, clayey, trace gravel Hard Grey Dry (TILL)		152.28 4.55	6	SS	42	Grain Size Analysis: Gr 3%/ Sa 38%/ Si 43%/ Cl 16%			
6		SHALE, highly weathered, thinly bedded, grey, weak with medium strong limestone interbeds		151.34 5.49	7	SS	50/ 0.050				
7		Becoming moderately to slightly weathered Rubble zones: 50mm at 7.4m			1	NQ		TCR=60%, SCR=50%, RQD=27%			FI
		Limestone layers (greater than 50mm): 50mm at 7.7m 50mm at 8.1m									5
8		Becoming slightly weathered to fresh									5
9					2	NQ		TCR=100%, SCR=100%, RQD=68%			3
10		Limestone layers (greater than 50mm): 50mm at 10.8m									3
11					3	NQ		TCR=100%, SCR=100%, RQD=97%			3
12											1
13		END OF BOREHOLE AT 12.8m. BOREHOLE OPEN AT 12.8m AND WATER LEVEL AT 1.2m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		144.03 12.80				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			0
14											0

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 01/06/2009

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



THURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-155

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 1, 2009
 COMPLETED : June 1, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.29							
		TOPSOIL: (100mm)		158.98 0.10	1	SS	12				
1		Silty CLAY, trace sand, occasional rootlets Stiff Brown		155.53 0.76	2	SS	10				
2		Silty CLAY, some sand to sandy, trace gravel, trace iron oxide staining Stiff to Hard Brown to Grey (TILL)			3	SS	36	Grain Size Analysis: Gr 0%/ Sa 19%/ Si 44%/ Cl 37%			
3					4	SS	59				
4					5	SS	54	Grain Size Analysis: Gr 0%/ Sa 42%/ Si 39%/ Cl 19%			
5					6	SS	30				
6		SHALE, highly weathered Grey		150.96 5.33							
7		END OF BOREHOLE AT 6.2m. BOREHOLE OPEN TO 6.2m AND WATER LEVEL AT 5.5m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen. WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.06.04 1.64 154.65		150.12 6.17	7	SS	50/ 075				
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



RECORD OF BOREHOLE 09-156

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : March 19, 2009
 COMPLETED : March 19, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●	rem V - ●	Q - ▲		
		GROUND SURFACE		156.26									
1		ASPHALT (100mm)		156.98	1	AS							
		SAND and GRAVEL Brown Moist (FILL)		155.50									
		SAND, some silt, trace clay, trace gravel Compact Brown Damp (FILL)		154.96	1	SS	12						
2		Silty CLAY, sandy, trace gravel Stiff Brown (TILL)(CL-ML)		154.96	2	SS	11						
				153.21	3	SS	14						
3		Clayey SILT and SAND, trace gravel Stiff Grey (TILL)		153.21	4	SS	14	Grain Size Analysis: Gr 3%/ Sa 40%/ Si 43%/ Cl 14%					
4		SHALE, highly weathered, thinly bedded, grey, weak to very weak, with strong to very strong limestone interbeds		152.45	5	SS	50/ 150						
5				152.45	1	NQ		TCR=100%, SCR=82%, RQD=67%					
6		Limestone layers (greater than 50mm); 75mm at 5.6m 50mm at 5.7m 300mm at 10.0m 100mm at 10.3m			2	NQ		TCR=75%, SCR=47%, RQD=33%					
7		Subvertical fractures at 6.7m, 7.3m, 9.6m and 9.7m											
8		Becoming slightly weathered to fresh			3	NQ		TCR=100%, SCR=90%, RQD=83%					
9													
10					4	NQ		TCR=100%, SCR=90%, RQD=90%					
11													
12		END OF BOREHOLE AT 11.8m Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		144.45	5	NQ		TCR=100%, SCR=100%, RQD=100%					
13		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.04.16 2.6 153.7 2009.05.05 2.0 154.3 2009.05.05 2.0 154.3 2009.06.04 1.6 154.7		11.81				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'					
14													

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) : 2009.06.04

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date) :

LOGGED : ES
 CHECKED : MA

HURBERS(REV) 1160.GPJ 7/9/09



RECORD OF BOREHOLE 09-157

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 2, 2009
 COMPLETED : June 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.90							
		TOPSOIL: (50mm)		156.88	1	SS	120				
1		SHALE, highly weathered, very dense to very loose, grey: (FILL)			2	SS	50/150				
2		Silty CLAY, sandy, trace gravel, very stiff to hard, brown to grey: (TILL)		154.77	3	SS	5				
3				2.13	4	SS	15				
4					5	SS	42	Grain Size Analysis: Gr 0%/ Sa 28%/ Si 45%/ Cl 27%			
5		SHALE, highly to moderately weathered, thinly bedded, grey, weak with medium to very strong limestone interbeds		152.63	6	SS	50/100				
6		Rubble zone (greater than 50mm): 50mm at 5.1m 230mm at 5.3m Limestone interbeds (greater than 50mm): 75mm at 5.2m 530mm at 5.6m 380mm at 6.1m			1	NQ		TCR=100%, SCR=92%, RQD=70%			
7		Rubble zone (greater than 50mm): 50mm at 6.7m 350mm at 6.9m 75mm at 7.5m Clay seams (50mm) at 7.0m			2	NQ		TCR=100%, SCR=83%, RQD=50%			
8		10									
9		Becoming slightly weathered to fresh			3	NQ		TCR=100%, SCR=100%, RQD=100%			
10											
11					4	NQ		TCR=100%, SCR=100%, RQD=100%			
12		END OF BOREHOLE AT 11.5m. BOREHOLE OPEN AT 11.5m AND WATER LEVEL AT 4.9m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		145.42 11.48				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'			

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.02

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



RECORD OF BOREHOLE 09-158

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 2, 2009
 COMPLETED : June 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1

DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100	SHEAR STRENGTH: Cu, KPa nat V - ● rem V - ● Q - ✖ Cpen ▲		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	WATER CONTENT, PERCENT wp ----- w ----- wl		
		GROUND SURFACE		156.81							
		TOPSOIL: (75mm)		156.00							
		SHALE, highly weathered, compact, grey, dry: (FILL)		156.05	1	SS	20				
1		Silty CLAY, sandy, trace gravel Stiff to Hard Mottled Brown to Grey (TILL)		0.76	2	SS	15				
2					3	SS	9	Grain Size Analysis: Gr 2%/ Sa 28%/ Si 47%/ Cl 23%			
3					4	SS	38				
4					5	SS	23	Grain Size Analysis: Gr 2%/ Sa 18%/ Si 41%/ Cl 39%			
5			SHALE, highly weathered, grey		152.31						
				4.50	50		.025				
		END OF BOREHOLE AT 5.2m UPON AUGER REFUSAL. BOREHOLE OPEN TO 5.2m AND DRY. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		151.63							
		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.06.04 2.38 154.43		5.18							
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date) 2009.06.04

▽ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



HURBER2S(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-159

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 3, 2009
 COMPLETED : June 3, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		WATER CONTENT, PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●			
		GROUND SURFACE		156.69								
1		TOPSOIL: (50mm) Silty CLAY, trace sand, trace rootlets, trace to some shale fragments Stiff to Hard Grey (FILL)		156.69	1	SS	10					
2		Silty CLAY, some sand, trace gravel, occasional iron oxide staining Very Stiff to Hard Mottled Brown to Grey (TILL)		155.22	2	SS	63					
3				1.47	3	SS	25					
4					4	SS	36	Grain Size Analysis: Gr 0%/ Sa 17%/ Si 48%/ Cl 35%				
5		SHALE, highly weathered, thinly bedded, grey, weak with limestone interbeds Becoming slightly weathered Rubble zone (75mm) at 5.2m		152.12	5	SS	50/ .075					
6				4.57	1	NQ		TCR=100%, SCR=97%, RQD=82%				FI
7		Becoming fresh			2	NQ		TCR=100%, SCR=100%, RQD=95%				
8					3	NQ		TCR=100%, SCR=100%, RQD=91%				
9		END OF BOREHOLE AT 9.2m. BOREHOLE OPEN TO 9.2m AND WATER LEVEL AT 1.3m. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		147.57				All point load tests conducted on limestone interbeds unless noted by 'x' All UCS tests conducted on shale unless noted by '+'				
10				9.12								
11												
12												
13												
14												

GROUNDWATER ELEVATIONS

SHALLOW/SINGLE INSTALLATION
 DEEP/DUAL INSTALLATION
 WATER LEVEL (date) WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



HURBER2S(REV) 1160.GPJ 7/9/09

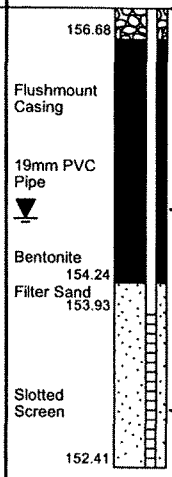
RECORD OF BOREHOLE 09-160

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 3, 2009
 COMPLETED : June 3, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		156.98							
1		SILT, some sand, trace gravel Very Dense Brown (FILL)		0.00	1	SS	50/0.150				
		Silty CLAY, trace to some sand, trace gravel Stiff Brown (FILL)		156.17 0.81	2	SS	16				
2		Silty CLAY, trace sand, occasional rootlets Stiff Dark Grey		155.46 1.52	3	SS	10				
		Silty CLAY, sandy, trace gravel Very Stiff Brown (TILL)		154.72 2.26	4	SS	26	Grain Size Analysis: Gr 0%/ Sa 24%/ Si 45%/ Cl 31%			
3		SILT and SAND, clayey, trace gravel Hard Dry (TILL)		153.93 3.05	5	SS	50/.150	Grain Size Analysis: Gr 5%/ Sa 39%/ Si 41%/ Cl 16%			
4		SHALE, highly weathered, grey		153.02 3.96							
5		END OF BOREHOLE AT 4.9m UPON AUGER REFUSAL. BOREHOLE OPEN TO 4.9m AND DRY. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		152.10 4.88	6	SS	50/.00				
6		WATER LEVEL READINGS: DATE DEPTH (m) ELEV. (m) 2009.06.04 2.10 154.88									
7											
8											
9											
10											
11											
12											
13											
14											



GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 ▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date) 2009.06.04
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



HURBER25(REV) 1160.GPJ 7/9/09

RECORD OF BOREHOLE 09-161

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : June 2, 2009
 COMPLETED : June 2, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS	SHEAR STRENGTH: Cu, KPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		157.92							
		TOPSOIL: (75mm)		158.08							
1		Silty SAND, trace gravel Compact Brown Moist (FILL)		157.31 0.61	1	SS	16				
2		Silty CLAY, sandy, trace gravel, occasional rootlets Very Stiff to Hard Brown to Grey (TILL)			2	SS	15				
3					3	SS	24	Grain Size Analysis: Gr 0%/ Sa 21%/ Si 52%/ Cl 27%			
4					4	SS	85				
5					5	SS	50/ .150	Grain Size Analysis: Gr 2%/ Sa 30%/ Si 45%/ Cl 23%			
5		SHALE, highly weathered, grey		153.35 4.57	6	SS	50/ .150				
6											
7		END OF BOREHOLE AT 6.1m. BOREHOLE OPEN TO 6.1m AND DRY. BOREHOLE BACKFILLED WITH BENTONITE TO SURFACE.		151.82 6.10	7	SS	50/ .150				
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF






RECORD OF BOREHOLE 09-162

PROJECT : Mississauga BRT East
 LOCATION : Mississauga, Ontario
 STARTED : May 25, 2009
 COMPLETED : May 25, 2009

Project No. 19-1351-160

SHEET 1 OF 1
 DATUM

DEPTH SCALE (metres)	BORING METHOD	SOIL PROFILE		SAMPLES			COMMENTS DYNAMIC CONE PENETRATION RESISTANCE PLOT	SHEAR STRENGTH: C_u , kPa		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE		BLOWS/0.3m	nat V - ●		
		GROUND SURFACE		152.62							
		ASPHALT, (130mm)		150.94							
1		SAND and GRAVEL, (crushed limestone) Dense to Compact Brown Dry (FILL)		0.13	1	SS	45				
					2	SS	22				
		SHALE, highly weathered, grey		151.27							
2		END OF BOREHOLE AT 1.7m UPON AUGER REFUSAL. BOREHOLE OPEN AND DRY UPON COMPLETION OF DRILLING. BOREHOLE BACKFILLED WITH CUTTINGS TO 1.5m THEN ASPHALT PATCH TO SURFACE.		1.35							
				150.94	3	SS	50/ .050				
3				1.68							
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ SHALLOW/SINGLE INSTALLATION
 WATER LEVEL (date)

▼ DEEP/DUAL INSTALLATION
 WATER LEVEL (date)

LOGGED : GA
 CHECKED : MF



RECORD OF BOREHOLE No BH-15 SHEET 1 OF 2 METRIC

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823269.0 ; E 605061.9 ORIGINATED BY TZ/AH

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE August 30 and 31, 2010 CHECKED BY TZ/HJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)						
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20	40	60
163.5	GROUND SURFACE																		
0.7	TOPSOIL																		
	Clayey silt, trace gravel, trace sand, containing rootlets and organics up to a depth of 1.7 m (FILL)	1	SS	2															
	Soft to very stiff Mottled reddish brown and brown to reddish brown Moist	2	SS	11															
		3	SS	17															
161.3	CLAYEY SILT with SAND, trace gravel (TILL)																		
2.2	Hard Brown to grey Moist	4	SS	38															
	Grey below a depth of 3.7 m	5	SS	48															
		6	SS	56															
158.9	CLAYEY SILT, trace sand																		
4.6	Hard Grey Moist to wet	7	SS	74															
		8	SS	89/0.28															
		9	SS	52															
		10	SS	48															
		11	SS	36															
	Wet below a depth of 9.1 m	12	SS	32															
153.3	Silty SAND, trace to some gravel, trace clay																		
10.2	Loose to very dense, wet Reddish brown Wet	13	SS	9															
		14	SS	99/0.22															
150.2	Gravelly SAND, trace to some silt, trace clay (TILL)																		
13.3	Very dense Reddish brown Wet	15	SS	98/20															
148.7																			
14.8																			

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

Continued Next Page

 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-15 SHEET 2 OF 2 **METRIC**

PROJECT 09-1111-6069-04

G.W.P. 5402-05-00 LOCATION N 4823269.0 ; E 605061.9 ORIGINATED BY TZ/AH

DIST _____ HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE August 30 and 31, 2010 CHECKED BY TZ/HJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80						100
	--- CONTINUED FROM PREVIOUS PAGE ---																
147.2	SAND, some silt, trace to some clay Compact Grey Wet	[Pattern]	16	SS	28											8 69 16 7	
16.3	Gravelly SAND, trace to some silt, trace clay, cobbles inferred from auger grinding, split spoon sampling(TILL) Very dense Grey Wet	[Pattern]	17	SS	85/13												
			18	SS	80/07												
144.2			19	SS	90/07												
	CLAYEY SILT with SAND, trace gravel (TILL) Hard Wet	[Pattern]	20	SS	50/07											1 34 52 13	
141.2			21	SS	75/0.03												
22.3	Weathered, Shale (BEDROCK)	[Pattern]	1	RC	REC 100%											RQD = 0%	
140.8	Shale (BEDROCK) Bedrock cored from depths 22.7 m to 26.1 m For bedrock coring details, refer to Record of Drillhole BH-15	[Pattern]	2	RC	REC 93%											RQD = 73%	
22.7			3	RC	REC 100%												RQD = 45%
137.4	END OF BOREHOLE																
26.1	NOTE: 1. Water level at a depth of 9.8 m below ground surface (Elev. 153.7 m) during drilling.																

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MASS.GDT 3/23/12 CD

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-04</u>		RECORD OF BOREHOLE No BH-16		SHEET 1 OF 2	METRIC
G.W.P. <u>5402-05-00</u>	LOCATION <u>N 4823196.4 ; E 6051119.1</u>	ORIGINATED BY <u>TZ</u>			
DIST <u>HWY 69</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>			
DATUM <u>Geodetic</u>	DATE <u>September 2, 3 and 7, 2010</u>	CHECKED BY <u>AH</u>			

SOIL PROFILE		STRAT PLOT	SAMPLES		GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL				
ELEV. DEPTH	DESCRIPTION		NUMBER	TYPE			"N" VALUES	20						40	60	80	100
164.7	GROUND SURFACE																
0.9	TOPSOIL																
	Clayey silt to silty clay, trace to some sand, trace gravel, rootlets, organics and wood fragments (FILL)																
	Stiff to very stiff	1	SS	14													
	Reddish brown grey	2	SS	17													
	Dry to moist	3	SS	11													
		4	SS	29													
161.7	CLAYEY SILT with SAND, trace gravel (TILL)																
3.0	Hard	5	SS	34													
161.0	Mottled reddish brown and grey																
3.7	Moist	6	SS	59													
	CLAYEY SILT, trace sand, containing oxidation stains from a depth of 3.7 m to 5.2 m																
	Hard	7	SS	77									0 1 85 14				
	Light brown to grey																
	Moist to wet	8	SS	63													
	Grey below a depth of 4.9 m	9	SS	63													
		10	SS	61													
		11	SS	77													
152.8	CLAYEY SILT with SAND, trace to some gravel (TILL)																
11.9	Hard	12	SS	32													
	Grey																
	Wet																
151.4	SAND and SILT, some gravel, trace to some clay (TILL)																
13.3	Dense to very dense	13	SS	30									19 40 33 8				
	Grey																
	Wet																

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

Continued Next Page

 $\overset{+}{\times} \overset{\times}{\times}$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-16 SHEET 2 OF 2 **METRIC**

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823196.4 ; E 605119.1 ORIGINATED BY TZ

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE September 2, 3 and 7, 2010 CHECKED BY AH

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)							
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40	60	80	100						20	40	60	80	100	10	20
--- CONTINUED FROM PREVIOUS PAGE ---																							
148.8	SAND and SILT, some gravel, trace to some clay (TILL) Dense to very dense Grey Wet	14	SS	53																			
15.9	SAND and SILT, trace clay Very dense Grey Wet	15	SS	75/10																			
		16	SS	50																		0 60 39 1	
146.4	Weathered, Shale (BEDROCK)	17	SS	100/08																			
18.4	Shale (BEDROCK) Reddish brown	18	SS	70/10																			
	Bedrock cored from depths of 18.4 m to 21.6 m For bedrock coring details, refer to Record of Drillhole BH-16	1	RC	REC 92%																		RQD = 48%	
		2	RC	REC 100%																			RQD = 53%
143.1	END OF BOREHOLE																						
21.6	NOTES: 1. Water level at a depth of 13.4 m below ground surface (Elev. 151.3 m) during drilling. 2. Water level measurements in piezometer: Date Depth (m) Elev. (m) 09/08/10 5.1 159.6 10/06/10 5.1 159.6 11/04/10 5.0 159.7 12/15/10 5.1 159.6 02/14/11 5.3 159.4 03/25/11 5.1 159.6 05/09/11 4.2 160.5 06/20/11 4.4 160.3 07/18/11 4.7 160.0 08/28/11 5.0 159.7 09/21/11 5.1 159.6 10/27/11 4.4 160.3 03/07/12 4.2 160.5																						

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MASS.GDT 3/23/12 CD

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-04</u>	RECORD OF BOREHOLE No BH-17	SHEET 1 OF 1	METRIC
G.W.P. <u>5402-05-00</u>	LOCATION <u>N 4823146.2 ; E 605190.5</u>	ORIGINATED BY <u>TZ</u>	
DIST <u> </u> HWY <u>69</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>August 26, 2010</u>	CHECKED BY <u>TZ/HJ</u>	

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa									
							20 40 60 80 100	○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × REMOULDED									
163.5	GROUND SURFACE																
0.9	TOPSOIL																
	Clayey silt, trace gravel, trace sand, containing organics and sand to sand and gravel pockets up to a depth of 1.5 m (FILL) Very stiff Reddish brown Dry to moist		1	SS	17		163										
			2	SS	26												
162.1																	
1.4	SAND and SILT, trace to some clay, trace gravel Compact to very dense Brown to reddish brown Moist to wet		3A	SS	19		162										
			3B														
			4	SS	90/28		161										6 43 45 6
160.6																	
160.3	Weathered, Shale (BEDROCK)		5	SS	60/08												
3.2	Shale (BEDROCK)																
	Bedrock cored from depths of 3.2 m to 7.8 m For bedrock coring details, refer to Record of Drillhole BH-17		1	RC	REC 100%		160										RQD = 50%
			2	RC	REC 95%		158										RQD = 68%
			3	RC	REC 100%		157										RQD = 68%
155.7							156										
7.8	END OF BOREHOLE																
	NOTE: 1. Borehole dry upon completion of drilling.																

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MASS.GDT 3/23/12 CD

RECORD OF BOREHOLE No BH-18 SHEET 1 OF 1 **METRIC**

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823095.7 ; E 605253.1 ORIGINATED BY TZ

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE September 8, 2010 CHECKED BY TZ/HJ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%)										
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80	100	W _p	W			W _L	20	40	60	80	100	10	20	30	GR
162.1	GROUND SURFACE																									
0.9	ASPHALT	[Cross-hatch pattern]	1	AS	-																					
161.5	Sand and gravel (FILL) Reddish brown Dry	[Dotted pattern]																								
0.6	Weathered, Shale (BEDROCK)	[Horizontal line pattern]	2	SS	77/28	▽																				
			3	SS	50/13																					
			4	SS	50/13																					
159.1	Shale (BEDROCK)	[Horizontal line pattern]	5	SS	50/13																					
3.0	Shale (BEDROCK)	[Horizontal line pattern]	1	RC	REC 100%																					RQD = 0%
	Bedrock cored from depths of 3.0 m to 7.1 m																									RQD = 33%
	For bedrock coring details, refer to Record of Drillhole BH-18		2	RC	REC 100%																					RQD = 28%
			3	RC	REC 100%																					RQD = 42%
			4	RC	REC 100%																					
155.0	END OF BOREHOLE																									
7.1	NOTE: 1. Water level at a depth of 1.2 m below ground surface (Elev. 160.9 m) upon completion of drilling.																									

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-19 SHEET 1 OF 5 **METRIC**

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823062.3 ; E 605325.9 ORIGINATED BY MK

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE July 18, 2011 CHECKED BY TZ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa					
167.0 0.0	GROUND SURFACE Overburden (Soil sample not obtained) Note: Depths are measured along the Borehole dip.						20 40 60 80 100	20 40 60 80 100	10 20 30				GR SA SI CL
162.9 4.4	Weathered, Shale (BEDROCK)												
160.9 6.5	Shale (BEDROCK) Bedrock cored from depths of 6.5 m to 62.1 m For bedrock coring details, refer to Record of Drillhole BH-19		1	RC	REC 100%								RQD = 0%
			2	RC	REC 86%								RQD = 0%
			3	RC	REC 100%								RQD = 24%
			4	RC	REC 100%								RQD = 30%
			5	RC	REC 33%								RQD = 0%
			6	RC	REC 100%								RQD = 64%
			7	RC	REC 100%								RQD = 53%

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

Continued Next Page

 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-19 SHEET 2 OF 5 **METRIC**

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823062.3 ; E 605325.9 ORIGINATED BY MK

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE July 18, 2011 CHECKED BY TZ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
--- CONTINUED FROM PREVIOUS PAGE ---																
145.5 22.9	Shale (BEDROCK)	[Bedrock Pattern]	7	RC	REC 100%											
	Bedrock cored from depths of 6.5 m to 62.1 m		8	RC	REC 100%											
	For bedrock coring details, refer to Record of Drillhole BH-19		9	RC	REC 100%											
			10	RC	REC 100%											
			11	RC	REC 100%											
			12	RC	REC 100%											
			13	RC	REC 100%											
			14	RC	REC 100%											
			15	RC	REC 100%											
			16	RC	REC 100%											
			17	RC	REC 100%											
	Shale (BEDROCK) Grey	[Bedrock Pattern]														
	Bedrock cored from depths of 6.5 m to 62.1 m															
	For bedrock coring details, refer to Record of Drillhole BH-19															

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

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 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-19 SHEET 3 OF 5 **METRIC**

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823062.3 ; E 605325.9 ORIGINATED BY MK

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE July 18, 2011 CHECKED BY TZ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
	--- CONTINUED FROM PREVIOUS PAGE ---						20	40	60	80	100		10	20	30	
	Shale (BEDROCK) Grey Bedrock cored from depths of 6.5 m to 62.1 m For bedrock coring details, refer to Record of Drillhole BH-19	[Pattern]	17	RC	REC 100%	[Pattern]										
		[Pattern]	18	RC	REC 100%	[Pattern]										
		[Pattern]	19	RC	REC 75%	[Pattern]										
		[Pattern]	20	RC	REC 100%	[Pattern]										
		[Pattern]	21	RC	REC 95%	[Pattern]										
		[Pattern]	22	RC	REC 85%	[Pattern]										
		[Pattern]	23	RC	REC 97%	[Pattern]										
		[Pattern]	24	RC	REC 97%	[Pattern]										
		[Pattern]	25	RC	REC 100%	[Pattern]									25.6	
		[Pattern]	26	RC	REC 98%	[Pattern]										
		[Pattern]	27	RC	REC 97%	[Pattern]										
		[Pattern]	28	RC	REC 99%	[Pattern]										

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

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+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-19 SHEET 4 OF 5 **METRIC**

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823062.3 ; E 605325.9 ORIGINATED BY MK

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE July 18, 2011 CHECKED BY TZ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80						100	20	40	60	80	100
--- CONTINUED FROM PREVIOUS PAGE ---																						
	Shale (BEDROCK) Grey Bedrock cored from depths of 6.5 m to 62.1 m For bedrock coring details, refer to Record of Drillhole BH-19		29	RC	REC 95%																RQD = 63%	
			30	RC	REC 97%																	RQD = 76%
			31	RC	REC 100%																	RQD = 65%
			32	RC	REC 99%																	RQD = 88%
			33	RC	REC 100%																	RQD = 75%
			34	RC	REC 100%																	RQD = 93%
			35	RC	REC 100%																	RQD = 100%
			36	RC	REC 100%																	RQD = 91%
			37	RC	REC 100%																	RQD = 95%
			38	RC	REC 100%																	RQD = 100%

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

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 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-04</u>	RECORD OF BOREHOLE No BH-19	SHEET 5 OF 5	METRIC
G.W.P. <u>5402-05-00</u>	LOCATION <u>N 4823062.3 ; E 605325.9</u>	ORIGINATED BY <u>MK</u>	
DIST <u> </u> HWY <u>69</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>July 18, 2011</u>	CHECKED BY <u>TZ</u>	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH kPa								
	--- CONTINUED FROM PREVIOUS PAGE ---						20	40	60	80	100					
	Shale (BEDROCK) Grey		38	RC												RQD = 100%
	Bedrock cored from depths of 6.5 m to 62.1 m		39	RC	REC 100%											RQD = 100%
	For bedrock coring details, refer to Record of Drillhole BH-19		40	RC	REC 100%											RQD = 100%
108.7 62.1	END OF BOREHOLE															
	NOTES: 1. Borehole was drilled at an inclination of 70° to the horizontal. 2. Open borehole dry upon completion of drilling. 3. Water level measurements in piezometer: Date Depth (m) Elev. (m) 09/21/11 0.7 166.3 10/13/11 0.9 166.2 10/27/11 1.0 166.1 03/07/12 1.7 165.4															

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MASS.GDT 3/23/12 CD

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-04</u>	RECORD OF BOREHOLE No BH-20	SHEET 1 OF 1	METRIC
G.W.P. <u>5402-05-00</u>	LOCATION <u>N 4823014.6 ; E 605416.3</u>	ORIGINATED BY <u>TZ</u>	
DIST <u> </u> HWY <u>69</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>August 25, 2010</u>	CHECKED BY <u>TZ</u>	

ELEV DEPTH	SOIL PROFILE DESCRIPTION	STRAT PLOT	SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
			NUMBER	TYPE	"N" VALUES			20	40					
164.8	GROUND SURFACE													
0.0	TOPSOIL Silty clay, trace gravel, trace sand, containing rootlets, wood fragments and organics (FILL) Stiff to very stiff Reddish brown to brown Moist		1A	SS	13		164							
			1B	SS										
			2	SS	22									
			3	SS	15		163							
162.6	Weathered, Shale (BEDROCK)		4	SS	33		162							
161.7	Shale (BEDROCK)		5	SS	75/23		161							
3.1	Bedrock cored from depths of 3.1 m to 7.0 m For bedrock coring details, refer to Record of Drillhole BH-20		1	RC	REC 93%		160							RQD = 41%
			2	RC	REC 95%		159							RQD = 44%
			3	RC	REC 97%		158							RQD = 14%
157.8	END OF BOREHOLE													
7.0	NOTES: 1. Borehole dry upon completion of drilling. 2. Water level measurements in piezometer: Date Depth (m) Elev. (m) 09/08/10 4.2 160.6 10/06/10 4.2 160.6 11/04/10 4.3 160.5 12/15/10 4.3 160.5 02/14/11 4.3 160.5 03/25/11 4.3 160.5 05/09/11 3.6 161.2 06/20/11 3.9 160.9 07/18/11 4.2 160.6 08/28/11 4.3 160.5 09/21/11 4.3 160.5 10/27/11 3.5 161.3 03/07/12 2.9 161.9													

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MASS.GDT 3/23/12 CD

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

RECORD OF BOREHOLE No BH-30 SHEET 1 OF 2 **METRIC**

PROJECT 09-1111-6069-04 G.W.P. 5402-05-00 LOCATION N 4823365.6 ; E 605013.0 ORIGINATED BY TZ/MK

DIST HWY 69 BOREHOLE TYPE 108 mm I.D. Hollow Stem Augers and HQ Coring COMPILED BY TZ

DATUM Geodetic DATE January 10 and 11, 2011 CHECKED BY TZ

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT		PLASTIC LIMIT W _p	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	UNIT WEIGHT γ	REMARKS & GRAIN SIZE DISTRIBUTION (%)										
ELEV DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES			20	40						60	80	100	20	40	60	80	100	10	20
163.4	GROUND SURFACE																						
0.0	Silty clay, trace to some gravel, trace sand, containing organics and topsoil between depths of 1.0 m and 1.1 m (FILL) Stiff to very stiff Reddish brown Moist	1	SS	13		163																	
		2	SS	17		162																	
161.8																							
1.6	CLAYEY SILT with SAND, trace gravel, with shale and limestone fragments and organics (TILL) Hard Brown Moist	3A	SS	70		161																	
		3B																					
		4	SS	53		160																	
		5A	SS	35		159																	
159.9																							
3.5	CLAYEY SILT, trace sand Hard Grey Moist to wet	5B				158																	
	Wet below a depth of 4.9 m	6	SS	97		157																	
		7	SS	57		156																	
		8	SS	51		155																	
		9	SS	70/10		154																	
156.2	Silty SAND, trace gravel, trace clay Very dense Grey Wet					153																	
7.2						152																	
154.7	Gravelly SAND, trace to some silt, trace clay (TILL) Very dense Grey Wet	10	SS	98/25		151																	
8.7		11	SS	122/25		150																	
		12	SS	8		149																	
152.4	Silty SAND, trace to some gravel, trace clay (TILL) Loose to very dense Reddish brown Wet					149																	
11.0		13	SS	80/13																			
149.6	Shale (BEDROCK)	14	SS	100/08																			
13.8	Bedrock cored from depths of 13.8 m to 15.4 m For bedrock coring details, refer to Record of Drillhole BH-30	1	RC	REC 98%																			RQD = 22%

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

Continued Next Page

 +³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT <u>09-1111-6069-04</u>	RECORD OF BOREHOLE No BH-30	SHEET 2 OF 2	METRIC
G.W.P. <u>5402-05-00</u>	LOCATION <u>N 4823365.6 ; E 605013.0</u>	ORIGINATED BY <u>TZ/MK</u>	
DIST <u>HWY 69</u>	BOREHOLE TYPE <u>108 mm I.D. Hollow Stem Augers and HQ Coring</u>	COMPILED BY <u>TZ</u>	
DATUM <u>Geodetic</u>	DATE <u>January 10 and 11, 2011</u>	CHECKED BY <u>TZ</u>	

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC NATURAL LIQUID LIMIT MOISTURE LIMIT CONTENT			UNIT WEIGHT γ kN/m ³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	20	40	60	80	100	W _p	W			W _L	10
148.0	--- CONTINUED FROM PREVIOUS PAGE ---	[Pattern]	1	RC	REC 98%													RQD = 22%
15.4	END OF BOREHOLE NOTE: 1. Water level at a depth of 8.2 m below ground surface (Elev. 155.2 m) during drilling.																	

GTA-MTO 001 09-1111-6069 (HWY 403 CROSSING).GPJ GAL-MISS.GDT 3/23/12 CD

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

PROJECT: 09-1111-6069-04

RECORD OF DRILLHOLE: BH-15

SHEET 1 OF 1

LOCATION: N 4823269.0 ; E 605061.9

DRILLING DATE: SEPTEMBER 2, 2010

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES					
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX						
							TOTAL CORE %	SOLID CORE %		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2	W3		W4	W5	W6		
							용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용	용용용용용		용용용용용	용용용용용	용용용용용	용용용용용	
		Continued from Record of Borehole BH-15		140.76																		
23	HQ-3 Bt / HQ Rods Triple Tube Sampling	22.74 - 26.06 m: Fresh, thinly laminated, grey, fine grained, non to faintly porous, very weak SHALE of the GEORGIAN BAY FORMATION interbedded with LIMESTONE (LST) and FOSSILIFEROUS LIMESTONE (FOSS LST) layers		140.01	1															Bc		
24		LST layers >2.5cm 23.49 - 23.54 m Total LST in run#2: ~5%		139.01	2																Ci/Br Ci Lc Ci/Br	
25		LST layers >2.5cm 24.91 - 25.00 m Total LST in run#3: ~10%		138.59	3																	Ci
26		Total FOSS LST in run#3: ~5%		137.44																		
		END OF DRILLHOLE																				
27																						
28																						
29																						
30																						
31																						
32																						

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE

1 : 50



LOGGED: TZ

CHECKED: AH

PROJECT: 09-1111-6069-04

RECORD OF DRILLHOLE: BH-18

SHEET 1 OF 1

LOCATION: N 4823095.7 ; E 605253.1

DRILLING DATE: SEPTEMBER 8, 2010

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES				
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP W.R.L. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec				WEATHERING INDEX			
							TOTAL CORE %	SOLID CORE %				TYPE AND SURFACE DESCRIPTION	Jr	Ja	W1	W2		W3	W4	W5	W6
		Continued from Record of Borehole BH-18		159.12																	
3	HQ-3 Bit / HQ Rods Triple Tube Sampling	3.00 - 4.06 m: Slightly to moderately weathered, thinly laminated, reddish brown and grey banded, fine grained, non to faintly porous, very weak to extremely weak SHALE of the QUEENSTON FORMATION	[Symbolic Log Pattern]	158.32	1						BA, PL, SM	1	1						Bc		
												BA, PL, SM	1	1						Bc	
													BA, UN, SM BA, PL, PO	2 0.5	1						Bc
4		4.06 - 7.09 m: Fresh, thinly laminated, reddish brown and grey banded, fine grained, non to faintly porous, very weak SHALE of the QUEENSTON FORMATION interbedded with occasional LIMESTONE (LST) layers		157.38	2								BA, PL, SM BA, PL, SM	1 1	1						Bc
5		Total LST in run#2: ~5%		156.39	3						BA, PL, SM BA, PL, RO BA, PL, SM BA, PL, SM BO, PL, PO BA, PL, SM BA, PL, SM BO, PL, SM, IN, CI/Br, 38 mm	1 1.5 1 1 0.5 1 1 1 1 1 1 0.5	1							CI/Br	
6		LST layers >2.5cm 5.73 - 5.89 m Total LST in run#3: ~15%		155.86	4						JA, PL, SM BA, UN, SM BA, PL, SM BA, PL, PO BA, PL, SM BA, PL, SM BO, PL, PO JO, PL, SM BO, PL, SM BO, PL, SM, IN, CI/Br, 20 mm	1 0.5 1 1 1 1 1 1 1 1 0.5	1								CI/Br
7		Total LST in run#4: ~5%		155.03							JA, PL, SM BA, PL, SM BO, PL, SM BO, PL, SM	1 1 0.5 1	1							CI	
		END OF DRILLHOLE									BO, PL, PO BA, PL, SM BO, PL, PO BA, PL, SM BA, PL, SM BO, PL, SM, IN, CI, 32 mm BA, PL, PO BA, PL, SM	1 1 1 0.5 1 1 1	1								

GTA-RCK 031 09-1111-6069.GPJ GAL-MASS.GDT 05/11/12 BR/MK



PROJECT: 09-1111-6069-04

RECORD OF DRILLHOLE: BH-19

SHEET 1 OF 6

LOCATION: N 4823062.4 ;E 605325.9

DRILLING DATE: JULY 18 TO AUGUST 2, 2011

DATUM: NAD83

INCLINATION: -70° AZIMUTH: 300°

DRILL RIG: CME-76

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY														FEATURES
						RECOVERY			FRACT. INDEX PER 0.25m	DIP W.R.T. CORE AXIS	DISCONTINUITY DATA	HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX					
						TOTAL CORE %	SOLID CORE %	R.Q.D. %				Jr	Ja	W1	W2	W3	W4	W5	W6	
Continued from Record of Borehole BH-19				160.95																
7		6.45 - 6.99 m: Highly weathered, thinly laminated, reddish brown, fine grained, non to faintly porous, extremely weak SHALE of the QUEENSTON FORMATION		160.44	1															Lc
8		6.99 - 15.26 m: Slightly to moderately weathered, thinly laminated, reddish brown and grey banded, fine grained, non to faintly porous, very weak to weak SHALE of the QUEENSTON FORMATION			2															Bc
9					3															Bc
10					4															Mbc
11																				Mbc
12	HQ-3 Bit / HQ Rods Triple Tube Sampling				5															Lc
13		15.26 - 21.71 m: Fresh to slightly weathered, thinly laminated, reddish brown with grey banding, fine grained, non to faintly porous, very weak to weak SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) layers		155.17	6															Mbc
14		Run #8 LST layers >2.5cm 16.79 - 16.87 m 17.41 - 17.44 m			7															
15					8															
16																				

CONTINUED NEXT PAGE

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK



DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES
						RECOVERY		FRACT. INDEX PER 0.25m	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX				
						TOTAL CORE %	SOLID CORE %		DIP w.r.t. CORE AXIS	TYPE AND SURFACE DESCRIPTION	Jr	Ja	10 ⁰	10 ¹	10 ²	W1	W2	
		--- CONTINUED FROM PREVIOUS PAGE ---																
27		21.71 - 29.63 m: Fresh, thinly laminated, grey, fine grained, non to faintly porous, weak to moderately strong SHALE of the GEORGIAN BAY FORMATION interbedded with LIMESTONE (LST) layers		140.56	14													
28		Run #16 LST layers >2.5cm 28.15 - 28.24 m 28.78 - 28.84 m 29.26 - 29.29 m		139.97	15													
29				139.51	16													
30		29.63 - 62.05 m: Fresh, thinly laminated, grey, fine grained, non to faintly porous, weak to moderately strong, SHALE of the GEORGIAN BAY FORMATION interbedded with LIMESTONE (LST) and FOSSILIFEROUS LIMESTONE (FOSS LST) layers		139.17	17													
31		Run #20 FOSS LST layers >2.5cm 32.09 m - 33.74 m 34.16 m - 34.22 m 34.37 m - 34.39 m		136.86	18													
32	HQ-3 Bit / HQ Rods Triple Tube Sampling			135.30	19													
33				134.91	20													
34		LST layers >2.5cm 34.96 - 35.12 m 35.16 - 35.21 m 35.79 - 35.83 m Total LST in run#21: ~20%		134.16	21													
35		FOSS LST layers >2.5cm 34.46 - 34.96 m 35.21 m - 35.49 m 35.70 m - 35.75 m Total FOSS LST in run#21: ~60%		133.66	22													
36		Total LST in run#22: 5%		133.46	23													
		LST layers >2.5cm 37.26 m - 37.30 m Total LST in run#23: 15%			24													
		CONTINUED NEXT PAGE																

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MLK



PROJECT: 09-1111-6069-04

RECORD OF DRILLHOLE: BH-19

SHEET 4 OF 6

LOCATION: N 4823062.4 ; E 605325.9

DRILLING DATE: JULY 18 TO AUGUST 2, 2011

DATUM: NAD83

INCLINATION: -70° AZIMUTH: 300°

DRILL RIG: CME-76

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	FLUSH RETURN	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY										FEATURES			
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DISCONTINUITY DATA			HYDRAULIC CONDUCTIVITY K, cm/sec				WEATHERING INDEX		
							TOTAL CORE %	SOLID CORE %			DIP w.r.t. CORE AXIS	Type and Surface Description	Jr	Ja	10 ⁰	10 ¹		10 ²	W1	W2
-- CONTINUED FROM PREVIOUS PAGE --																				
37		LST layers >2.5cm 37.26 m - 37.30 m Total LST in run#22: 5%		132.00	23															
38		LST layers >2.5cm 37.61 m - 38.05m 38.10 m - 38.14 m 38.49 m - 38.61 m Total LST in run#24: 39%		131.67 131.25	24												Bc			
39		LST layers >2.5cm 39.15 m - 39.22 m 39.26 m - 39.45 m 39.54 m - 39.64 m 40.25 m - 40.37 m Total LST in run#25: 38%		130.84 130.22	25															
40		LST layers >2.5cm 41.08 m - 41.15 m 41.25 m - 41.30 m 41.54 m - 41.77 m 41.80 m - 42.00 m Total LST in run#26: 36%		129.94 129.19	26															
41	HQ-3 Bit / HQ Rods Triple Tube Sampling	LST layers >2.5cm 42.10 m - 42.16 m 42.25 m - 42.79 m 43.00 m - 43.19 m 43.34 m - 43.39 m 43.49 m - 43.51 m Total LST in run#27: 47%		128.41 127.98 127.76 127.54	27												MBc			
42		LST layers >2.5cm 43.51 m - 43.59 m 43.69 m - 43.74 m 44.31 m - 44.39 m 44.61 m - 44.67 m Total LST in run#28: 23%		126.80 126.60 126.42	28															
43		LST layers >2.5cm 45.05 m - 45.45 m 45.68 m - 45.96 m 46.04 m - 46.13 m 46.16 m - 46.20 m 46.29 m - 46.34 m Total LST in run#29: 52%		125.37 125.09 124.68 124.30 124.08 123.82	29															
44																				
45																				
46																				
CONTINUED NEXT PAGE																				

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

DEPTH SCALE

1 : 50



LOGGED: MK/TZ/PS

CHECKED: AH

PROJECT: 09-1111-6069-04

RECORD OF DRILLHOLE: BH-30

SHEET 1 OF 1

LOCATION: N 4823365.6 ;E 605013.0

DRILLING DATE: JANUARY 11, 2011

DATUM: NAD83

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: CME-75

DRILLING CONTRACTOR: All-Terrain Drilling

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV.	RUN No.	NOTE: For abbreviations, symbols and descriptions refer to LITHOLOGICAL AND GEOTECHNICAL ROCK DESCRIPTION TERMINOLOGY												FEATURES	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 0.25m	DIP w.r.t. CORE AXIS	DISCONTINUITY DATA		HYDRAULIC CONDUCTIVITY K, cm/sec			WEATHERING INDEX			
						TOTAL CORE %	SOLID CORE %				Jr	Ja	W1	W2	W3	W4	W5		W6
14	HQ-3 Bit / HQ Rods Triple Tube Sampling	Continued from Record of Borehole BH-30 13.77 - 15.38 m: Fresh, thinly laminated, reddish brown, fine grained, non to faintly porous, weak SHALE of the QUEENSTON FORMATION interbedded with LIMESTONE (LST) and FOSSILIFEROUS LIMESTONE (FOSS LST) layers LST layers >2.5 cm 13.8 - 13.96 m 14.05 - 14.15 m 14.25 - 14.38 m 14.62 - 14.74 m 15.26 - 15.33 m Total LST in run#1: ~40% FOSS LST layers >2.5 cm 14.17 - 14.22 m 15.33 - 15.38 m Total FOSS LST in run#1: ~7% END OF DRILLHOLE		149.60 148.75 148.11	1								Lc Ci Cv/Br MBc MBc						

DEPTH SCALE

1 : 50



LOGGED: TZ/MK

CHECKED: AH

GTA-RCK 031 09-1111-6069.GPJ GAL-MISS.GDT 05/11/12 BR/MK

PROJECT: 1788766
 LOCATION: N 4840269.37; E 599419.05

RECORD OF BOREHOLE: 17-15

SHEET 1 OF 3

BORING DATE: December 21 and 22, 2017

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
								20	40	60	80	nat V. +	rem V. ⊕	Q - ●				U - ○
0		GROUND SURFACE		235.88												GR SA SI CL		
		TOPSOIL (100 mm)		0.00												Concrete		
		(CL) Sandy SILTY CLAY, some gravel; brown becoming grey with oxidation staining below a depth of 5.3 m (TILL); cohesive, w<PL to w~PL, stiff to hard		0.10	1	SS	9											
1					2	SS	27											
2					3	SS	30											
3					4	SS	25											
4					5	SS	29											
5					6	SS	37											
5		- Tricone grinding at a depth of 4.6 m.			7	SS	50/0.13											
6					8	SS	38											
6		- Silty sand lenses at a depth of 6.1 m.			9	SS	50/0.10											
7					10	SS	50/0.08											
8					11	SS	50/0.13											
9					12	SS	50/0.05											
9		(ML/SM) SILT and SAND, trace to some gravel; grey (TILL); non-cohesive, moist, very dense		227.57 8.31														
9		- Silty clay lenses between depths of 9.1 m and 9.5 m.			13	SS	50/0.13											
10					14	SS	50/											

CONTINUED NEXT PAGE

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\WILLIAMS PARKWAY_RDI02 DATA\GINT\WILLIAMS PARKWAY_RD.GPJ GAL-MIS.GDT 18-9-11

DEPTH SCALE

1 : 50



LOGGED: DU

CHECKED: DH/ARV

PROJECT: 1788766
 LOCATION: N 4840269.37; E 599419.05

RECORD OF BOREHOLE: 17-15

SHEET 2 OF 3

BORING DATE: December 21 and 22, 2017

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								20 40 60 80		nat V. + Q - rem V. ⊕ U - ○		10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³				Wp — W — WI	
10		— CONTINUED FROM PREVIOUS PAGE — (ML/SM) SILT and SAND, trace to some gravel; grey (TILL); non-cohesive, moist, very dense				0.08									GR SA SI CL		
11				15	SS	50/0.10							○	5 38 53 4			
12				16	SS	50/0.08							○	Screen			
13				17	SS	50/0.13							○	Sand			
14				18	SS	50/0.10							○				
15	Mud Rotary Tricone			19	SS	50/0.08							○				
16				20	SS	50/0.08							○				
17				21	SS	50/0.10							○				
18				22	SS	50/0.10							○				
19				23	SS	50/0.10							○				
20				24	SS	50/0.13							○				
							219.88										
							16.00										
														Bentonite			

CONTINUED NEXT PAGE

GTA-BHS 005 S:\CLIENTS\REGION OF PEEL\WILLIAMS PARKWAY_RDI02 DATA\GINT\WILLIAMS PARKWAY_RD.GPJ GAL-MIS.GDT 18-9-11

DEPTH SCALE

1 : 50



LOGGED: DU

CHECKED: DH/ARV

PROJECT: 1788766
 LOCATION: N 4840269.37; E 599419.05

RECORD OF BOREHOLE: 17-15

SHEET 3 OF 3

BORING DATE: December 21 and 22, 2017

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
								20	40	60	80	nat V. +	Q - ●			rem V. ⊕	U - ○
20		-- CONTINUED FROM PREVIOUS PAGE --													GR SA SI CL		
21	Mud Rotary Tricone	(SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, moist to wet, very dense		214.26	25	SS	50/ 0.13									Bentonite	
22		END OF BOREHOLE		21.62													
23		NOTE: 1. Groundwater level measurement in monitoring well:															
		Date	Depth (m)	Elev. (m)													
		12/22/2017	4.3	231.6													
		01/15/2018	4.4	231.5													
		03/06/2018	4.4	231.5													

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DEPTH SCALE

1 : 50



LOGGED: DU

CHECKED: DH/ARV

PROJECT: 1788766
 LOCATION: N 4840110.39; E 599468.26

RECORD OF BOREHOLE: 17-27

SHEET 1 OF 1

BORING DATE: January 8, 2018

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.		+		-			Wp
0		GROUND SURFACE		234.49												GR SA SI CL	
0		TOPSOIL (80 mm) (CL) Sandy SILTY CLAY, trace gravel; brown with oxidation staining, containing organics and rootlets to a depth of 0.7 m (TILL); cohesive, w<PL to w>PL, stiff to hard		0.00 0.08	1	SS	9									Concrete	
1					2	SS	17										
2					3	SS	18										
3					4	SS	21										
3					5	SS	60/ 0.23										
4		(SM) Gravelly SILTY SAND; grey (TILL); non-cohesive, moist, very dense		230.83 3.66	6	SS	57									Bentonite	
5					7	SS	80									Mar. 7, 2018	
6					8	SS	94									Sand	
7		END OF BOREHOLE		227.94 6.55												Screen	
8		NOTES: 1. Open borehole dry upon completion of drilling. 2. Groundwater level measurements in monitoring well: Date Depth (m) Elev. (m) 01/15/2018 3.8 230.7 03/07/2018 3.0 231.5															Sand

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DEPTH SCALE

1 : 50



LOGGED: DU

CHECKED: SEC/ARV

PROJECT: 1788766
 LOCATION: N 4839995.47; E 599586.99

RECORD OF BOREHOLE: 17-28

SHEET 1 OF 1

BORING DATE: January 8, 2018

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
								20	40	60	80	nat V. +	rem V. ⊕	Q - U -				Wp
0		GROUND SURFACE		232.70												GR SA SI CL		
0		TOPSOIL (100 mm) (CL) Gravelly sandy SILTY CLAY; brown to reddish-brown to grey, oxidation staining, trace organics and rootlets to a depth of 0.7 m (TILL); cohesive, w<PL to w>PL, stiff to hard		0.00 0.10	1	SS	16									Concrete		
1					2	SS	9											
2					3	SS	59									Bentonite		
2		- Auger grinding at a depth of 2.1 m.			4	SS	46									Mar. 7, 2018		
3	Power Auger 150 mm Diameter Solid Stem Augers				5	SS	45									20 28 37 15		
4					6	SS	50/ 0.15									21.4 KN/m ²		
4				228.36 4.34	7	SS	91/ 0.28									Sand		
5		(ML) SILT, trace to some sand; grey; non-cohesive, moist to wet, very dense			8	SS	50/ 0.10									Screen		
6				226.35 6.35												Sand		
7		END OF BOREHOLE														Bentonite		
7		NOTE: 1. Groundwater level measurements in monitoring well:																
		Date	Depth (m)	Elev. (m)														
		01/15/2018	3.0	229.7														
		03/07/2018	2.1	230.6														

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DEPTH SCALE

1 : 50



LOGGED: DU

CHECKED: SEC/ARV

PROJECT: 1788766
 LOCATION: N 4839794.37; E 599789.69

RECORD OF BOREHOLE: 17-29

SHEET 1 OF 1

BORING DATE: January 8, 2018

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Track-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	GRAIN SIZE DISTRIBUTION (%)	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT						
								20	40	60	80	nat V. +	rem V. ⊕	Q -				U -
0		GROUND SURFACE		232.27												GR SA SI CL		
		TOPSOIL (150 mm)		0.00														
		(CL) Gravelly sandy SILTY CLAY; brown, oxidation staining, trace organics and rootlets to a depth of 0.7 m (TILL); cohesive, w<PL, stiff to hard		0.15	1	SS	13									Concrete		
1					2	SS	18									May 2, 2018		
					3	SS	53									Bentonite		
2					4	SS	34											
					5	SS	27											
3																		
4		(ML) SILT, trace sand, trace gravel; grey; non-cohesive, moist, very dense		228.64 3.63	6	SS	85/ 0.28									Screen		
					7	SS	50/ 0.13											
5																		
6					8	SS	50/ 0.10											
7		END OF BOREHOLE		225.92 6.35														
		NOTES:																
		1. Open borehole dry upon completion of drilling.																
		2. Groundwater level measurements in monitoring well:																
		Date	Depth (m)	Elev. (m)														
		01/15/2018	3.3	229.0														
		03/08/2018	1.9	230.4														
		05/02/2018	1.1	231.2														
8																		
9																		
10																		

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DEPTH SCALE

1 : 50



LOGGED: DU

CHECKED: SEC/ARV

PROJECT: 1788766
 LOCATION: N 4839625.83; E 600009.26

RECORD OF BOREHOLE: 17-30

SHEET 1 OF 1

BORING DATE: January 18, 2018

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 55 Truck-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa				WATER CONTENT PERCENT					
								20	40	60	80	nat V. +	Q -			rem V. ⊕	U -
0		GROUND SURFACE		229.93											GR SA SI CL		
		TOPSOIL		0.00	1A										Concrete		
		FILL - (SM) SILTY SAND, some gravel; brown, containing trace organics; non-cohesive, moist, compact to dense		229.63 0.30	1B	39									Bentonite		
1		(CL) Sandy SILTY CLAY, some gravel; brown (TILL); cohesive, w<PL, stiff to hard		228.79 1.14	2A	14									Sand		
					2B										May 2, 2018		
2					3	31											
					4	20											
3		(ML) Sandy SILT, trace gravel; brown, becoming grey below a depth of 3.8 m (TILL); non-cohesive, moist to wet, very dense		226.96 2.97	5	88/ 0.28									Screen		
					6	65											
4					7	50/ 0.13											
					8	50/ 0.13											
5					9	50/ 0.08									Bentonite		
6															5 34 54 7		
		END OF BOREHOLE		223.61 6.32											Cave		
7		NOTES: 1. Borehole caved to a depth of about 5.5 m below ground surface when augers were removed. 2. Groundwater level measured at a depth of 4.3 m (Elev. 225.5 m) upon completion of drilling. 3. Groundwater level measurements in monitoring well:															
8																	
9																	
10																	

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DEPTH SCALE

1 : 50



LOGGED: CL

CHECKED: SEC/ARV

PROJECT: 1788766
 LOCATION: N 4839626.00; E 599986.40

RECORD OF BOREHOLE: 17-212

SHEET 1 OF 1

BORING DATE: February 28, 2018

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: CME 75 Truck-Mounted

HAMMER TYPE: AUTOMATIC

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								Cu, kPa		nat V. rem V.		Q - U				Wp	
0		GROUND SURFACE		229.82											GR SA SI CL		
		ASPHALT (150 mm)		0.00											Concrete		
		FILL - (SP/GP) SAND and GRAVEL; brown; non-cohesive, moist, compact		0.15	1	SS	24										
1		(CL) Sandy SILTY CLAY, some gravel; brown (TILL); cohesive, w<PL, stiff to very stiff		0.76	2	SS	13										
2				229.06	3	SS	24								Bentonite		
				227.61	4	SS	19								9 26 42 23		
3		(ML) Sandy SILT, some gravel; brown (TILL); non-cohesive, moist, compact to very dense		2.21	5	SS	68								Mar. 15, 2018		
				223.31	6	SS	100/0.23								Sand		
4					7	SS	50/0.13								6 31 55 4		
5					8	SS	90/0.28										
6					9	SS	89/0.25								Screen		
				223.31											6 21 65 4		
7		END OF BOREHOLE		6.51													
		NOTE: 1. Groundwater level measurements in monitoring well:															
		Date	Depth (m)	Elev. (m)													
		03/09/2018	2.5	227.3													
		03/15/2018	2.5	227.3													
8																	
9																	
10																	

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DEPTH SCALE

1 : 50



LOGGED: AD

CHECKED: SEC/ARV

PROJECT: 1527321
 LOCATION: N 4840271.03; E 599419.74

RECORD OF BOREHOLE: 15-54

SHEET 1 OF 2
 DATUM: Geodetic

BORING DATE: July 22, 2015
 DRILL RIG: D-120 Track Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT PERCENT					
								20 40 60 80		10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴ 10 ⁻³		nat V. + Q - ●				rem V. ⊕ U - ○	
0		GROUND SURFACE		234.76											GR SA SI CL		
		TOPSOIL		0.00 234.53													
		FILL - (CL-ML) SILTY CLAY, trace gravel, mottled brown and grey, moist, stiff RDR 2		0.23 234.07	1	SS	14										
1		(CL) SANDY LEAN CLAY, trace to some gravel, with cobbles and boulders; brown, oxidation staining, (TILL); moist, very stiff to hard RDR 2-4		0.69	2	SS	19										
					3	SS	24										
					4	SS	50/0.15										
					5	SS	24										
					6	SS	39										
		(CL-ML) SANDY SILTY CLAY, some gravel; reddish brown, (TILL); moist, hard RDR 2-3 Brown sand lens at 4.67 m		230.28 4.50	7	SS	50/0.15								5 28 46 21		
		(CL-ML) SILTY CLAY with SAND, some gravel; grey, (TILL); moist, hard RDR 3-4		229.68 5.08	8	SS	44										
					9A	SS	50/0.15										
					9B	SS	50/0.15										
		(SM-ML) SILTY SAND with GRAVEL, some gravel, trace clay; grey, (TILL); moist, very dense RDR 3-4		228.48 6.30	10	SS	50/0.15										
					11	SS	50/0.13								16 34 44 6		
					12	SS	50/0.15										
		(CL) LEAN CLAY, trace gravel; grey, (TILL); moist, hard RDR 2-3		225.92 8.84	13	SS	75										
					14	SS											

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DEPTH SCALE
 1 : 50



DRILLER: Altech / TG
 LOGGED: ML
 CHECKED: SMM

PROJECT: 1527321
 LOCATION: N 4840271.03; E 599419.74

RECORD OF BOREHOLE: 15-54

SHEET 2 OF 2
 DATUM: Geodetic

BORING DATE: July 22, 2015
 DRILL RIG: D-120 Track Mount

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁶	10 ⁻⁵			10 ⁻⁴	10 ⁻³
		-- CONTINUED FROM PREVIOUS PAGE --															
10	Power Auger 108 mm I.D. Hollow Stem Augers	(SM-ML) SILTY SAND, trace clay, trace gravel; grey, (TLL); moist to wet below 10.67 m, very dense RDR 2-3		224.40		50/											
				10.36													
11				15	SS	50/											
12		END OF BOREHOLE		222.54		16	SS	50/									
		NOTE: 1. Water level in open borehole at a depth of 11.4 m below ground surface (Elev. 223.3 m) on completion.		12.22													

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DEPTH SCALE
1 : 50



DRILLER: Altech / TG
 LOGGED: ML
 CHECKED: SMM

DRAFT



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