Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

A REPORT TO
BOLTON SHORE HOLDINGS LTD.

A HYDROGEOLOGICAL ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT

15, 21 AND 27 SHORE STREET
TOWN OF CALEDON

REFERENCE NO. 2404-W107

OCTOBER 03, 2024

DISTRIBUTION

Digital Copy - Bolton Shore Holding Ltd.
Digital Copy - Soil Engineers Ltd. (Richmond Hill)

LIMITATIONS OF LIABILITY

This report was prepared by Soil Engineers Ltd. for the account of Bolton Shore Holding Ltd. and for review by its designated agents, financial institutions and government agencies, and can be used for development approval purposes by the Town of Caledon and their peer reviewer who may rely on the results of the report. The material in it reflects the judgment of Daixi Zhang, B.Sc., G.I.T., and Narjes Alijani, M.Sc., P.Geo. Any use which a Third Party makes of this report and/or any reliance on decisions to be made based on it is the responsibility of such Third Parties. Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this.

One must understand that the mandate of Soil Engineers Ltd. is to obtain readily available current and past information pertinent to the Subject Site for a Hydrogeological Study only. No other warranty or representation, expressed or implied, as to the accuracy of the information is included or intended by this assessment. Site conditions are not static and this report documents site conditions observed at the time of the Subject Site reconnaissance.

TABLE OF CONTENTS

TABLES:

DRAWINGS:

APPENDICES:

1.0 EXECUTIVE SUMMARY

Soil Engineers Ltd. (SEL) was retained by Bolton Shore Holdings Ltd. to conduct a hydrogeological assessment for the proposed residential development at 15, 21 and 27 Shore Street, Town of Caledon (the Subject Site).

The Subject Site is located on the north side of Shore Street and approximately 38 metres west of Highway 50, in the Town of Caledon. The Subject Site is bounded by residential to the west and north, commercial to the east, and Shore Street to the South. It is currently occupied by three (3) residential lots with 1-storey dwellings in each lot.

Based on the review of the Site Plan, prepared by Fausto Cortese Architects, dated July 10, 2024, it is understood that the Subject Site will be redeveloped into a 4-storey apartment residential building with a 1-level basement and at-grade parking lot. The proposed building will be provided with underground services.

The current investigation revealed that:

- The Subject Site is generally underlain by a stratum of silty clay, with a localized deposit of silty clay till beneath the topsoil and a layer of earth till until the end of the investigation at 8.5 metre below ground surface (mbgs).
- Shallow groundwater was monitored within the silty clay unit. The highest and lowest shallow groundwater level was measured at El. 253.0 metres above sea level (masl) and 248.6 masl at BH/MW 2 and BH/MW 1, respectively.
- Estimated hydraulic conductivity using single well response test (SWRT) ranges from 1.4 x 10^{-8} m/sec at BH/MW 1 and 3 to 5.3 x 10^{-9} m/sec at BH/MW 2 for the silty clay unit.
- Groundwater quality for one (1) collected unfiltered sample from BH/MW 3 meets the Peel Region's Sanitary Sewer Use By-Law standards. However, it exceeds for total manganese and total zinc when compared to the Peel Region's Storm Sewer Use By-Law standards
- The anticipated dewatering flow rate for short-term construction activities for the proposed 4-storey residential building with a 1-level basement including groundwater seepage with a safety factor of 2.0, including storm water is at 12,200.0 L/day.
- The anticipated dewatering flow rate for short-term construction activities for the construction of underground services and the proposed rainwater cistern including groundwater seepage with a safety factor of 2.0, including storm water range from a minimum rate of 400.0 L/day to a maximum of 1,900.0 L/day.
- Findings of the estimated long-term foundation drainage flow rates show that the anticipated groundwater seepage considering a safety factor of 2.0 is at 400.0 L/day. The total anticipated long-

term foundation drainage flow rate considering infiltration due to storm events and groundwater seepage with a safety factor or 2.0 is at 1,700.0 L/day.

- Considering the findings of the short-term dewatering assessment and anticipated dewatering flow calculated for the proposed building that well be excavated and constructed below shallow groundwater table, filing EASR with MECP is not required. Additionally, obtaining a discharge permit from the Region of Peel is required, if the potential collected discharge water during construction is proposed to be discharged to the region's sewer system.
- A review of the estimated long-term foundation drainage flow rates indicates that anticipated groundwater flow does not exceed 50,000 L/day for the proposed postconstruction buildings with 1-level basement that will be constructed partially below shallow groundwater table. As such, filing PTTW with MECP is not required. However, obtaining discharge agreement from the Region of Peel is required if long-term foundation drainage effluent is proposed to be conveyed to the region's sewer system. Alternatively, collected water can be hauled off-site using a licensed contractor.
- Groundwater quality result indicates that groundwater quality sample collected from a selected monitoring well (BH/MW 3) mostly meets the Region of Peel Storm and Sanitary Sewer Use By-Law standards except for total magnesian and total zinc. As such, pre-treatment is required prior to discharge to the regions storm sewer system.
- The conceptual ZOI for dewatering may reaches maximum of 2.8 m away from the dewatering area in the area of proposed residential building and underground services. As the maximum conceptual ZOI is within the Subject Site, potential risk for ground settlement is not expected due to dewatering. However, as a conservative approach it is recommended a professional geotechnical engineer is consulted in advance of excavation and construction.
- Record review indicates that there are no records for natural heritage features including woodland, wetlands, water bodies, watercourses and ANSI within the maximum conceptual ZOI for the dewatering at the Subject Site. As such, impacts to surface water, wetlands, and areas of natural significance are not anticipated pertaining to the proposed construction.
- A review of the MECP well records confirmed that there is one (1) record for water supply well that is registered within 500 m of the Subject Site Study Area. However, there is no record of water supply well fall within the maximum anticipated conceptual ZOI. As such, impacts to water supply wells located within the maximum ZOI are not anticipated.

2.0 INTRODUCTION

2.1 Site Location and Project Description

Soil Engineers Ltd. (SEL) was retained by Bolton Shore Holdings Ltd. to conduct a hydrogeological assessment for the proposed residential development at 15, 21 and 27 Shore Street, Town of Caledon (the Subject Site). The location of the Subject Site is shown on **Drawing 1**.

The Subject Site is located on the north side of Shore Street and approximately 38 metres west of Highway 50, in the Town of Caledon. The Subject Site is bounded by residential properties to the west and north, a commercial property to the east, and Shore Street to the South. It is currently occupied by three (3) residential lots with 1-storey dwellings in each lot.

Based on the review of the Site Plan, prepared by Fausto Cortese Architects, dated July 10, 2024, it is understood that the Subject Site will be redeveloped into a 4-storey apartment residential building with a 1-level basement and at-grade parking lot. The proposed building will be provided with underground services.

2.2 Project Objectives

The current hydrogeological assessment report presents the regional and local setting of the Subject Site. The findings of the fieldwork, including subsoil investigation, groundwater level monitoring, groundwater quality assessment, and hydraulic conductivity testing are presented in the report. Potential needs for short-term dewatering and long-term foundation drainage control are assessed, and hydrogeological impacts of the proposed development to the nearby groundwater receptors including water supply wells, natural heritage features, and structures are assessed (if applicable). This report provides comments on the potential impacts of the proposed development to the groundwater receptors, and structures. Comments and recommendations are provided on any needs for applying for a Permit to Take Water (PTTW), or posting Environmental Activity and Sector Registry (EASR) with the Ministry of the Environment, Conservation and Parks (MECP).

The current report is prepared in consideration of the Ontario Water Resource Act, Ontario Regulation (O. Reg.) 387/04.

2.3 Scope of Work

The scope of work for the hydrogeological assessment is summarized below:

- *Background Review:* Available background geological and hydrogeological information for the Subject Site including topographic mapping, surface geological, natural heritage features databases, Town of Caledon official plans, Toronto Region Conservation Authority (TRCA) regulated area plans, and MECP water well records were reviewed.

- *Fieldwork:* Fieldwork includes inspecting the Subject Site and surrounding properties with respect to the natural features, groundwater receptors, and structures, as well as installing and developing the monitoring wells. Additionally, groundwater levels within the installed monitoring wells were monitored over three (3) monitoring events, in-situ hydraulic conductivity testing was completed within the installed monitoring wells. One (1) set of groundwater samples was collected and submitted to a CALA laboratory to characterize groundwater quality in comparison with the Regional Municipality of Peel Wastewater By-Law (By-Law No. 53-2010) parameters.
- *Short-Term Dewatering and Long-Term Drainage Flow Rate:* Based on a review of the available conceptual site plan, findings of the current subsurface investigation, and recommendations provided in the geotechnical investigation report (if available), preliminary short-term dewatering and long-term drainage flow rate including groundwater seepage, and anticipated water that should be collected over potential storm events was calculated. A mitigation plan was recommended to mitigate potential short-term dewatering impacts to the nearby groundwater receptors (including natural heritage features and water supply wells), and structures, if applicable.
- *Permit Requirements:* Considering the estimated preliminary short-term construction dewatering and long-term foundation drainage flow rates, recommendations were provided on any need for applying for a PTTW or posting on the EASR with the MECP, if required.

3.0 APPLICABLE REGULATIONS AND OFFICIAL PLANS

The regulations and policies are relevant to this hydrogeological assessment and the location of the Subject Site within the official plans are summarized below.

3.1 Toronto Region Conservation Authority (TRCA) Policies and Regulation (O. Reg. 166/06)

Under Section 28 of the Conservation Authorities Act, local conservation authorities are mandated to protect the health and integrity of the regional greenspace system and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. The TRCA, through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (O. Reg.) 166/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposals or Site alteration work to shorelines and watercourses within the regulated areas.

TRCA Regulated Area online mapping was reviewed on September 23, 2024. It is our understanding that the Subject Site is not located within TRCA Regulated Area. As such, it is anticipated that obtaining a permit from the TRCA under O. Reg. 166/06 will not be required for the proposed development.

3.2 Clean Water Act

The MECP mandates the protection of existing and future sources of drinking water under the Clean Water Act, 2006 (CWA). Initiatives under the CWA include the delineation of Wellhead Protection Areas (WHPAs), significant groundwater recharge areas (SGRAs) and Highly Vulnerable Aquifers (HVAs) as well as the assessment of drinking water quality and quantity threats within Source Protection Regions. Source Protection Plans are developed under the CWA and include the restriction and prohibition of certain types of activities and land uses within WHPAs.

Based on a regional-scale source water protection mapping (Source Water Protection Information Atlas) provided by the MECP updated on July 25, 2024, the Subject Site is not located within a WHPA area, Issue Contributing Area and Intake Protection Zone, Issue Contributing Area, Event Based Area and SGRA. However, it is located within the Highly Vulnerable Aquifer with a score of 6.

3.3 Town of Caledon Official Plan

The Town of Caledon Official Plan sets up policies that deal with legislative and administrative concerns, guides physical growth, and addresses social, economic, and environmental concerns. The Official Plan provides land use planning designations and identifies areas of environmental significance where more stringent policies may apply for development applications.

Town of Caledon Official Plan maps were reviewed for the current study with the results summarized

below:

- Schedule A1 (Town of Caledon Town Structure) – A review of the map, dated March 2024, indicates that the Subject Site is located within an area designated as Rural Service Centre
- Schedule C (Balton Land Use Area) – A review of the map, dated March 2024, indicates that the Subject Site is located within an area designated as Low Density Residential.
- Schedule O (Wellhead Protection Areas) – A review of the map, dated March 2024, indicates that the Subject Site is not located within a Wellhead Protection Area, and is located within an area designated as Settlement Area.
- Schedule P (Oak Ridges Moraine Conservation Plan Land Use Designations) – A review of the map, dated March 2024, indicates that the Subject Site is not located within the Oak Ridge Marine.

4.0 METHODOLOGY

4.1 Borehole Advancement and Monitoring Well Installation

Drilling boreholes and construction of monitoring wells were conducted for geotechnical investigation by SEL Ltd. between May 29 and 30, 2024. The program consisted of the drilling of the four (4) boreholes extending to depths ranging between 8.1 and 8.5 metres below ground surface (mbgs).

All boreholes were utilized for the hydrogeological assessment of the Subject Site. Boreholes 1, 2 and 3 were instrumented with the monitoring wells for geotechnical and hydrogeological assessment purposes. The locations of the boreholes and monitoring wells are shown on **Drawing 2**.

Borehole drilling and monitoring well construction were completed by a licensed water well contractor, under the full-time supervision of SEL's geotechnical supervisor who logged the soil strata encountered during borehole advancement and collected representative soil samples for textural classification. The boreholes were drilled using a track-mounted drill rig equipped with solid stem augers and split spoons. Detailed descriptions of the encountered subsoil and groundwater conditions as well as a grain size distribution graph are provided by SEL and presented on the borehole and monitoring well logs, in the enclosed **Appendix A**.

The monitoring wells were constructed using 50-mm diameter PVC pipes for three (3) selected borehole locations. 1.5 m long 10-slot well screens were installed at three (3) monitoring well locations. BH/MW 1 and 2 were equipped with monument casing, while BH/MW 3 was equipped with flush mount casing at the ground surface.

The UTM coordinates and ground surface elevations at the monitoring wells' locations, as well as the monitoring well construction details, are presented in **Table 4-1**. The ground surface elevations and horizontal coordinates at the monitoring well locations were determined at the time of the investigation, using the Trimble TSC3 handheld Global Navigation Satellite System.

Table 4-1 - Monitoring Well Installation Details

Monitoring Well ID	Installation Date	UTM Coordinates (m)		Ground El. (masl)	Screen Interval (mbgs)	Soil in the Screen Interval	Casing Dia. (mm)	Protective Casing Type
		Easting	Northing					
BH/MW 1	May 30, 2024	601839.3	4858697.0	254.1	4.5 – 7.6	Silty Clay	50	Monument
BH/MW 2	May 29, 2024	601853.3	4858710.9	254.1	4.5 – 7.6	Silty Clay	50	Monument
BH/MW 3	May 29, 2024	601850.3	4858686.5	254.5	4.5 – 7.6	Silty Clay	50	Flush Mount

Notes:
mbgs meters below ground surface
masl meters above sea level

4.2 MECP Water Well Records Review

MECP Water Well Records (WWRs) were reviewed for the registered wells located within 500 m radius of the Subject Site (Study Area). The water well records indicate that fifty-one (51) are located within the 500 m zone of influence Study Area relative to the Subject Site. The findings of the MECP well records are summarized in the **Section 5.6** of the current report.

4.3 Groundwater Monitoring

All three (3) installed monitoring wells were utilized to measure and monitor groundwater levels within the Subject Site. Monitoring wells were developed, and the groundwater monitoring program confirmed the stabilized groundwater level beneath the Subject Site. The stabilized groundwater levels were manually measured over three (3) monitoring events from June 11, 2024 to July 9, 2024, with the results presented in **Section 7.1**.

4.4 In-Situ Hydraulic Conductivity Test

SEL has conducted in-situ hydraulic conductivity tests (falling hea) at all BH/MW locations. The in-situ hydraulic conductivity test (falling head or rising head) provides estimated hydraulic conductivity (K) for subsoil strata at the depths of the well screens. The monitoring wells were developed in advance of the tests. Well development involves the purging and removal of groundwater from each monitoring well to remove remnants of clay, silt and other debris introduced into the monitoring well during construction, and to induce the flow of formation groundwater through the well screens, thereby improving the transmissivity of the subsoil strata formation at the well screen depths.

The in-situ falling head hydraulic conductivity test involves the placement of a slug of known volume into the monitoring well, below the water table, to displace the groundwater level upward. The in-situ rising head hydraulic conductivity test involves removing a volume of water from the monitoring well to displace the groundwater level downward. The rate at which the water level recovers to static conditions (rising head/falling head) is tracked manually using a water level tape and a data logger. Slug tests in the monitoring wells with partially submerged screens may exhibit a double straight-line effect due to the filter pack drainage. Therefore, the data that represents the filter pack around the screen is eliminated during the interpretation of the slug test. The rate at which the water table recovers to static conditions is used to estimate the K value for the water-bearing strata formation at the well screen depth using the Bouwer and Rice method (1976). The findings for the hydraulic conductivity testing are presented in **Section 7.3** of the current report.

4.5 Groundwater Quality Assessment

Groundwater quality assessment was completed by SEL on July 9, 2024. One (1) set of groundwater samples was collected from one (1) selected monitoring well (BH/MW 3) to characterize its quality for evaluation against Peel's Wastewater By-Law (formerly called The Region of Peel Sewer Use By-Law (By-Law No. 53-2010) parameters. This is performed to assess whether any anticipated dewatering effluent can be disposed of into the Region of Peel Sanitary and/or Storm Sewer system during construction. Based on the results, recommendations for any pre-treatment for any dewatering effluent can be developed, if required.

The sample analysis was performed by SGS Canada Inc. and the results of the analysis are discussed in **Section 7.4** of the current report.

4.6 Review of Regional Data and Available Reports for the Subject Site

The maps, data, and documents provided by the MECP, Ontario Geological Survey (OGS), Ministry of Natural Resource and Forestry (MNRF), Oak Ridges Moraine Groundwater Program (ORMGP), and TRCA were reviewed. Additionally, the issued geotechnical investigation report, dated July 2024 was reviewed at the time of preparation of the current hydrogeological assessment report, with the findings summarized in **Sections 5, 6 and 8.2**.

5.0 REGIONAL AND LOCAL SITE SETTING

5.1 Regional Geology

The current understanding of the surface geological setting of the Subject Site is based on scientific work conducted by the OGS (OGS, 2003). The Subject Site is located within an area mapped as Till deposits (5d) known as Halton Till, comprising of clay to silt-textured till, which is derived from glaciolacustrine deposits or shale. **Drawing 3** illustrates the mapped surficial geology for the Subject Site and the surrounding area.

The Oak Ridges Moraine Groundwater Program (ORMGP) produced a cross-sectional geological map to aid in the characterization of the general area. Considering the regional cross-section, it is understood that the overburden units prevalent in this area are as follows, with the youngest unit at the top:

- *Undifferentiated Sediments:* Undifferentiated sediments present at the ground surface, with an approximate thickness between 15.2 m and 16.0 m beneath the Subject Site.

- *Halton Till:* The Halton Till is mainly comprised of sandy silt to clayey silt till interbedded with silt, clay, and a number of discontinuous sand and gravel lenses. It was deposited approximately 12,500 years ago. Based on cross-section, the Halton Till or equivalent can be contacted beneath the undifferentiated sediments with an approximate thickness ranging from 12.3 m to 13.0 m beneath the Subject Site.

- *Oak Ridge Moraine:* The Oak Ridges Moraine Aquifer Complex (ORAC) is a regionally significant aquifer in southern Ontario. A majority of the aquifer's recharge occurs at the crest of the moraine north of the Site. It is primarily composed of interbedded fine sand and silt deposits with localized coarse sand and gravel deposits. The ORAC has an approximately thickness ranging from 33.0 m to 35.3 m beneath the crest of the moraine.

- *Newmarket Till:* The Newmarket Till is a regionally extensive till formation that acts as an aquitard separating the Oak Ridges Aquifer Complex (ORAC) from the underlying Thorncliffe Formation. Based on the ORMGP cross-section, Newmarket Till is mapped beneath the ORAC. The Newmarket Till can be contacted beneath the ORAC. The Newmarket Till (Lower Newmarket Till) has an approximate thickness of 31.0 m beneath the Subject Site.

- *Throncliff Formation:* The Thorncliffe Formation consists of glaciofluvial and glaciolacustrine sand and silt deposited approximately 30,000 to 50,000 years ago. The Thorncliffe Formation shows a considerable variation in grain size and thickness, both locally and regionally. It acts as a regional aquifer. Based on the ORMGP cross-section, the thickness of the Thorncliffe could reach up to 13.6 m beneath the Subject Site.

- *Sunnybrook Drift:* The Sunnybrook Drift consists of silt to silty clay materials deposited 45,000 years ago and acts as a regional aquitard. The thickness of the Sunnybrook Drift is generally less than 10 m to 20 m. Based on the ORMGP cross-section, the estimated thickness of the unit could reach up to 8.5 m beneath the Subject Site.

The underlying bedrock at the Subject Site is the Georgian Bay Formation, which consists of shale and limestone, being grey to green and dark grey in color, along with fossiliferous calcareous siltstone to bioclastic limestone (OGS, 2007). A review of the ORMGP cross-section indicates that the bedrock could be contacted at an approximate elevation of 142.0 metres above sea level (masl) beneath the Subject Site.

5.2 Regional Physiography

The Subject Site is located within a regional physiography of Southern Ontario known as South Slope, and is situated on the Till Plains (Drumlinized) physiographic feature. The South Slope which is the southern slope of the Oak Ridges Moraine, includes a land strip south of the Peel Plain. It rises 90 to 120 m in elevation to the line of contact with the moraine at elevations ranging from 240 to 300 masl. The south slope exhibits an average width of 9.6 to 11.3 km, extending from the Niagara Escarpment to the Trent River. It covers an area of approximately 2,400 km^2. The South Slope is smoothed, faintly drumlinized, and scarred at intervals by valleys and tributaries of the Rouge, Don, and Humber River systems (Chapman and Putnam, 1984). **Drawing 4** shows the location of the Subject Site within the regional physiography map.

5.3 Regional Topography and Drainage

A review of a regional topography map presented on **Drawing 5** indicates that topography along the Subject Site is generally flat, and exhibits a gentle decline towards the north portion of the Subject Site.

The ground surface elevation ranges approximately between 254.1 and 254.5 masl, based on ground surface elevations measured at the borehole and monitoring wells' locations.

5.4 Watershed Setting

The Subject Site is located within the Humber River Watershed that falls in the Toronto and Region Conservation Authority (TRCA) jurisdiction.

5.5 Local Surface Water and Natural Heritage Features

MNRF database was reviewed for any natural heritage features including, watercourses, bodies of water, wetland features, Area of Natural and Scientific Interest (ANSI) and wooded areas. **Drawing 6** shows the location of the Subject Site within the surrounding Natural Heritage Features.

Record review indicates that there are no records for natural heritage features including woodland, wetlands, water bodies, watercourses and ANSI within the Subject Site.

Record review indicates that the closest watercourse is Humber River located approximately 924 m northwest of the Subject Site, and the closest record of a wooded area is located approximately 901 m northwest of the Subject Site.

5.6 Ground Water Resources (MECP Well Records)

MECP well record database was reviewed for records located within a radius of 500 m from the approximate Subject Site (Study Area). The records indicate that fifty-one (51) well records are located within the Study Area relative to the Subject Site boundaries. A summary of the final status of the records, obtained from the records review is presented in **Table 5-1**.

The locations of the well records, based on the UTM coordinates provided by the records, are shown on **Drawing 7**. Details of the MECP water well records that were reviewed are provided in **Appendix B**.

Table 5-1 - MECP Well Record Summary

Water Use - Final Status	Number of Records
Unknown	33
Test Hole	11
Observation Wells	3
Abandoned-Other	2
Water Supply	1
Monitoring and Test Hole	1

The above summary indicates that there is one (1) record of water supply wells in close proximity of the Subject Site (Study Area).

5.7 Active Permit to Take Water Application Record Review

MECP website was reviewed for any active PTTW application records within 1.0 km radius of the Subject Site on September 23, 2024. Record review indicates there is on active PTTW within close proximity of 1 km radius to the Study Area.

6.0 SOIL LITHOLOGY AND SUBSURFACE INVESTIGATION

The subsoil investigation has revealed that beneath the topsoil and a layer of earth fill, the Subject Site is generally underlain by a stratum of silty clay, with a localized deposit of silty clay till until the end of the investigation. Information regarding borehole logs and grain size distributions is presented in **Appendix A** on **Figure 1** to **4**. The approximate locations of boreholes are shown on **Drawing 2**. Additionally, a cross-section key plan and subsoil profiles (cross-sections) are presented on **Drawings 8-1, 8-2A** and **8-2B**. Based on a review of the borehole logs, the stratigraphy beneath the investigated areas of the Subject Site generally consists of the followings:

6.1 Topsoil (All BH and BH/MWs)

The investigation revealed that an approximately 8 to 10 cm thick layer of topsoil was encountered at the ground surface of all Borehole and BH/MW locations.

6.2 Earth Fill (All BH and BH/MWs)

Beneath the surface cover, a layer of earth fill was contacted in all Borehole and BH/MW locations, extending to a depth of 0.8 mbgs. The fill is dark brown in color, and consists of silty clay, with a variable amount of topsoil and rootlets. The moisture contents for the retrieved subsoil samples range from 23 to 33 %. The high-water content value indicates the presence of topsoil.

6.3 Silty Clay/Silty Clay Till (All BH and BH/MWs)

Native deposits of silty clay were contacted at various depths in all Borehole and BH/MW locations. The silty clay is the predominant soil in the revealed stratigraphy. It contains traces of sand and gravel, with occasional silt seams.

The silty clay till was encountered beneath the topsoil and earth fill, overlying the silty clay at BH/MW 3 location. It consists of a random mixture of particle sizes ranging from clay to gravel, with the silt and clay being the dominant fraction.

The silty clay/silty clay till deposit is stiff to hard, being generally very stiff in consistency and brown and grey in color. The moisture contents for the retrieved subsoil samples range from 16 to 29 %, indicating a moist to very moist, generally moist condition.

Grain size analyses were performed on one (1) selected subsoil sample for silty clay, and one (1) selected subsoil sample for silty clay till, respectively. The estimated permeability for the silty clay unit encountered at BH/MW 2 location at the depth of 6.4 mbgs is about 10^{-7} cm/sec. The estimated permeability for the silty

clay till unit encountered at BH/MW 3 location at the depth of 1.0 mbgs is about 10^{-7} cm/sec. The gradations are plotted in **Appendix A** (**Figures 5** and **6)**.

7.0 LOCAL HYDROGEOLOGICAL STUDY

7.1 Monitoring Well Development and Groundwater Level Monitoring

The groundwater levels in the monitoring wells were measured, manually on June 11 and 24, 2024, and July 9, 2024 to record the fluctuation of the shallow groundwater table beneath the Subject Site.

Monitoring wells were developed and groundwater levels were monitored over three (3) monitoring events. SEL measured the groundwater levels using an interface probe (Heron Water Tape Series #1900). A summary of the groundwater level observations and their corresponding elevations are provided in **Table 7-1**.

Table 7-1 - A Summary of Groundwater Monitoring

BH/MW ID	Unit	Groundwater Level			Fluctuation
		June 11, 2024	June 24, 2024	July 9, 2024	(m)
BH/MW 1	mbgs	5.5	4.6	2.6	2.9
	masl	**248.6**	249.5	251.5	
BH/MW 2	mbgs	1.3	1.1	1.4	0.3
	masl	252.8	**253.0**	252.7	
BH/MW 3	mbgs	1.8	1.8	1.9	0.1
	masl	252.7	252.7	252.6	

Notes:
mbgs meters below ground surface
masl meters above sea level

As shown in **Table 7-1**, the highest and lowest groundwater levels were measured at El. 253.0 masl and 248.6 masl at BH/MW 2 and BH/MW 1, respectively.

7.2 Shallow Groundwater Flow Pattern

The recorded groundwater level measured on June 24, 2024 were considered for interpretation of the shallow groundwater direction beneath the investigated area of the Subject Site. A review of the interpreted shallow groundwater flow pattern indicates that shallow groundwater flows westerly direction. The shallow groundwater flow pattern at the Subject Site is shown on **Drawing 9**.

7.3 In-Situ Hydraulic Conductivity Testing

All BH/MWs underwent a single well response testing (SWRTs), to assess the hydraulic conductivity (K) for saturated shallow aquifer or water bearing unit at the depths of the well screens. Each monitoring well was equipped with a digital transducer to record the fluctuation made to complete the SWRT. The results of the SWRT tests are presented in **Appendix C**, with a summary of the findings provided in **Table 7-2**.

Table 7-2 - A Summary of Rising and Falling Head Hydraulic Conductivity Testing

Well ID	Ground El. (masl)	Screen Interval (mbgs)	Screened Soil Strata	Hydraulic Conductivity (K) (m/sec)	Test Method
BH/MW 1	254.1	4.5 – 7.6	Silty Clay	1.4×10^{-8}	Rising Head Test
BH/MW 2	254.1	4.5 – 7.6	Silty Clay	5.3×10^{-9}	Falling Head Test
BH/MW 3	254.5	4.5 – 7.6	Silty Clay	1.4×10^{-8}	Falling Head Test

Notes:
mbgs meters below ground surface
masl meters above sea level

The findings of SWRTs reveal that the hydraulic conductivity (K) for saturated water bearing unit underneath the Subject Site are 1.4×10^{-8} at BH/MW 1 and 3, and 5.3×10^{-9} m/sec at BH/MW 2 locations.

7.4 Groundwater Quality

One (1) set of groundwater samples was collected for analysis from the monitoring well BH/MW 3 on July 9, 2024, by SEL to characterize their quality for evaluation against The Peel's Wastewater By-Law (By-Law No. 53-2010) parameters. Upon sampling, all of the bottles were placed in a cooler for shipment to the analytical laboratory. Sample analysis was performed by SGS Canada Inc., which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Results of the analysis are provided in **Appendix D**, with a discussion of the findings provided below. The chain of custody numbers for the submitted samples that underwent analysis is 039210.

As per the protocols for The Peel's Wastewater By-Law, a complete set of unfiltered groundwater samples were submitted to the laboratory with the results being presented as totals for various analyzed parameters.

The results of analysis for the unfiltered groundwater indicate two (2) exceedances when compared and evaluated against the Region of Peel's Sanitary and Storm Sewer Use By-Law parameters. The exceedances, together with the Sanitary and Storm Sewer Use standards, are presented in **Table 7-3**.

Table 7-3 - Groundwater Quality Analysis Results Exceeded

Exceeded Parameter	Groundwater Quality Results (Unfiltered Sample) (mg/L)	Peel's Sanitary Sewer Use Limits (mg/L)	Peel's Storm Sewer Use Limits (mg/L)	Detection Limit (mg/L)
Total Manganese	**0.0710**	5	**0.05**	0.00001
Total Zinc	**0.048**	3	**0.04**	0.002

As shown above, the concentrations for total manganese and total zinc exceed Peel's Storm Sewer Use By-Law standards, but meet the Sanitary Sewer Use By-Law standards.

These results suggest that any short-term construction dewatering or long-term foundation drainage discharge (from a groundwater source) would not be acceptable for disposal to The Regional Municipality

of Peel Storm Sewer Use By-Law without any pre-treatment to lower the total manganese and total zinc before discharge into the storm sewer. However, discharging to the sanitary sewer would be acceptable without significant pre-treatment.

The final design for any dewatering effluent pre-treatment system is the responsibility of the contractors responsible for construction, or of the water treatment system design specialist, or mechanical engineer, if required, for any long-term foundation drainage system for the completed underground structure.

8.0 DISCHARGE WATER CONTROL

8.1 A Review of Proposed Development Plans

The Site Plan, prepared by Fausto Cortese Architects, dated July 10, 2024, and the Site Grading Plan, Site Servicing Plan and Cross Sections, prepared by Urbanworks Engineering Corporation, dated September 24, 2024 were reviewed for the current assessment.

According to the Site Plan, and information provided by Urbanworks Engineering Corporation, it is understood that the proposed development within the Subject Site will consist of the construction of a 4-storey apartment residential building with a 1-level basement and at-grade parking. The development will be provided with municipal services and paved roadways meeting the city's standards. Additionally, an underground rainwater cistern is proposed east of the proposed building. Reviewed plans are presented in **Appendix E**.

8.2 A Review of Geotechnical Investigation Report

A review of the Geotechnical Investigation report, Reference No. 2404-W107, dated June 2024, prepared by SEL indicates that:

- The existing topsoil and earth fill must be removed for site development. After demolition of the existing structures, the debris must be removed and disposed of off-site.

- The proposed development will consist of a 4-storey building with a conventional basement. The basement elevation will likely be approximately 3.0 m below the prevailing ground surface. The new building foundation placed on sound, natural soil with conventional spread and strip footings can be designed.

- Foundations exposed to weathering should have at least 1.2 m of earth cover for protection against frost action.

- The building foundation should meet the requirements specified in the latest Ontario Building Code and the structures should be designed to resist an earthquake force using Site Classification 'D' (stiff soil).

- The elevator pit, which normally extends below the floor level, should be designed as a submerged 'tank' structure with waterproofed pit walls and pit floor.

- The underground services should be founded on sound native soil or properly compacted inorganic earth fill. Where weathered soil is encountered, it should be subexcavated and replaced with the bedding material, compacted to at least 98% SPDD.

- The narrow trenches for services crossings should be cut at 1 vertical: 2 horizontal so that the backfill in the trenches can be effectively compacted. Otherwise, soil arching in the trenches will prevent achievement of the proper compaction. In confined areas where the desired slope cannot be achieved or the operation of a proper kneading-type roller cannot be facilitated, imported sand fill, which can be appropriately compacted by using a smaller vibratory compactor, must be used.

8.3 Construction Dewatering Requirements

Based on the available design drawing with the details discussed in **Section 8.1**, the following sections present the estimated dewatering flow rates for each portion, separately.

8.3.1 Methodology

Short-Term Dewatering Calculation: The pumping rate calculation for the construction of the proposed development was performed based on the assumption that each excavation acts as trench considering the dimensions of the proposed excavation boxes. The calculation was based on the equations provided by Powers et al. (2007). For the purposes of this analysis, steady state flow into an open excavation is assumed, Additionally, the equations of radial flow have the following assumptions:

- Ideal aquifer conditions (homogeneous, isotropic, uniform thickness and has infinite areal extent)
- Fully penetrating pumping well
- Only lateral flow to the pumping well

The following equations were used for open trenches and is based on unconfined aquifer conditions (Powers et. al., 2007):

$$Q = \frac{\pi K(H^2 - h^2)}{\ln(R_0 / r_s)} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

Where:

Q	=	Anticipated pumping Rate (m^3/day)
K	=	Hydraulic Conductivity (m/day)
H	=	Distance from the static water level to the bottom of the saturated aquifer (m)
h	=	Depth of water in the well while pumping (m)
R_o	=	Distance from a point of greatest drawdown to a point where there is zero drawdown (radius of influence) (m)
r_s	=	Distance to the wellpoints from the center of the trench, assumed to be half of the trench width (m) for Trench base calculation and Radius of Excavation for Single Well Equation.
x	=	Trench Length (m)
L	=	Distance from a line source to the trench, R_o (m)/2

The calculated pumping rate was multiplied by a factor of safety of 1.5 to account for uncertainties and natural variability in the range of hydraulic conductivity.

Zone of Influence for Dewatering: An estimate of the Zone of Influence (ZOI) for dewatering in unconfined aquifers can be calculated using the following equation (Bear, 1979):

$$R_0 = 2.45\sqrt{\frac{HK}{S_y}}t$$

where,

R_o	=	Zone of Influence (m), beyond which there is negligible drawdown
H	=	Distance from initial static water level to bottom of saturated aquifer (m)
S_y	=	Specific yield of the aquifer formation
t	=	Time, in seconds, required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days)
K	=	Hydraulic Conductivity (m/s)

Anticipated Storm Event: The amount of runoff that could accumulate in the excavation boxes were also considered for any construction dewatering needs assessment. Additional dewatering may be required to maintain the dry condition of the excavation during and following significant precipitation events. Therefore, the dewatering flow rates along the Subject Site should also include removing stormwater from the excavation.

A review of the intensity duration frequency curve (IDF curve) for the year 2010 for the coordinates 43° 52' 15" N, 79° 43' 45" W, the rainfall depth considering 2-year storm event over a 3-hour period per day is approximately 30.7 mm, and a 100-year storm event over a 12-hour period per day is 100.8 mm. The data was taken from the Ministry of Transportation's (MTO) website. The accumulated runoff associated with rainfall events within the anticipated excavations for the proposed underground services were calculated using the estimated rainfall depth multiplied by the estimated area of the proposed excavation footprint of the proposed development.

8.3.2 Short-Term Dewatering for Proposed Residential Building

Based on a review of the Site Plan, prepared by Fausto Cortese Architects, dated July 10, 2024, and the Site Grading Plan, prepared by Urbanworks Engineering Corporation, dated September 24, 2024, it is understood that the proposed within the Subject Site will consist of the construction of a 4-storey apartment residential building with a 1-level basement and at-grade parking. The proposed finished floor elevation (FFE), the top of the basement slab elevation, and the building dimensions are provided. Reviewed plans are presented in **Appendix E**.

The highest measured shallow groundwater level at BH/MW 2 on June 24, 2024, and the highest hydraulic conductivity of 1.4×10^{-8} m/sec are used for the current assessment.

The summary of proposed construction details, groundwater seepage flow rate estimates, estimated zone of influence, anticipated maximum drawdown, and storm water events are presented in **Table 8-1** below, and **Appendix F**.

Table 8-1 - Short-Term Dewatering Flow Rate Estimates for the Proposed Building (Including Precipitation)

Parameters	4-Storey Residential Building with 1-Level Basement
Excavation Box Dimensions (m)	17.2 x 23.0
Excavation Area (m²)	395.6
Proposed Finished Floor Elevation (FFE) (masl)	254.6
Proposed Top of Basement Slab Elevation (masl)	251.6
Assumed Base of the Drainage Layer Elevation (masl) *	251.1
Assumed Bulk Excavation Depth (masl)	251.1
Soil Media at the Assumed Excavation Depth	Silty Clay
Highest Measured Shallow Groundwater Elevation (masl)	253.0
Estimated Zone of Influence (m)	2.8
Anticipated Maximum Drawdown (m)	2.9
Dewatering Flow Estimate without S.F. (L/Day)	400.0
Estimated Dewatering flow rates with S.F. of 2.0 (L/Day)	800.0
Anticipated 2-year Storm Event (L/day)	12,200.0
Total Anticipated Flow considering 2-year Storm Event (L/day)	13,000.0

S.F. - Safety Factor

*Assuming 0.5 m below the assumed top of basement slabs

Additionally, storm water flow considering 100-year storm event for a duration of 12 hours was considered to estimate the maximum storm water that can be collected during the excavation and construction period. The storm water flow considering 100-year storm event can reach up to 40,700.0 L/day.

8.3.3 Short-Term Dewatering for Proposed Underground Services

Based on a review of the Site Servicing Plan and Cross Sections, prepared by Urbanworks Engineering Corporation, dated September 24, 2024, it is understood that the proposed development will be provided with storm and sanitary sewer services connecting to the region’s or city’s sewer system. Also, an underground rainwater cistern is proposed with connection to the storm sewer system.

The summary of the construction dewatering flow rates for the underground services is summarized in **Table 8-2** below, and **Appendix F**.

Table 8-2 - Groundwater Seepage Flow Rate Estimates for the Underground Services Installation

Type of Service	Storm	Storm	Storm	Sanitary	Underground Rainwater Cistern	Underground Rainwater Cistern Connection
Chainage	**CB 1 - CBMH 1**	**CBMH 1 - CBMH 2**	**CBMH 2 - DIVERSION MH**	**PLUG (Building) - PR. SAN MH 1A**	**3 Cisterns**	**Cistern - CBMH 2**
Approximate Existing Highest Ground Surface Contour Elevation (masl)	254.5	254.2	254.9	254.9	254.6	254.6
Proposed Highest Grading Elevation (masl)	254.2	254.0	254.2	254.6	254.4	254.4
Approximate Proposed Excavation Depth (masl)	253.0	252.9	252.7	251.6	252.5	252.5
Highest Interpreted Groundwater Contour Elevation (masl)	253.0	253.0	253.0	253.0	253.0	253.0
Estimated Zone of Influence (m)	0.0	1.7	2.0	2.6	2.1	2.1
Anticipated Maximum Drawdown (m)	0.0	1.1	1.3	2.4	1.5	1.5
Trench Width (m)	2.0	2.0	2.0	2.0	3.0	2.0
Trench Length (m)	30.4	19.4	12.6	2.1	8.2	6.3
Area (m^2)	60.9	38.9	25.2	4.2	24.7	12.6
Perimeter (m)	64.9	42.9	29.2	8.2	22.5	16.6
Total flow in L/day (Without Safety factor) *	NG**	100.0	100.0	100.0	200.0	100.0
Total flow in L/day (With a Safety factor of 2.0)	NG**	200.0	200.0	200.0	400.0	200.0
Anticipated Storm Flow (2-year storm event with a duration of 3 hr/day) (L/day)	1,900.0	1,200.0	800.0	200.0	800.0	400.0
Total Estimated Short-Term Dewatering Flow Rate for 2-year event	1,900.0	1,400.0	1,000.0	400.0	1,200.0	600.0
Anticipated Storm Flow (100-year storm event with a duration of 12 hr/day) (L/day)	6,200.0	4,000.0	2,600.0	500.0	2,500.0	1,300.0

S.F. - Safety Factor

*Considering lowering the groundwater table 1.0 m below the base of the excavation

**NG - Negligible

The reviewed drawings indicates that Storm and Sanitary sewers are proposed at various depths, therefore the dewatering estimates are considered for the deepest underground service installation.

The anticipated dewatering flow including groundwater seepage with a safety factor of 2.0 during storm event for the proposed service installation can range from 400.0 L/day to 1,900.0 L/day considering a 2-year storm event with a duration of 3hr per day. However, negligible groundwater seepage is expected for connected CB-1 to CBMH1.

Additionally, a potential 100-year storm event with a duration of 12 hours is expected to range from 500.0 L/day to 6,200.0 L/day considering an active trenches with dimensions as mentioned in the above table.

8.4 Long-Term Foundation Drainage Flow Rates

Groundwater seepage and infiltration flow due to storm event should be collected for the post-construction 1-level basement. As such, a foundation drainage system should be designed to collect the anticipated flow for the proposed basement. The Proposed drainage layer elevation for the long-term foundation drainage flow rate calculation was considered at 251.5 masl, which was assumed to be 0.5 m below the proposed top of basement floor elevation (251.6 masl).

Anticipated flow considering 30.7 mm storm event (2-year events for a duration of 3 hours) was considered to estimate the total anticipated long-term foundation drainage flow rate. Summary of the estimated flow rates is presented in **Table 8-3**.

Table 8-3 - Summary of Anticipated Long-term Foundation Drainage Flow Rates

Proposed Development	Groundwater Seepage (L/day)	Groundwater Seepage S.F. * 2.0 (L/day)	Anticipated Flow through Infiltration (L/day)	Total Anticipated Foundation Drainage Flow Rates
4-Storey Residential Building with 1-level Basement	200.0	400.0	1,300.0	1,700.0

S.F. - Safety Factor

The above estimated flow rates do not include potential long-term flow for sump pit or any other localized structures that may extend below the drainage layer, assuming the above noted structures will be waterproofed for post-development structure.

8.5 Permit Requirements

Short-Term Construction Dewatering: Water takings of more than 50,000 L/day but less than 400,000 L/day is to be registered on EASR, while water takings of more than 400,000 L/day require a PTTW issued by the MECP. If it is identified that an EASR or PTTW is required for the Subject Site, a hydrogeological assessment report will need to be submitted in support of the application. However, as per the MECP's document titled "Streamlining Permissions for Low-Risk Short-Term Water Taking Activities" dated June 2021, if the groundwater seepage is between 50,000 L/day and 400,000 L/day, the water taking limit only applies to groundwater.

A review of the total anticipated dewatering flow rate presented in **Table 8-1** indicates that, total anticipated dewatering flow calculated for the proposed 4-storey residential building with a 1-level basement with the proposed top of basement floor elevation lower than the highest shallow groundwater table is below the MECP threshold of 50,000 L/day. As such, filing EASR or applying for PTTW with MECP is not required for construction of the building.

A review of the anticipated dewatering flow rates for the construction of the proposed underground services presented in **Table 8-2** shows that the anticipated dewatering flow rate for the construction of the servicing trenches range from 400.0 L/day to 1,900.0 L/day, including precipitation and groundwater seepage, which remain below the MECP threshold of 50,000 L/day. As such, filing EASR or applying for PTTW with MECP is not required for construction of the underground services.

Obtaining a discharge permit from the Region of Peel or the City of Caledon may be required, if the potential collected discharge water during construction is proposed to be discharged to the region's or city's sewer system. Alternatively, collected water can be hauled off-site using a licensed contractor.

Long-Term Foundation Drainage: If the estimated long-term foundation drainage flow from groundwater source exceeds MECP PTTW threshold limit of 50,000 L/day, applying for PTTW with MECP is required.

The estimated long-term foundation drainage flow rates from groundwater source presented in **Table 8-3** indicates that flow rate doesn't exceed 50,000 L/day for each of the proposed 4-storey residential building with a 1-level basement. As such, filing PTTW with MECP is not required. Obtaining discharge agreement from the Region of Peel or the City of Caledon is required if long-term foundation drainage effluent is proposed to be conveyed to the region's or city's sewer system.

8.6 Potential Dewatering Impacts and Mitigation Plan

8.6.1 Short-Term Discharge Water Quality

The dewatering system must be appropriately filtered in order to prevent the pumping of fines and loss of ground during the dewatering activities.

One set of unfiltered groundwater samples were collected for analysis from the selected monitoring well, BH/MW 3, on July 9, 2024, and the results were compared with the Region of Peel Sanitary and/or Storm Sewer By-Law standards. Based on the results, any short-term construction dewatering or long-term foundation drainage discharge (from a groundwater source) would not be acceptable for disposal to The Regional Municipality of Peel Storm Sewer Use By-Law without any pre-treatment to lower the total manganese and total zinc before discharge into the storm sewer. However, discharging to the sanitary sewer would be acceptable without the significant pre-treatment.

The final design for any temporary construction dewatering effluent pre-treatment system is the responsibility of the contractors responsible for construction, or the water treatment system design specialists, if required.

8.6.2 Ground Settlement

The conceptual ZOI for dewatering may reaches maximum of 2.8 m away from the dewatering area of proposed 4-storey residential building, where dewatering is necessary. As the maximum conceptual ZOI is within the Subject Site, potential risk for ground settlement is not expected due to dewatering. However, as a conservative approach it is recommended a professional geotechnical engineer is consulted in advance of excavation and construction.

8.6.3 Surface Water, Wetlands and Areas of Natural Significance

Record review indicates that there are no records for natural heritage features including woodland, wetlands, water bodies, watercourses and ANSI within the maximum conceptual ZOI for the dewatering at the Subject Site. As such, impacts to surface water, wetlands, and areas of natural significance are not anticipated pertaining to the proposed construction.

8.6.4 Water Supply Wells and Zone of Influence

A review of the MECP well records confirmed that there is one (1) record a for water supply well that is registered within 500 m of the Subject Site Study Area. There is no water supply well located within the maximum conception ZOI for the dewatering at the Subject Site. As such, impacts to water supply wells are not anticipated.

9.0 CONCLUSIONS AND RECOMMENDATIONS

- The Subject Site is located within an area mapped as Till deposits (5d), comprising of clay to silt-textured till.
- The Subject Site is located within a regional physiography of Southern Ontario known as South Slop.
- The Subject Site is located within the Humber River Watershed that falls in the Toronto and Region Conservation Authority (TRCA) jurisdiction
- The Subject Site is generally underlain by a stratum of silty clay, with a localized deposit of silty clay till beneath the topsoil and a layer of earth till until the end of the investigation at 8.5 mbgs.
- Shallow groundwater was monitored within the silty clay unit. The highest and lowest shallow groundwater level was measured at El. 253.0 masl and 248.6 masl at BH/MW 2 and BH/MW 1, respectively.
- Estimated hydraulic conductivity using single well response test (SWRT) ranges from 1.4×10^{-8} m/sec at BH/MW 1 and 3 to 5.3×10^{-9} m/sec at BH/MW 2 for the silty clay unit.
- Groundwater quality for one (1) collected unfiltered sample from BH/MW 3 meets the Peel Region's Sanitary Sewer Use By-Law standards. However, it exceeds for total manganese and total zinc when compared to the Peel Region's Storm Sewer Use By-Law standards
- The anticipated dewatering flow rate for short-term construction activities for the proposed 4-storey residential building with a 1-level basement including groundwater seepage with a safety factor of 2.0, including storm water is at 12,200.0 L/day.
- The anticipated dewatering flow rate for short-term construction activities for the construction of underground services and the proposed rainwater cistern including groundwater seepage with a safety factor of 2.0, including storm water range from a minimum rate of 400.0 L/day to a maximum of 1,900.0 L/day.
- Findings of the estimated long-term foundation drainage flow rates show that the anticipated groundwater seepage considering a safety factor of 2.0 is at 400.0 L/day. The total anticipated long-term foundation drainage flow rate considering infiltration due to storm events and groundwater seepage with a safety factor or 2.0 is at 1,700.0 L/day.
- Considering the findings of the short-term dewatering assessment and anticipated dewatering flow calculated for the proposed building that well be excavated and constructed below shallow groundwater table, filing EASR with MECP is not required. Additionally, obtaining a discharge permit from the Region of Peel is required, if the potential collected discharge water during construction is proposed to be discharged to the region's sewer system.

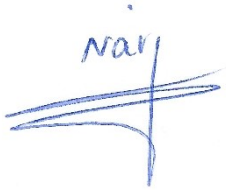
- A review of the estimated long-term foundation drainage flow rates indicates that anticipated groundwater flow does not exceed 50,000 L/day for the proposed postconstruction buildings with 1-level basement that will be constructed partially below shallow groundwater table. As such, filing PTTW with MECP is not required. However, obtaining discharge agreement from the Region of Peel is required if long-term foundation drainage effluent is proposed to be conveyed to the region's sewer system. Alternatively, collected water can be hauled off-site using a licensed contractor.
- Groundwater quality result indicates that groundwater quality sample collected from a selected monitoring well (BH/MW 3) mostly meets the Region of Peel Storm and Sanitary Sewer Use By-Law standards except for total magnesian and total zinc. As such, pre-treatment is required prior to discharge to the regions storm sewer system.
- The conceptual ZOI for dewatering may reaches maximum of 2.8 m away from the dewatering area in the area of proposed residential building and underground services. As the maximum conceptual ZOI is within the Subject Site, potential risk for ground settlement is not expected due to dewatering. However, as a conservative approach it is recommended a professional geotechnical engineer is consulted in advance of excavation and construction.
- Record review indicates that there are no records for natural heritage features including woodland, wetlands, water bodies, watercourses and ANSI within the maximum conceptual ZOI for the dewatering at the Subject Site. As such, impacts to surface water, wetlands, and areas of natural significance are not anticipated pertaining to the proposed construction.
- A review of the MECP well records confirmed that there is one (1) record for water supply well that is registered within 500 m of the Subject Site Study Area. However, there is no record of water supply well fall within the maximum anticipated conceptual ZOI. As such, impacts to water supply wells located within the maximum ZOI are not anticipated.

10.0 CLOSURE

We trust that the above-noted information is suitable for your review. If you have any questions regarding this information, please do not hesitate to contact the undersigned.

Yours truly,

SOIL ENGINEERS LTD.



For: Daixi Zhang, B. Sc., G.I.T.
Project Manager-Hydrogeological Services

Narjes Alijani, M.Sc., P.Geo.
Department Manager-Hydrogeological Services

11.0 REFERENCES

1. Chapman, L.J. and D.F. Putnam, 1984. The Physiography of Southern Ontario. Ontario.
2. Town of Caledon Official Plans, 2024.
3. Freeze, A. and Cherry, J., 1979. Groundwater, Prentice-Hall Inc., New Jersey.
4. Geological Survey. Ontario Geological Survey (OGS), 2003. Surficial Geology of Southern Ontario. Miscellaneous Release – Data 128 – revised.
5. Geological Survey. Ontario Geological Survey (OGS), 2007. Bedrock Geology of Ontario. Miscellaneous Release – MRD 219.
6. Ministry of the Environment, Conservation and Parks (MECP), 2024, Source Protection Information Atlas Interactive Map.
7. Ministry of Natural Recourses and Forestry (MNRF), 2024, Natural Heritage Interactive Map.
8. Toronto Region Conservation Authority (TRCA), 2024, Online Regulated Area Map.

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 684-4242	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 542-2769

DRAWINGS 1 to 9

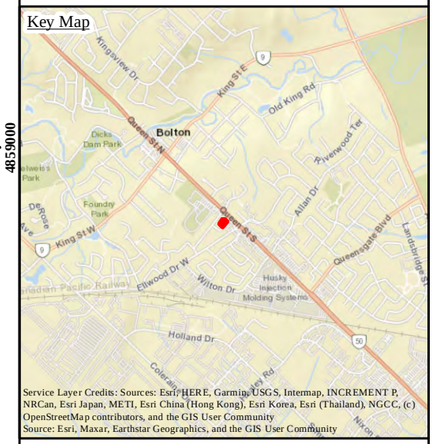
REFERENCE NO. 2404-W107

601500
602000
602500
4859000
4858500
ANN STREET
NANCY STREET
KING STREET WEST
JANE STREET
ELIZABETH STREET
HAINES DRIVE
NORTON BOULEVARD
DOWNEY DRIVE
QUEEN STREET SOUTH
CONNAUGHT CRESCENT
WILLIAM STREET
SHORE STREET
ELLWOOD DRIVE EAST
GLENWOOD CRESCENT
STRAWBERRY HILL COURT
BELLAIR DRIVE
NEWLOVE DRIVE
MELLOW CRESCENT
ALLAN DRIVE
RAGE CRESCENT
ROYAL TIER
ROLLING HILLS LANE
RIDGE ROAD
ELLWOOD DRIVE WEST
MARTHA STREET
PEARL STREET
LEONARD STREET
HENDERSON STREET
STATION VIEW PLACE
STATION ROAD
MARTHA CRESCENT
STEPHEN DRIVE
WILTON DRIVE
LANDSBRIDGE STREET
D:\Projects\2404-W107\

N

References: Ontario Ministry of Natural Resources and Forestry
© Queen's Printer for Ontario, 2022

Key Map



Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary Of Subject Site
- Major Road
- Local Road
- Railway
- Waterbody
- Watercourse

Soil Engineers Ltd.

Site Location Plan

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

Scale:
0 25 50 100 150 200 250
Metres

Drawing No. 1

601840

601880

4858720

4858680

BH/MW 1

BH/MW 2

BH/MW 3

BH 4

PROPOSED 4-STOREY APARTMENT BUILDING 19 UNITS FFE: 254.60

SHORE STREET

3 STOREY RESIDENTIAL

1 STOREY RESIDENTIAL

1 STOREY DETACHED GARAGE

CONCRETE RETAINING WALL REFER TO CIVIL DRAWINGS

EXISTING CHAIN LINK TO REMAIN REFER TO CIVIL DRAWINGS

EXISTING BOARD FENCE REFER TO LANDSCAPE DWGS

6m FIRE ROUTE/ WASTE COLLECTION ROUTE

FIRE ROUTE SIGN - NO PARKING

PROPOSED HYDRANT

SERVICE ACCESS

MAIN ACCESS WALKWAY

BALCONY & COVERED PORCH

BALCONY @ 2ND & 3rd FL

ROOF DOWNSPOUT CONNECTED TO UNDERGROUND INFILTRATION

UNDERGROUND INFILTRATION FACILITY FOR ROOF RUNOFF - REFER TO CIVIL DRAWINGS

TRANSFORMER PAD 2.74m x 2.74m

EX. UTILITY POST

CB/MH

CB

SAN MH

1.5m WALKWAY

CURB RAMP

1.5m METAL FENCE WITH GATE - REFER TO LANDSCAPE DWGS

1.8m PRIVACY WOOD FENCE - REFER TO LANDSCAPE DWGS

TRANSITION OF PROPOSED 1.8m PRIVACY WOOD FENCE & EXISTING BOARD FENCE - REFER TO LANDSCAPE DWGS

18m STRAIGHT AHEAD APPROACH & GARBAGE LOADING PAD - MINIMUM BASE 200mm COMPACTED 20mm CRUSHER RUN LIMESTONE FINISHED TO A MIN. OF 200mm CONCRETE

GARBAGE PICKUP STAGING PAD 3.27m x 6m

19.65 m - N 38°01'05" E

16.13 m - N 45°41'45" W

8.51 m - N 37°04'25" E

25.60 m - N 45°51'35" W

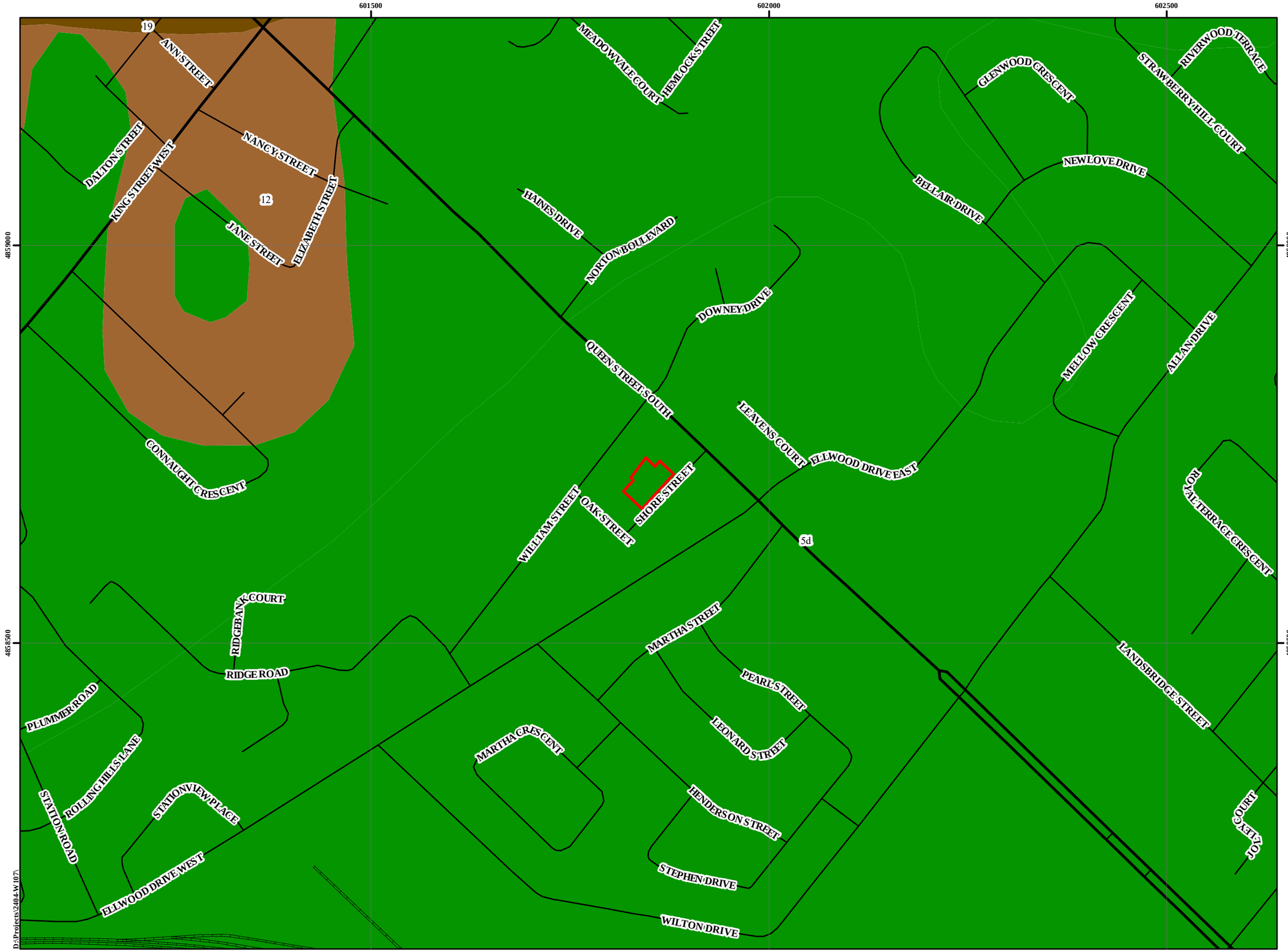
4.78 m - N 37°10'05" W

18.13 m - N 43°07'45" E

3.19 m - N 46°49'45" W

30.34 m - N 45°55'49" W

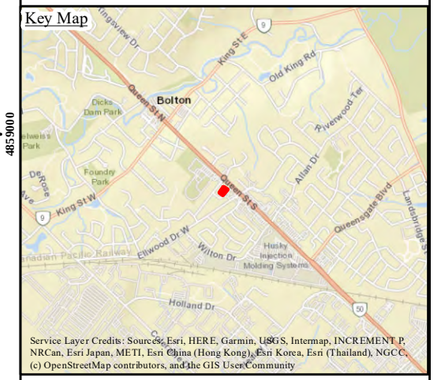
58.17 m - N 42°58'10" E



N

References: Service Layer Credits: © Natural Heritage Map was Produced by Soil Engineers Ltd. under license from the Ministry of North Development and Mines (MNDM). Copyright © is hold by the Queen's Printer for Ontario.

Key Map



Legend

- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Railway
- 5d: Halton Till; consisting of diamicton
- 12: Older Alluvium; consisting of silt, sand, gravel
- 19: Modern Alluvium; consisting of silt, sand, gravel

Soil Engineers Ltd.

Surface Geology Map

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

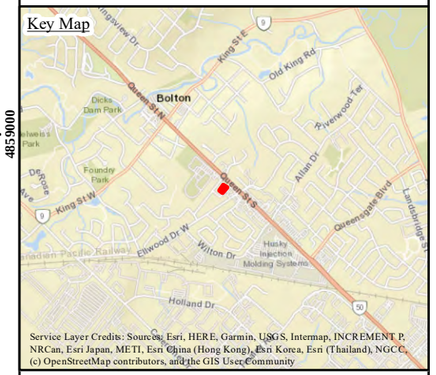
Scale:
0 50 100 150 200 250
Metres

Drawing No. 3

601500
602000
602500
4859000
4858500
ANN STREET
MEADOW VALE COURT
HEMLOCK STREET
GLENWOOD CRESCENT
STRAWBERRY HILL COURT
RIVERWOOD TERRACE
DALTON STREET
KING STREET WEST
NANCY STREET
ELIZABETH STREET
JANE STREET
HAINES DRIVE
NORTON BOULEVARD
BELL AIR DRIVE
NEWLOVE DRIVE
DOWNEY DRIVE
QUEEN STREET SOUTH
South Slope
MELLOW CRESCENT
ALLAN DRIVE
LEAVENS COURT
ELLWOOD DRIVE EAST
CONNAUGHT CRESCENT
SHORE STREET
OAK STREET
WILLIAM STREET
Till Plains
(Drumlinized)
ROYAL TERRACE CRESCENT
RIDGEBANK COURT
RIDGE ROAD
MARTHA STREET
PEARL STREET
LEONARD STREET
LANDSBRIDGE STREET
PLUMMER ROAD
ROLLING HILLS LANE
STATION ROAD
STATION VIEW PLACE
MARTHA CRESCENT
HENDERSON STREET
COURTLEY COURT
ELLWOOD DRIVE WEST
STEPHEN DRIVE
WILTON DRIVE
D:\Projects\2404-W107\
Source: Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario;
Ontario Geological Survey, Miscellaneous Release--Data 228 ISBN 978-1-4249-5158-1

N

Key Map



Legend

- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Railway
- Region Boundary
- Till Plains (Drumlinized)

Soil Engineers Ltd.

Physiographic Map

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

Scale:
0 25 50 100 150 200 250
Metres

Drawing No. 4

601500 602000 602500

4859000 4858500

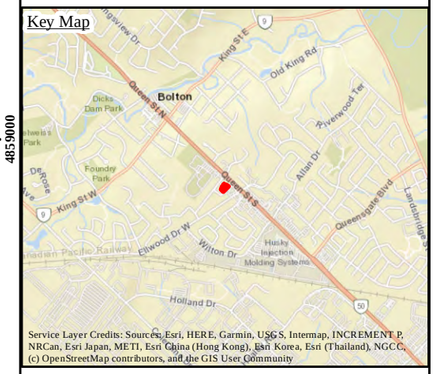
ANN STREET
DALTON STREET
KING STREET WEST
NANCY STREET
ELIZABETH STREET
JANE STREET
HAINES DRIVE
NORTON BOULEVARD
MEADOWVALE COURT
HEMLOCK STREET
QUEEN STREET SOUTH
DOWNEY DRIVE
LEAVENS COURT
ELLWOOD DRIVE EAST
GLENWOOD CRESCENT
NEWLOVE DRIVE
BELL AIR DRIVE
MELLOW CRESCENT
ALLAN DRIVE
STRAWBERRY HILL COURT
RIVERWOOD TERRACE
ROYAL TERRACE CRESCENT
LANDSBRIDGE STREET
COURTLEY COURT
CONNAUGHT CRESCENT
WILLIAM STREET
OAK STREET
SHORE STREET
RIDGEBANK COURT
RIDGE ROAD
PLUMMER ROAD
ROLLING HILLS LANE
STATION ROAD
STATION VIEW PLACE
ELLWOOD DRIVE WEST
MARTHA CRESCENT
MARTHA STREET
PEARL STREET
LEONARD STREET
HENDERSON STREET
STEPHEN DRIVE
WILTON DRIVE

D:\Projects\2404-W107\

N

References: Ontario Ministry of Natural Resources and Forestry
© Queen's Printer for Ontario, 2022

Key Map



Legend

- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Railway
- Waterbody
- Watercourse
- York - 1 m

Soil Engineers Ltd.

Topographic Map

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

Scale:
0 25 50 100 150 200 250
Metres

Drawing No. 5

601500
602000
602500
4859000
4858500

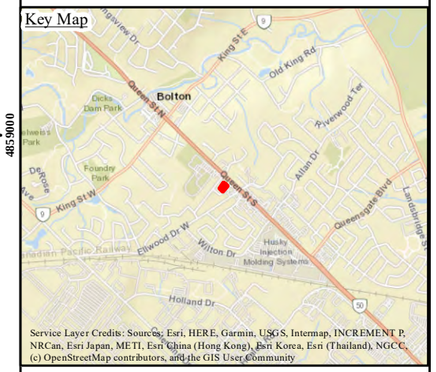
ANN STREET
DALTON STREET
KING STREET WEST
NANCY STREET
JANE STREET
ELIZABETH STREET
MEADOWVALE COURT
HEMLOCK STREET
HAINES DRIVE
NORTON BOULEVARD
GLENWOOD CRESCENT
RIVERWOOD TERRACE
STRAWBERRY HILL COURT
NEWLOVE DRIVE
BELL AIR DRIVE
DOWNEY DRIVE
QUEEN STREET SOUTH
LEAVENS COURT
ELLWOOD DRIVE EAST
MELLOW CRESCENT
ALLAN DRIVE
CONNAUGHT CRESCENT
RIDGEBANK COURT
RIDGE ROAD
WILLIAM STREET
OAK STREET
SHORE STREET
ROYAL TERRACE CRESCENT
MARTHA STREET
PEARL STREET
LEONARD STREET
MARTHA CRESCENT
HENDERSON STREET
STEPHEN DRIVE
WILTON DRIVE
LANDSBRIDGE STREET
COURT
PLUMMER ROAD
ROLLING HILLS LANE
STATION ROAD
STATION VIEW PLACE
ELLWOOD DRIVE WEST

D:\Projects\2404-W107\

N

References: Service Layer Credits: © Natural Heritage Map was Produced by Soil Engineers Ltd. under license from the Ministry of North Development and Mines (MNDM). Copyright © is hold by the Queen's Printer for Ontario.

Key Map



Legend

- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Railway
- Watercourse
- Waterbody
- Wooded Area *Wooded Area*

Soil Engineers Ltd.

Natural Features and Protection Area Plan

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

Scale:
0 50 100 150 200 250
Metres

Drawing No. 6

601500 602000 602500

4859000 4858500

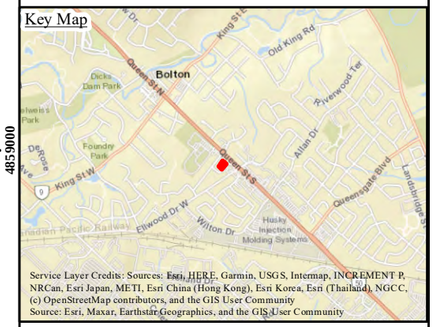
SACKVILLE STREET
TEMPERANCE STREET
ANN STREET
WILLOW STREET
MEADOW VALE COURT
HEMLOCK STREET
BELL AIR DRIVE
GLENWOOD CRESCENT
STRAWBERRY HILL COURT
KING STREET WEST
NANCY STREET
JANE STREET
ELIZABETH STREET
HAINES DRIVE
NORTON BOULEVARD
LYDIA COURT
DOWNEY DRIVE
NEWLOVE DRIVE
ELLWOOD DRIVE EAST
MELLOW CRESCENT
ALLAN DRIVE
CONNAUGHT CRESCENT
QUEEN STREET SOUTH
LEAVENS COURT
SHORE STREET
WILLIAM STREET
OAK STREET
RIDGEBANK COURT
RIDGE ROAD
ROLLING HILLS LANE
PLUMMER ROAD
ELLWOOD DRIVE WEST
MARTHA STREET
LEONARD STREET
PEARL STREET
HENDERSON STREET
MARTHA CRESCENT
MURRAY LANE
STEPHEN DRIVE
KING ARTHURS COURT
LANDSBRIDGE STREET
HOLLEY COURT
STATION ROAD
STATIONVIEW PLACE
WILTON DRIVE

23 33 34 35 51 15 47 46 45 44 1 10 30 11 9 8 6 7 19 16 2 13 3 32 5 42 12 21 20 14 36 26 28 25 43 29 24 27 4

N

References: ESRI, DigitalGlobe, GeoEye, Earthstar Geograp -hics, CNES/Airbus Ds, USDA, USGS, AeroGRIS, IGN, and the GIS User Community produced by Soil Engineers Ltd. Copyright (c) Queen's Printer 2020. Water Well Information System Ministry of the Environment, Conservation and Parks, 2020

Key Map



Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site
- 500 Metres From Subject Site Boundary
- Major Road
- Local Road
- Waterbody
- Watercourse
- Unknown (33)
- Abandoned-Other (2)
- Monitoring and Test Hole (1)
- Observation Wells (3)
- Test Hole (11)
- Water Supply (1)

Soil Engineers Ltd.

MECP Well Location Plan

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

Scale:

0 25 50 100 150 200 250
Metres

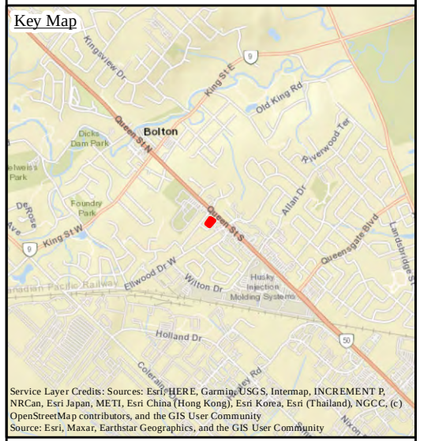
Drawing No. 7

D:\Projects\2404-W107\

N

References: Ontario Ministry of Natural Resources and Forestry
© Queen's Printer for Ontario, 2022

Key Map



Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site
- A — A' Cross Section
- Local Road
- Borehole (1)
- Borehole with Monitoring Well (3)

Soil Engineers Ltd.

Cross-Section Plan

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

Scale:
0 1.5 3 6 9 12 15
Metres

Drawing No. 8-1

D:\Projects\2404-W107\

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | HYDROGEOLOGICAL | BUILDING SCIENCE

SUBSURFACE PROFILE
CROSS SECTION A-A'
DRAWING NO. 8-2A
SCALE: AS SHOWN

JOB NO.: 15, 21 and 27 Shore Street, Town of Caledon
REPORT DATE: September 2024
PROJECT DESCRIPTION: 2404-W107

PROJECT LOCATION: Proposed 4-Storey Apartment with Basement

LEGEND
FILL | SILTY CLAY | TOPSOIL | SCREEN

WATER LEVEL (STABILIZED)

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL | ENVIRONMENTAL | HYDROGEOLOGICAL | BUILDING SCIENCE

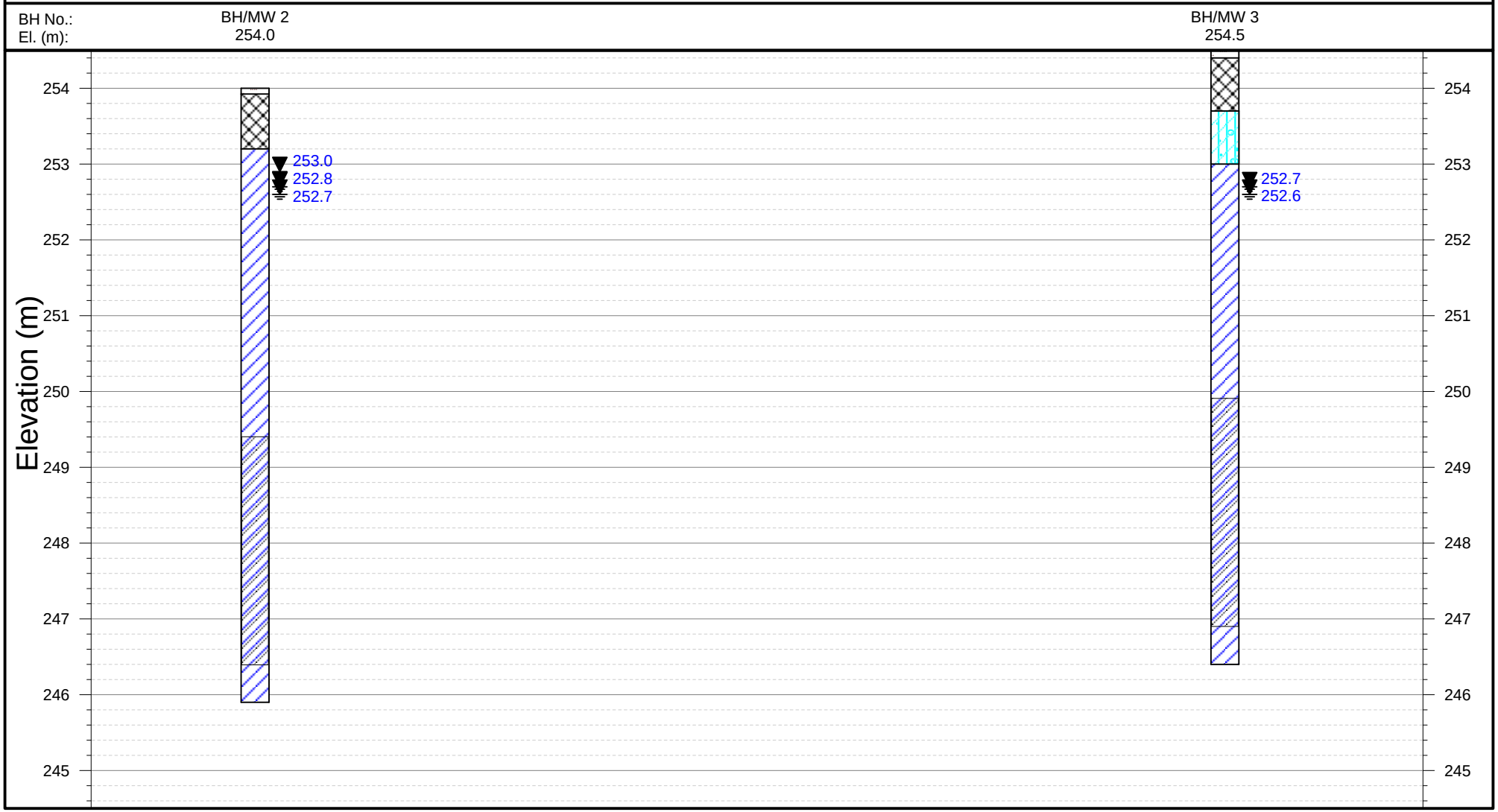
SUBSURFACE PROFILE
CROSS SECTION B-B'
DRAWING NO. 8-2B
SCALE: AS SHOWN

JOB NO.: 15, 21 and 27 Shore Street, Town of Caledon
REPORT DATE: September 2024
PROJECT DESCRIPTION: 2404-W107
PROJECT LOCATION: Proposed 4-Storey Apartment with Basement

LEGEND

FILL | SILTY CLAY | SILTY CLAY TILL | TOPSOIL | SCREEN

WATER LEVEL (STABILIZED)



601840

601880

4858720

4858680

254

BH/MW 2
(253.0)

BH/MW 1
(249.5)

BH/MW 3
(252.7)

250

251

252

253

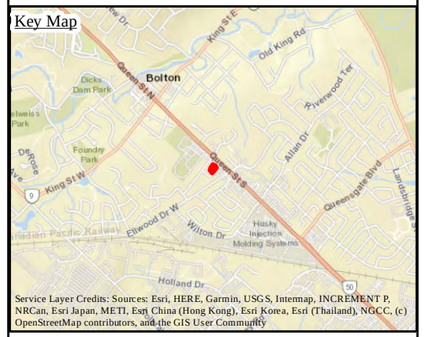
SHORE STREET

D:\Projects\2404-W107\

N

References: Ontario Ministry of Natural Resources and Forestry

Key Map



Legend

- Approximate Boundary of Subject Site
- Local Road
- York - 1 m
- Highest Interpreted Shallow Groundwater Elevation Contour
- Highest Inferred Shallow Groundwater Elevation Contour
- Interpreted Shallow Groundwater Flow Direction
- (253.0) Highest Shallow Groundwater Level Measured on June 24, 2024

Soil Engineers Ltd.

Shallow Groundwater Flow Pattern Plan

Hydrogeological Assessment
Proposed 4-Storey Building with Basement
15, 21 and 27 Shore Street
Town of Caledon

Reference No. 2404-W107

Date: September 26, 2024

Scale:

0 1.5 3 6 9 12 15
Metres

Drawing No. 9

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX A

BOREHOLE AND MONITORING WELLS LOGS
AND
GRAIN SIZE DISTRIBUTION GRAPHS

REFERENCE NO. 2404-W107

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report, are as follows:

SAMPLE TYPES

AS Auger sample
CS Chunk sample
DO Drive open (split spoon)
DS Denison type sample
FS Foil sample
RC Rock core (with size and percentage recovery)
ST Slotted tube
TO Thin-walled, open
TP Thin-walled, piston
WS Wash sample

PENETRATION RESISTANCE

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter, 90° point cone driven by a 140-pound hammer falling 30 inches.

Plotted as '—•—'

Standard Penetration Resistance or 'N' Value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil.

Plotted as '○'

WH Sampler advanced by static weight
PH Sampler advanced by hydraulic pressure
PM Sampler advanced by manual pressure
NP No penetration

SOIL DESCRIPTION

Cohesionless Soils:

'N' (blows/ft)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
over 50	very dense

Cohesive Soils:

Undrained Shear Strength (ksf)	'N' (blows/ft)	Consistency
less than 0.25	0 to 2	very soft
0.25 to 0.50	2 to 4	soft
0.50 to 1.0	4 to 8	firm
1.0 to 2.0	8 to 16	stiff
2.0 to 4.0	16 to 32	very stiff
over 4.0	over 32	hard

Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 Field vane test in borehole; the number denotes the sensitivity to remoulding

△ Laboratory vane test

□ Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength

METRIC CONVERSION FACTORS

1 ft = 0.3048 metres
1lb = 0.454 kg
1 inch = 25.4 mm
1ksf = 47.88 kPa

JOB NO.: 2404-W107

LOG OF BOREHOLE:BH/MW 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 30, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
254.1	Ground Surface							
0.0	**7.6 cm TOPSOIL**				0			
	Dark brown **EARTH FILL** silty clay occ. rootlets and topsoil inclusions	1	DO	7			24	
253.2 / 0.8	Stiff to hard **SILTY CLAY** traces of sand and gravel occ. silt seams	2	DO	8	1		23	
		3	DO	31	2		20	
		4	DO	39			21	
		5	DO	45	3		21	
	brown / grey	6	DO	20	4		21	
		7	DO	20	5		25	
		8	DO	28	6			
		9	DO	25	7		19	
245.5 / 8.5	**END OF BOREHOLE**				8			
	Installed 50 mm Ø monitoring well to 7.6 m completed with 3.1 m screen Sand backfill from 4.0 m to 7.6 m Bentonite seal from 0.0 m to 4.0 m Provided with a steel monument casing				9			
					10			

W.L. @ El. 248.6 masl on Jun 11, 2024
W.L. @ El. 249.5 masl on Jun 24, 2024
W.L. @ El. 251.5 masl on Jul 09, 2024

Soil Engineers Ltd.

JOB NO.: 2404-W107

LOG OF BOREHOLE:BH/MW 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 29, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m²) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
254.1	Ground Surface							
0.0	**7.6 cm TOPSOIL**				0			
	Dark brown **EARTH FILL** silty clay occ. rootlets and topsoil inclusions	1	DO	10			29	
253.2								
0.8	Stiff to hard **SILTY CLAY** traces of sand and gravel occ. silt seams	2	DO	9	1		25	
		3	DO	24	2		20	
		4	DO	26			23	
		5	DO	37	3		21	
		6	DO	22	4		25	
	brown / grey	7	DO	14	5		29	
		8	DO	21	6		20	
245.9					7			
8.1	**END OF BOREHOLE**				8			
	Installed 50 mm Ø monitoring well to 7.6 m completed with 3.1 m screen Sand backfill from 4.0 m to 7.6 m Bentonite seal from 0.0 m to 4.0 m Provided with a steel monument casing				9			
					10			

W.L. @ El. 252.8 masl on Jun 11, 2024
W.L. @ El. 253.0 masl on Jun 24, 2024
W.L. @ El. 252.7 masl on Jul 09, 2024

Soil Engineers Ltd.

JOB NO.: 2404-W107

LOG OF BOREHOLE:BH/MW 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 29, 2024

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
254.5	Ground Surface				
0.0	**10 cm TOPSOIL**	1A			0
	Dark brown **EARTH FILL** silty clay occ. rootlets and topsoil inclusions	1B	DO	5	
253.7					
0.8	Brown, very stiff **SILTY CLAY TILL** some sand, a trace of gravel	2	DO	21	1
253.0					
1.5	Very stiff to hard **SILTY CLAY** traces of sand and gravel occ. silt seams	3	DO	28	2
		4	DO	42	
		5	DO	35	3
	brown / grey	6	DO	23	4
		7	DO	23	5
		8	DO	22	6
246.4					7
8.1	**END OF BOREHOLE**				8
	Installed 50 mm Ø monitoring well to 7.6 m completed with 3.1 m screen Sand backfill from 4.0 m to 7.6 m Bentonite seal from 0.0 m to 4.0 m Provided with a flush mounted cover				9
					10

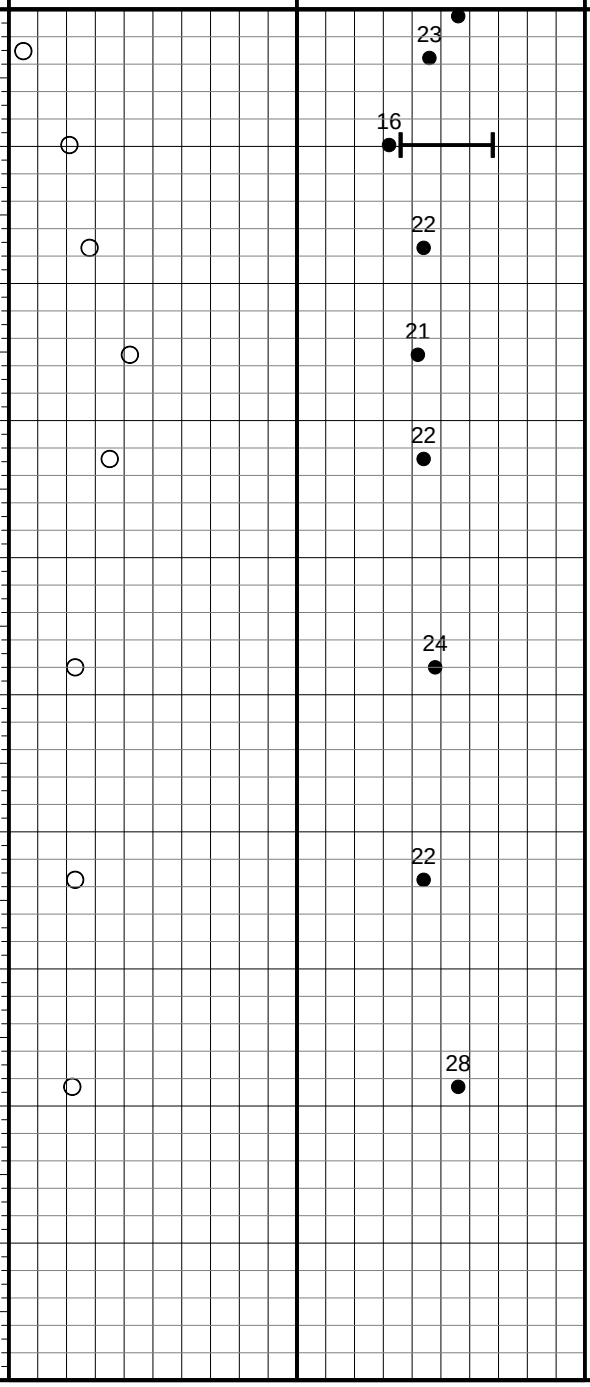
Dynamic Cone (blows/30 cm) 10 30 50 70 90

Shear Strength (kN/m²) 50 100 150 200

Penetration Resistance (blows/30 cm) 10 30 50 70 90

Atterberg Limits PL LL

Moisture Content (%) 10 20 30 40



WATER LEVEL

W.L. @ El. 252.7 masl on Jun 11, 2024
W.L. @ El. 252.7 masl on Jun 24, 2024
W.L. @ El. 252.6 masl on Jul 09, 2024

Soil Engineers Ltd.

JOB NO.: 2404-W107

LOG OF BOREHOLE:BH 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed 4-Storey Apartment with Basement

METHOD OF BORING: Solid-Stem Augers

PROJECT LOCATION: 15, 21 and 27 Shore Street, Town of Caledon

DRILLING DATE: May 29, 2024

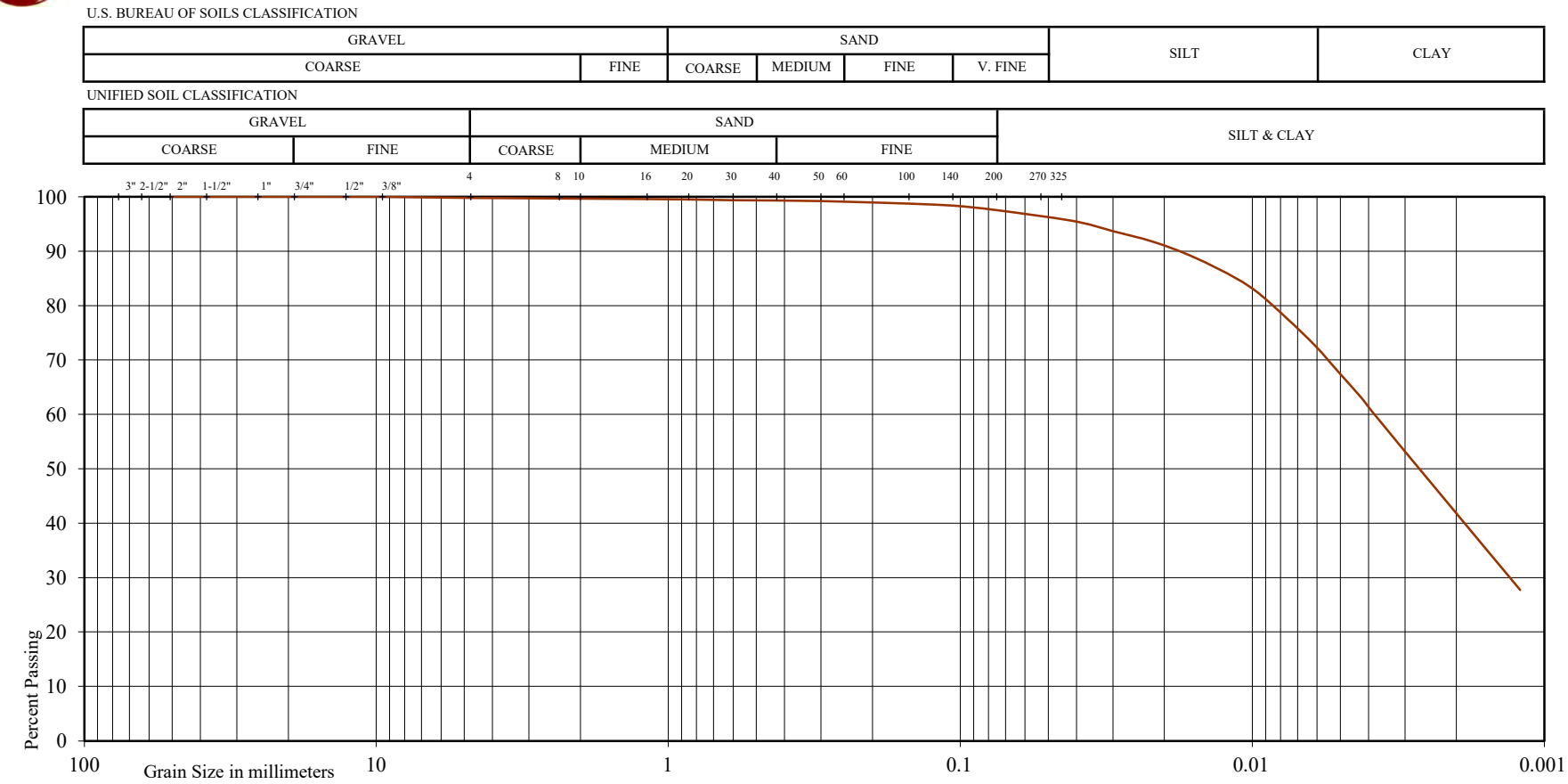
El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m^2) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
254.1	Ground Surface							
0.0	**7.6 cm TOPSOIL**				0			
	Dark brown **EARTH FILL** silty clay occ. rootlets and topsoil inclusions	1	DO	8			33	
253.3								
0.8	Very stiff **SILTY CLAY** traces of sand and gravel occ. silt seams	2	DO	29	1		20	
		3	DO	31	2		22	
		4	DO	26			23	
		5	DO	22	3		25	
		6	DO	23	4		25	
	brown grey	7	DO	20	5 6		26	
		8	DO	23	7 8		21	
246.0								
8.1	**END OF BOREHOLE**				9 10			

Soil Engineers Ltd.

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 2404-S107



Project: Proposed 4-Storey Apartment with Basement

Location: 15, 21 and 27 Shore Street, Town of Caledon

Borehole No: 2

Sample No: 7

Depth (m): 6.4

Elevation (m): 247.7

Liquid Limit (%) = 41

Plastic Limit (%) = 21

Plasticity Index (%) = 20

Moisture Content (%) = 29

Estimated Permeability (cm./sec.) = 10^{-7}

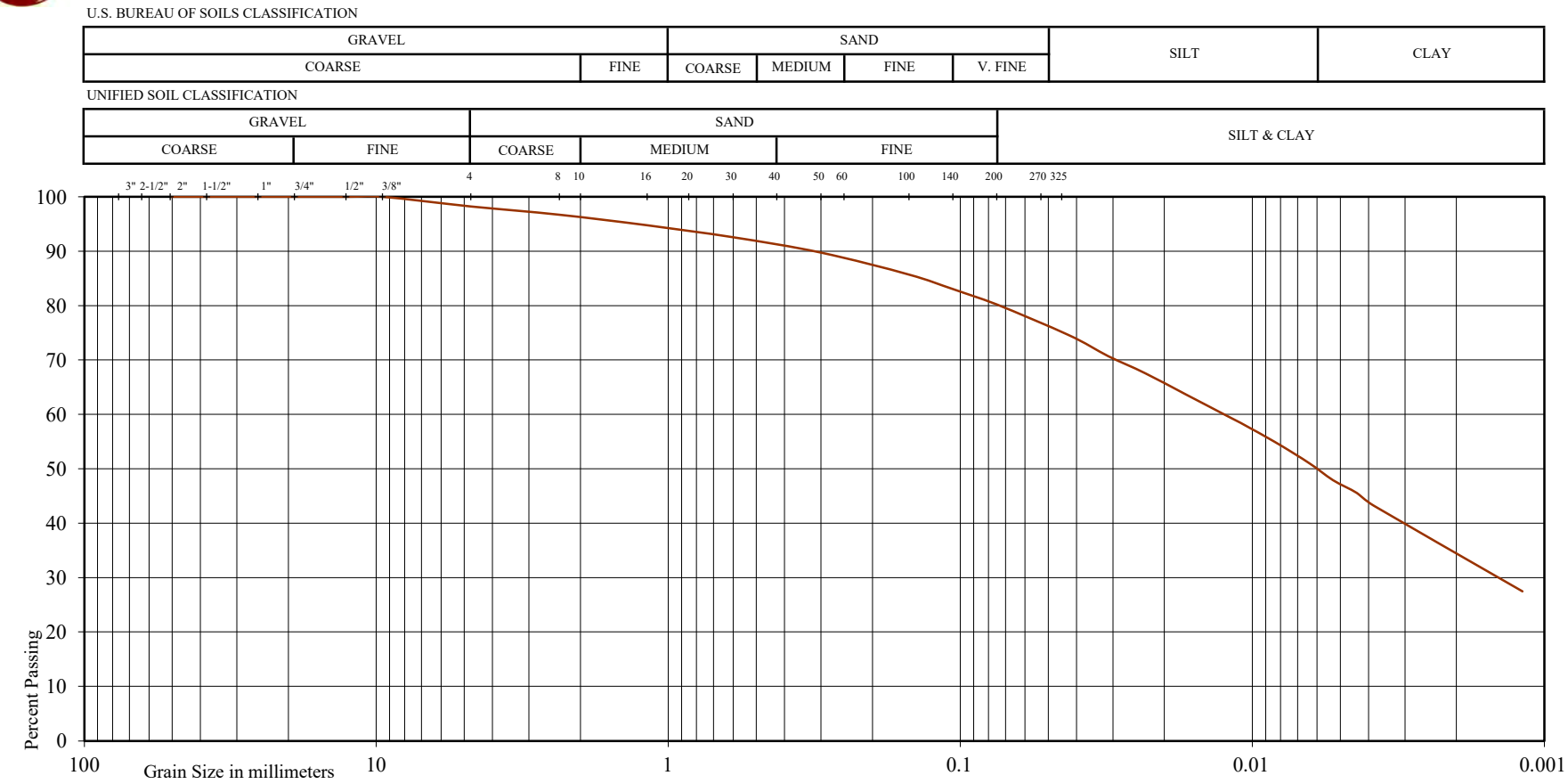
Classification of Sample [& Group Symbol]: SILTY CLAY
a trace of fine sand

Figure: 5

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

Reference No: 2404-S107



Project: Proposed 4-Storey Apartment with Basement

Location: 15, 21 and 27 Shore Street, Town of Caledon

Borehole No: 3

Sample No: 2

Depth (m): 1.0

Elevation (m): 253.5

Liquid Limit (%) = 34

Plastic Limit (%) = 18

Plasticity Index (%) = 16

Moisture Content (%) = 16

Estimated Permeability (cm./sec.) = 10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY TILL

some sand, a trace of gravel

Figure: 6

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX B

MECP WELL RECORDS SUMMARY

REFERENCE NO. 2404-W107

MECP Well Records Summary

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use				
1	4904841	Rotary (Reverse)	108.8	Water Supply	Municipal	11.6	99.4	108.5	1976-03-05
2	4910125	Boring	10.0	Observation Wells	Not Used	-	7.0	10.0	2005-12-01
3	4910369	Other Method	6.1	Observation Wells	-	-	3.0	6.1	2006-10-29
4	7038501	Other Method	6.1	Abandoned-Other	-	-	3.1	6.1	2006-10-11
5	7042357	Boring	6.1	Observation Wells	-	-	3.0	6.1	2005-11-29
6	7124969	Auger	-	Test Hole	Monitoring and Test Hole	-	13.6	9.8	2009-05-04
7	7124969	Auger	-	Test Hole	Monitoring and Test Hole	-	13.6	9.8	2009-05-20
8	7124969	Auger	-	Test Hole	Monitoring and Test Hole	-	13.6	9.8	2009-05-08
9	7124969	Auger	-	Test Hole	Monitoring and Test Hole	-	13.6	9.8	2009-05-04
10	7124969	Auger	-	Test Hole	Monitoring and Test Hole	-	13.6	9.8	2009-05-25
11	7124969	Auger	15.1	Test Hole	Monitoring and Test Hole	-	13.6	9.8	2009-05-19
12	7130845	-	-	Test Hole	Not Used	-	3.0	5.3	2008-05-15
13	7130845	-	-	Test Hole	Not Used	-	3.0	5.3	2008-05-16
14	7130845	-	6.0	Test Hole	Not Used	-	3.0	5.3	2008-05-15
15	7245132	Direct Push	-	Abandoned-Other	Monitoring and Test Hole	-	3.0	6.1	2015-06-11
16	7245133	Direct Push	6.1	Monitoring and Test Hole	Monitoring and Test Hole	-	3.0	6.1	2015-06-11
17	7254154	-	-	-	-	-	-	-	2015-11-26
18	7254155	-	-	-	-	-	-	-	2015-11-26
19	7266368	Auger	30.0	-	Monitoring and Test Hole	-	20.0	30.0	2015-06-11
20	7267291	-	-	-	-	-	-	-	2013-09-27
21	7269524	-	-	-	-	-	-	-	2015-04-24
22	7270520	-	-	-	-	-	-	-	2016-02-19
23	7314504	-	-	-	-	-	-	-	2018-06-21
24	7359281	Rotary (Convent.)	4.9	-	Test Hole	-	-	-	2020-04-19
25	7359282	Rotary (Convent.)	6.7	-	Test Hole	-	-	4.0	2020-03-19
26	7359283	Rotary (Convent.)	6.7	-	Test Hole	-	-	4.0	2020-03-18
27	7359284	-	4.9	-	Test Hole	-	-	4.0	2020-03-19
28	7359285	Rotary (Convent.)	4.9	-	Test Hole	-	-	3.0	2020-03-19
29	7359286	Rotary (Convent.)	4.9	-	Test Hole	-	-	3.0	2020-03-19
30	7367302	-	-	-	-	-	-	-	2020-06-23
31	7367329	-	-	-	-	-	-	-	2020-07-30
32	7367381	-	-	-	-	-	-	-	2020-06-24
33	7371501	Boring	-	-	-	-	-	4.5	2020-07-09
34	7371502	Boring	-	Test Hole	Test Hole	-	-	7.4	2020-07-09
35	7371503	Boring	-	Test Hole	Test Hole	-	-	4.5	2020-08-05
36	7383909	-	-	-	-	-	-	-	2020-11-27
37	7403147	-	-	-	-	-	-	-	2021-10-13
38	7403148	-	-	-	-	-	-	-	2021-10-13
39	7403149	-	-	-	-	-	-	-	2021-10-13

WELL ID	MECP* WWR ID	Construction Method	Well Depth (m)**	Well Usage		Static Water Level (m)**	Top of Screen Depth (m)**	Bottom of Screen Depth (m)**	Date Completed
				Final Status	First Use				
40	7405987	-	-	-	-	-	-	-	2021-11-30
41	7405988	-	-	-	-	-	-	-	2021-11-30
42	7405989	-	-	-	-	-	-	-	2021-11-30
43	7409317	-	-	-	-	-	-	-	2021-10-27
44	7411140	-	-	-	-	-	-	-	2021-12-13
45	7411141	-	-	-	-	-	-	-	2021-12-13
46	7411142	-	-	-	-	-	-	-	2021-12-13
47	7411143	-	-	-	-	-	-	-	2021-12-13
48	7411379	-	-	-	-	-	-	-	2021-11-05
49	7411407	-	-	-	-	-	-	-	2021-11-05
50	7412488	-	-	-	-	-	-	-	2022-02-03
51	7412930	-	-	-	-	-	-	-	2021-09-27

Notes:
*MECP WWID: Ministry of the Environment, Conservation and Parks Water Well Records Identification
**Metres below ground surface

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

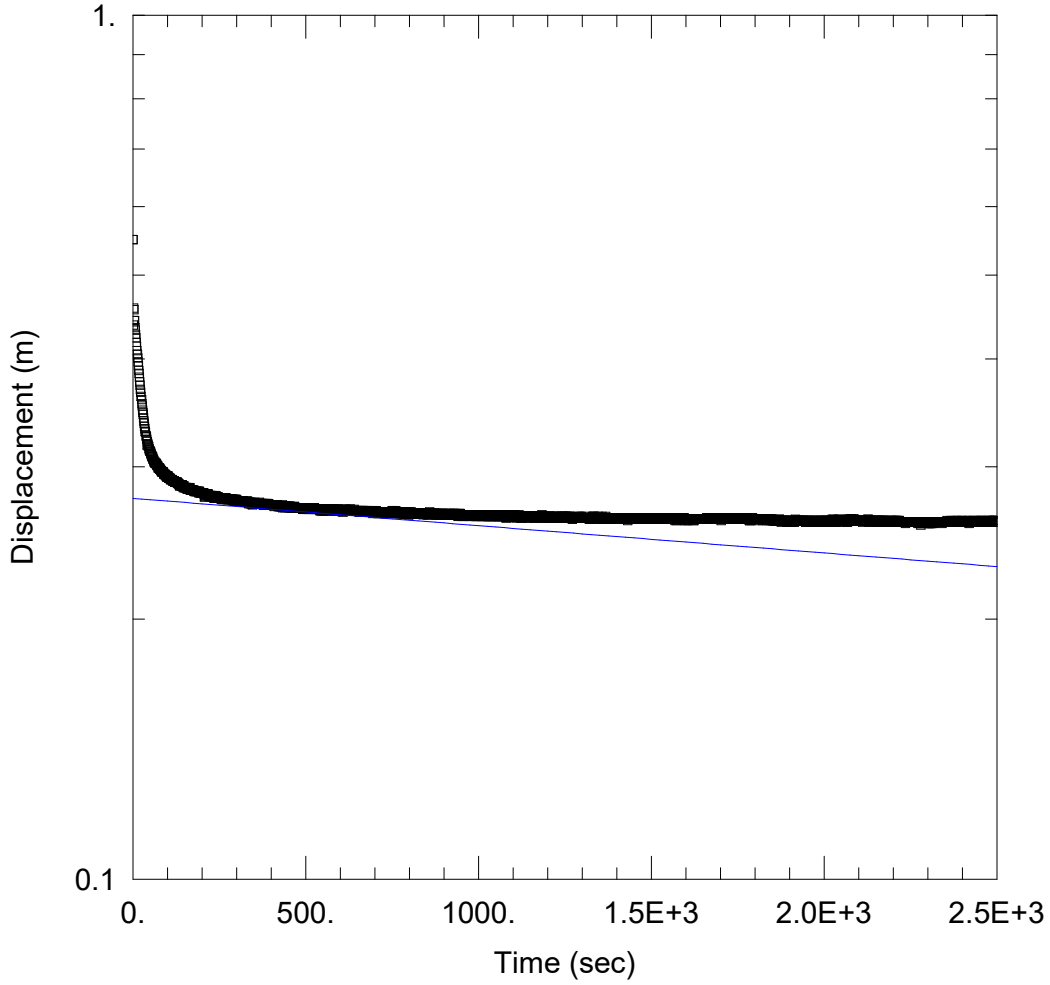
APPENDIX C

IN-SITU HYDRAULIC CONDUCTIVITY TESTING DETAILS

REFERENCE NO. 2404-W107

Rising Head SWRT of BH/MW 1

Prepared By:	Prepared For:
Soil Engineers Ltd.	Bolton Shore Holdings Ltd.
Project:	**Location:**
2404-W107	15, 21 and 27 Shore Street, Caledon



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.353E-8 m/sec y0 = 0.2758 m

AQUIFER DATA

Saturated Thickness: 2.8 m Anisotropy Ratio (Kz/Kr): 1.

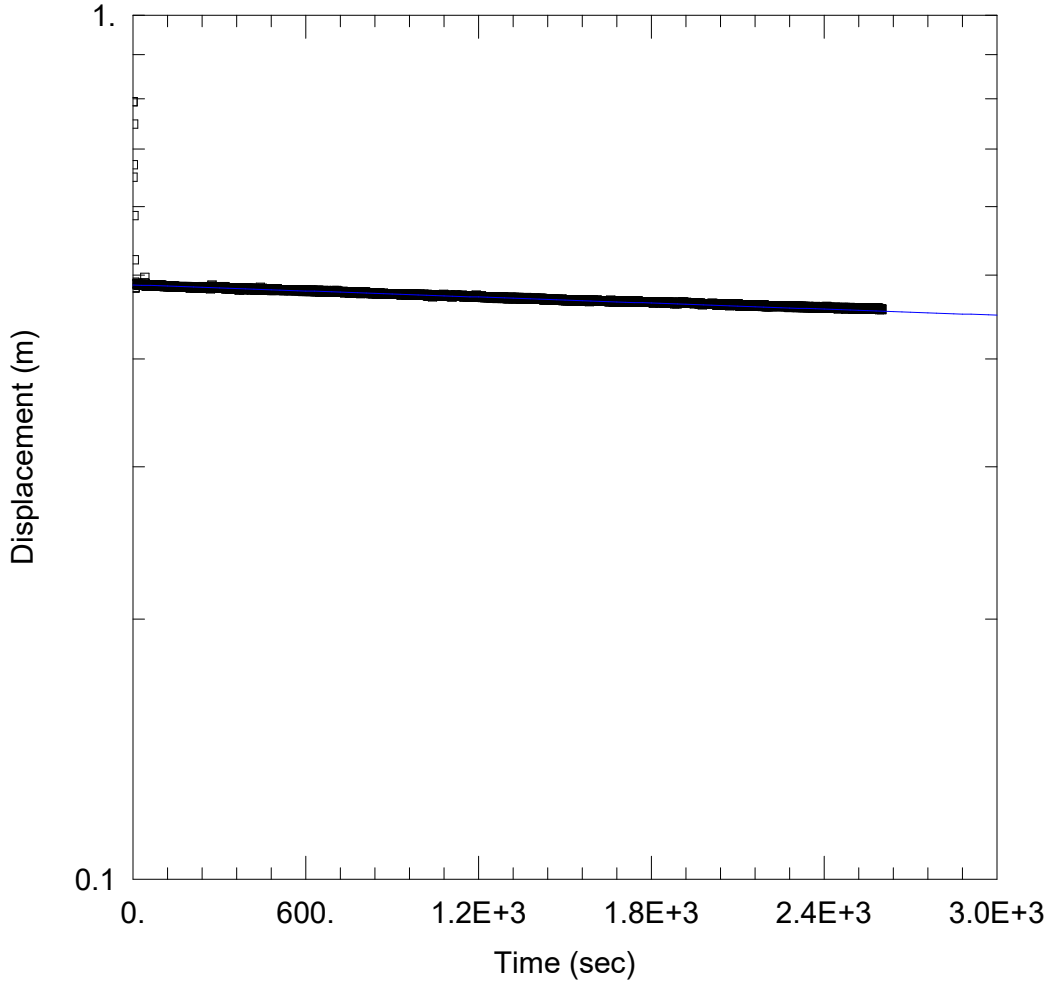
WELL DATA (BHMW 1)

Initial Displacement: 0.55 m
Static Water Column Height: 2.8 m
Total Well Penetration Depth: 3. m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m

Soil Engineers Ltd.

Falling Head SWRT of BH/MW 2

Prepared By:	Prepared For:
Soil Engineers Ltd.	Bolton Shore Holdings Ltd.
Project:	**Location:**
2404-W107	15, 21 and 27 Shore Street, Caledon



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 5.31E-9 m/sec y0 = 0.4873 m

AQUIFER DATA

Saturated Thickness: 6.4 m Anisotropy Ratio (Kz/Kr): 1.

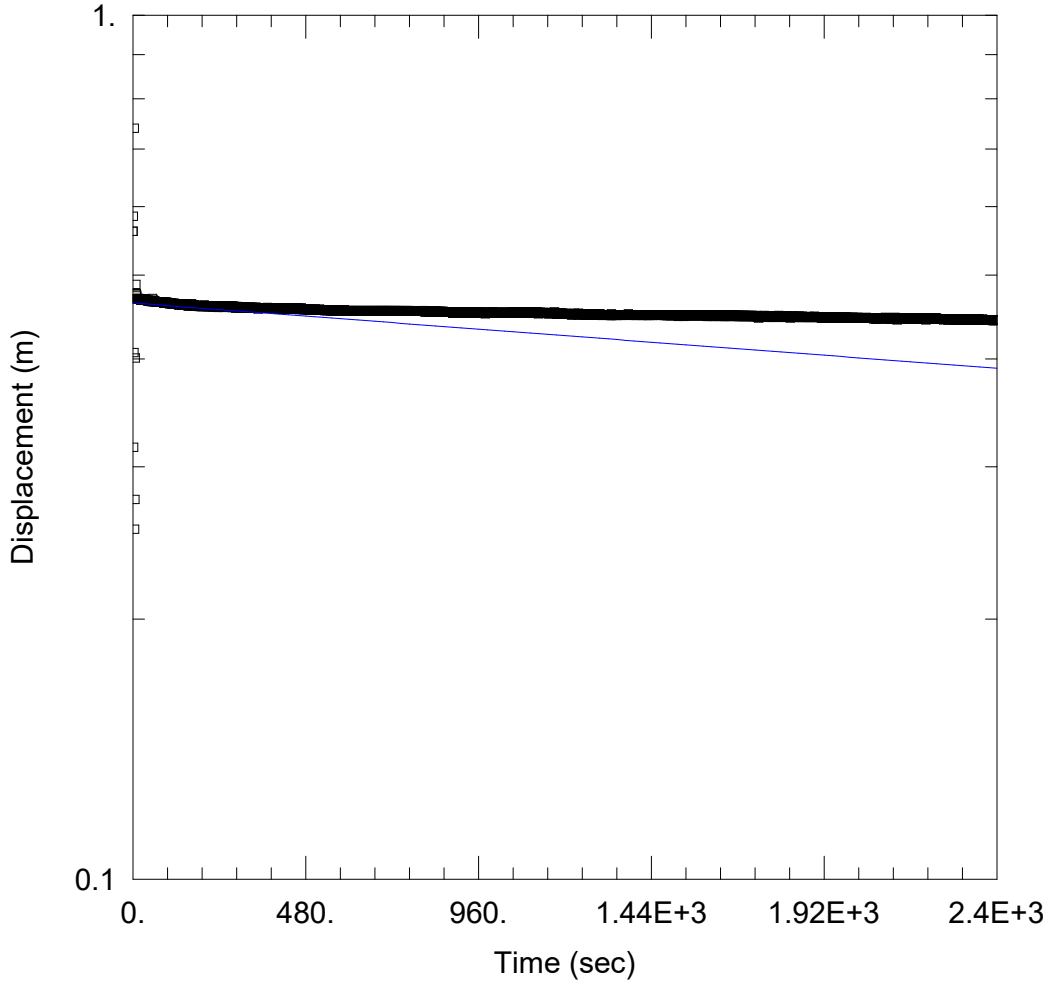
WELL DATA (BHMW 2)

Initial Displacement: 0.794 m
Static Water Column Height: 6.4 m
Total Well Penetration Depth: 6.4 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m

Soil Engineers Ltd.

Falling Head SWRT of BH/MW 3

Prepared By:	Prepared For:
Soil Engineers Ltd.	Bolton Shore Holdings Ltd.
Project:	**Location:**
2404-W107	15, 21 and 27 Shore Street, Caledon



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.403E-8 m/sec y0 = 0.4642 m

AQUIFER DATA

Saturated Thickness: 5.7 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW 3)

Initial Displacement: 0.562 m
Static Water Column Height: 5.7 m
Total Well Penetration Depth: 5.7 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0254 m

Soil Engineers Ltd.

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX D

GROUNDWATER QUALITY TEST RESULTS

REFERENCE NO. 2404-W107

FINAL REPORT

CA40066-JUL24 R1

2404-W107 19, 21 and 27 Shore Street ,Toronto C aldeon

Prepared for

Soil Engineers Ltd.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Soil Engineers Ltd.
Address	90 West Beaver Creek Rd Richmond, ON M1S 3A7. Canada
Contact	Amar Deep Regmi
Telephone	437-771-6640
Facsimile	416-754-8516
Email	amardeep.regmi@soilengineersltd.com; tarek.agha@soilengine
Project	2404-W107 19, 21 and 27 Shore Street ,Toronto C aldeon
Order Number	
Samples	Ground Water (1)

LABORATORY DETAILS

Project Specialist	Brad Moore Hon. B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2143
Facsimile	705-652-6365
Email	brad.moore@sgs.com
SGS Reference	CA40066-JUL24
Received	07/09/2024
Approved	07/16/2024
Report Number	CA40066-JUL24 R1
Date Reported	07/16/2024

COMMENTS

RL - SGS Reporting Limit
Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present: yes
Custody Seal Present: yes

Chain of Custody Number: 039210

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Soil Engineers Ltd.
Project: 2404-W107 19, 21 and 27 Shore Street ,Toronto C aldeon
Project Manager: Amar Deep Regmi
Samplers: Amar Deep Regmi

MATRIX: WATER

Sample Number	8
Sample Name	BHMW3
Sample Matrix	Ground Water
Sample Date	09/07/2024

L1 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
General Chemistry					
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	6
Total Suspended Solids	mg/L	2	350	15	5
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	< 0.5
Metals and Inorganics					
Fluoride	mg/L	0.06	10		0.23
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01
Sulphate	mg/L	2	1500		98
Aluminum (total)	mg/L	0.001	50		0.014
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0006
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000016
Chromium (total)	mg/L	0.00008	5	0.08	0.00019
Copper (total)	mg/L	0.001	3	0.05	0.001
Cobalt (total)	mg/L	0.000004	5		0.000561
Lead (total)	mg/L	0.00009	3	0.12	< 0.00009
Manganese (total)	mg/L	0.00001	5	0.05	0.0710
Molybdenum (total)	mg/L	0.0004	5		0.0012
Nickel (total)	mg/L	0.0001	3	0.08	0.0017
Phosphorus (total)	mg/L	0.003	10	0.4	< 0.003
Selenium (total)	mg/L	0.00004	1	0.02	0.00008
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Tin (total)	mg/L	0.00006	5		0.00045

Client: Soil Engineers Ltd.
Project: 2404-W107 19, 21 and 27 Shore Street ,Toronto C aldeon
Project Manager: Amar Deep Regmi
Samplers: Amar Deep Regmi

MATRIX: WATER

Sample Number	8
Sample Name	BHMW3
Sample Matrix	Ground Water
Sample Date	09/07/2024

L1 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Titanium (total)	mg/L	0.0001	5		0.0005
Zinc (total)	mg/L	0.002	3	0.04	0.048
Microbiology					
E. Coli	cfu/100mL	0		200	0
Nonylphenol and Ethoxylates					
Nonylphenol	mg/L	0.001	0.02		< 0.001
Nonylphenol Ethoxylates	mg/L	0.01	0.2		< 0.01
Nonylphenol diethoxylate	mg/L	0.01			< 0.01
Nonylphenol monoethoxylate	mg/L	0.01			< 0.01
Oil and Grease					
Oil & Grease (total)	mg/L	2			< 2
Oil & Grease (animal/vegetable)	mg/L	4	150		< 4
Oil & Grease (mineral/synthetic)	mg/L	4	15		< 4

Client: Soil Engineers Ltd.
Project: 2404-W107 19, 21 and 27 Shore Street ,Toronto C aldeon
Project Manager: Amar Deep Regmi
Samplers: Amar Deep Regmi

MATRIX: WATER

Sample Number	8
Sample Name	BHMW3
Sample Matrix	Ground Water
Sample Date	09/07/2024

L1 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Storm Sewer Discharge - BL_53_2010

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	No unit	0.05	10	9	7.23
Mercury (total)	mg/L	0.00001	0.01	0.0004	< 0.00001
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001
Phenols					
4AAP-Phenolics	mg/L	0.002	1	0.008	< 0.002
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002	0.08	0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.012	0.0088	< 0.002
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005	4	0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005	0.14	0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	1.4	0.017	< 0.0005
Methyl ethyl ketone	mg/L	0.02	8		< 0.02
Styrene	mg/L	0.0005	0.2		< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.008	< 0.0005

Client: Soil Engineers Ltd.

Project: 2404-W107 19, 21 and 27 Shore Street ,Toronto C aldeon

Project Manager: Amar Deep Regmi

Samplers: Amar Deep Regmi

MATRIX: WATER

Sample Number	8
Sample Name	BHMW3
Sample Matrix	Ground Water
Sample Date	09/07/2024

L1 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Sanitary Sewer Discharge - BL_53_2010

L2 = SANSEW / WATER / - - Peel Sewer Use ByLaw - Storm Sewer Discharge - BL_53_2010

VOCs - BTEX

Parameter	Units	RL	L1	L2	Result
Benzene	mg/L	0.0005	0.01	0.002	< 0.0005
Ethylbenzene	mg/L	0.0005	0.16	0.002	< 0.0005
Toluene	mg/L	0.0005	0.27	0.002	< 0.0005
Xylene (total)	mg/L	0.0005	1.4	0.0044	< 0.0005
m-p-xylene	mg/L	0.0005			< 0.0005
o-xylene	mg/L	0.0005			< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Peel Sewer Use ByLaw - Sanitary Sewer Discharge - BL_53_2010 L1	SANSEW / WATER / - - Peel Sewer Use ByLaw - Storm Sewer Discharge - BL_53_2010 L2
BHMW3					
Manganese	SM 3030/EPA 200.8	mg/L	0.0710		0.05
Zinc	SM 3030/EPA 200.8	mg/L	0.048		0.04

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 375.4 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Sulphate	DIO8024-JUL24	mg/L	2	<2	0	20	106	80	120	108	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0019-JUL24	mg/L	2	< 2	1	30	100	70	130	NV	70	130

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Cyanide (total)	SKA0085-JUL24	mg/L	0.01	<0.01	ND	10	96	90	110	94	75	125

QC SUMMARY

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-014

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Fluoride	EWL0281-JUL24	mg/L	0.06	<0.06	1	10	101	90	110	77	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B I Internal ref.: ME-CA-[ENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury (total)	EHG0024-JUL24	mg/L	0.00001	< 0.00001	ND	20	117	80	120	120	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver (total)	EMS0082-JUL24	mg/L	0.00005	<0.00005	ND	20	102	90	110	83	70	130
Aluminum (total)	EMS0082-JUL24	mg/L	0.001	<0.001	11	20	103	90	110	103	70	130
Arsenic (total)	EMS0082-JUL24	mg/L	0.0002	<0.0002	ND	20	103	90	110	96	70	130
Cadmium (total)	EMS0082-JUL24	mg/L	0.000003	<0.000003	ND	20	102	90	110	100	70	130
Cobalt (total)	EMS0082-JUL24	mg/L	0.000004	<0.000004	20	20	100	90	110	97	70	130
Chromium (total)	EMS0082-JUL24	mg/L	0.00008	<0.00008	11	20	104	90	110	104	70	130
Copper (total)	EMS0082-JUL24	mg/L	0.001	<0.001	ND	20	103	90	110	101	70	130
Manganese (total)	EMS0082-JUL24	mg/L	0.00001	<0.00001	1	20	103	90	110	102	70	130
Molybdenum (total)	EMS0082-JUL24	mg/L	0.0004	<0.0004	0	20	102	90	110	100	70	130
Nickel (total)	EMS0082-JUL24	mg/L	0.0001	<0.0001	ND	20	106	90	110	96	70	130
Lead (total)	EMS0082-JUL24	mg/L	0.00009	<0.00009	ND	20	99	90	110	95	70	130
Phosphorus (total)	EMS0082-JUL24	mg/L	0.003	<0.003	2	20	100	90	110	NV	70	130
Antimony (total)	EMS0082-JUL24	mg/L	0.0009	<0.0009	ND	20	98	90	110	96	70	130
Selenium (total)	EMS0082-JUL24	mg/L	0.00004	<0.00004	ND	20	101	90	110	116	70	130
Tin (total)	EMS0082-JUL24	mg/L	0.00006	<0.00006	ND	20	100	90	110	NV	70	130
Titanium (total)	EMS0082-JUL24	mg/L	0.0001	<0.0001	0	20	100	90	110	NV	70	130
Zinc (total)	EMS0082-JUL24	mg/L	0.002	<0.002	ND	20	99	90	110	110	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9180-JUL24	cfu/100mL	-	ACCEPTED	ACCEPTED							

Nonylphenol and Ethoxylates

Method: ASTM D7065-06 | Internal ref.: ME-CA-IENVIGC-LAK-AN-015

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nonylphenol diethoxylate	GCM0222-JUL24	mg/L	0.01	<0.01			71	55	120			
Nonylphenol Ethoxylates	GCM0222-JUL24	mg/L	0.01	<0.01								
Nonylphenol monoethoxylate	GCM0222-JUL24	mg/L	0.01	<0.01			73	55	120			
Nonylphenol	GCM0222-JUL24	mg/L	0.001	<0.001			72	55	120			

QC SUMMARY

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (total)	GCM0213-JUL24	mg/L	2	<2	NSS	20	109	75	125			

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-[ENV]GC-LAK-AN-019

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Oil & Grease (animal/vegetable)	GCM0213-JUL24	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0213-JUL24	mg/L	4	< 4	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0188-JUL24	No unit	0.05	NA	0		100			NA		

QC SUMMARY

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0084-JUL24	mg/L	0.002	<0.002	ND	10	99	80	120	121	75	125

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-[ENV]GC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Polychlorinated Biphenyls (PCBs) - Total	GCM0182-JUL24	mg/L	0.0001	<0.0001	NSS	30	94	60	140	NSS	60	140

QC SUMMARY

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-[ENV]GC-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Bis(2-ethylhexyl)phthalate	GCM0177-JUL24	mg/L	0.002	< 0.002	NSS	30	114	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0177-JUL24	mg/L	0.002	< 0.002	NSS	30	109	50	140	NSS	50	140

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0251-JUL24	mg/L	2	< 2	1	10	100	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-[ENV]SFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0101-JUL24	as N mg/L	0.5	<0.5	0	10	106	90	110	119	75	125

QC SUMMARY

Volatile Organics

Method: EPA 5030B/8260C | Internal ref.: ME-CA-[ENVIGC-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	100	60	130	108	50	140
1,2-Dichlorobenzene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	95	60	130	99	50	140
1,4-Dichlorobenzene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	95	60	130	96	50	140
Benzene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	97	60	130	98	50	140
Chloroform	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	96	60	130	97	50	140
cis-1,2-Dichloroethene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	94	60	130	92	50	140
Ethylbenzene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	94	60	130	97	50	140
m-p-xylene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	94	60	130	96	50	140
Methyl ethyl ketone	GCM0150-JUL24	mg/L	0.02	<0.02	ND	30	100	50	140	102	50	140
Methylene Chloride	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	93	60	130	95	50	140
o-xylene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	92	60	130	94	50	140
Styrene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	95	60	130	98	50	140
Tetrachloroethylene (perchloroethylene)	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	97	60	130	97	50	140
Toluene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	97	60	130	97	50	140
trans-1,3-Dichloropropene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	97	60	130	100	50	140
Trichloroethylene	GCM0150-JUL24	mg/L	0.0005	<0.0005	ND	30	97	60	130	93	50	140

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Results relate only to the sample tested.
Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 039210

SGS Industries & Environment - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Abneet
Received Date: 07/09/24 (mm/dd/yy)
Received Time: 17:03 (hr : min)
Received By (signature): ✓
Custody Seal Present: Yes ✓ No
Custody Seal Intact: Yes ✓ No
Cooling Agent Present: Yes ✓ No Type: ICE
Temperature Upon Receipt (°C) 9x3
LAB LIMS #: CA-40066-JUL-24 NP

REPORT INFORMATION

Company: Soil Engineers Ltd.
Contact: Amar Deep Regmi
Address: 50 West Beaver Creek Rd. Richmond Hill
Phone: 437-771-6640
Fax:
Email: amardeep.regmi@soilengineersltd.com

INVOICE INFORMATION

☑ same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #:
P.O. #:
Project #: 2404-W107
Site Location/ID: 19, 21 and 27 Shore Street, Town of Caledon

TURNAROUND TIME (TAT) REQUIRED

☐ Regular TAT (5-7days)

TAT's are quoted in business days (exclude statutory holidays & weekends).
Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days
PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19
☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table ____ Appx. ____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations:
☐ Reg 347/558 (3 Day min TAT)
☐ PWQO ☐ MMER
☐ CCME ☐ Other:
☐ MISA
☐ ODWS Not Reportable *See note

Sewer By-Law:
☐ Sanitary
☐ Storm
Municipality: Caledon

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH,(B(HWS),EC,SAR-soil) (Cl, Na-water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd, Cr,Co,Cu,Pb,Mo,Ni,Se,Ag,Tl,U,V,Zn	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs Total ☐ Aroclor ☐	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Sewer Use: Specify pkg: Peel Sanitary Storm Sewer By-Law	Other: Water Characterization Pkg General ☐ Extended ☐	SPLP: Specify tests ☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	TCLP: Specify tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	COMMENTS:
1	BHMW3	07/09/24	2:30	18	GW	N												✓				Please
2																						Read the
3																						final report
4																						& invoice
5																						to
6																						datxi.zh
7																						- amy @
8																						soilengineers
9																						ltd.com
10																						as well.
11																						
12																						

Observations/Comments/Special Instructions

Sampled By (NAME): Amar Deep Regmi Signature: ✓ Date: 07/09/24 (mm/dd/yy)
Relinquished by (NAME): Amar Deep Regmi Signature: ✓ Date: 07/09/24 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1:7
Date of Issue: 07 JUNE 2023

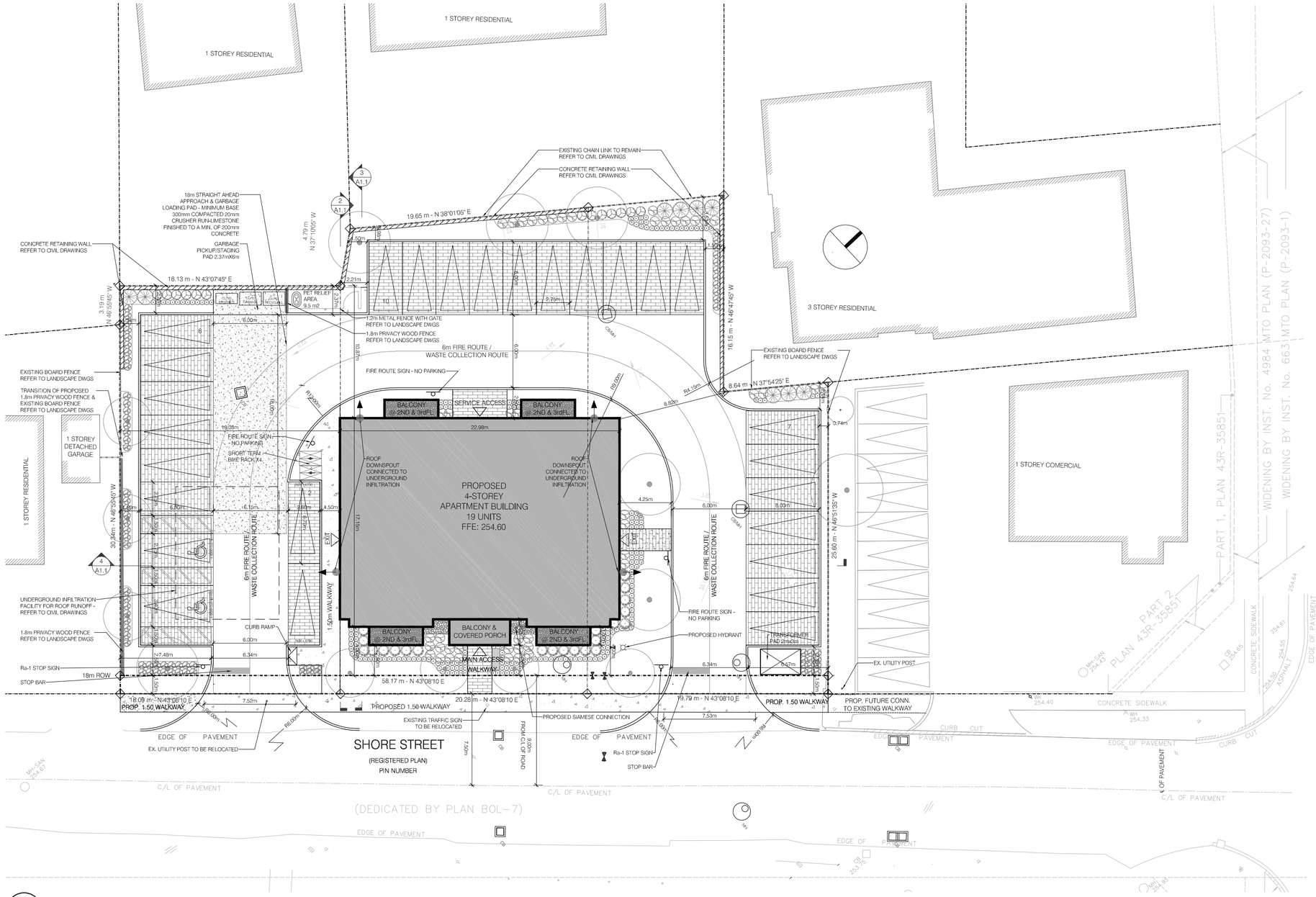
Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX E

REVIEWED PLANS

REFERENCE NO. 2404-W107



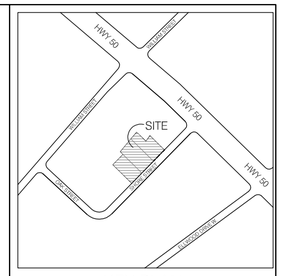
1 SITE PLAN
A100 SCALE: 1:250

SITE PLAN LEGEND

CB	DENOTES CATCHBASIN REFER TO CIVIL DWGS
CB/MH	DENOTES CATCHBASIN/MANHOLE REFER TO CIVIL DWGS
MH	DENOTES MANHOLE REFER TO CIVIL DWGS
	DENOTES BIKE STORAGE
	DENOTES TREES/PLANTS REFER TO LANDSCAPE DWGS
	DENOTES WASTE RECEPTACLE
	DENOTES UNIT PAVING REFER TO LANDSCAPE DWGS
	DENOTES CONCRETE PAVING REFER TO LANDSCAPE DWGS
	DENOTES RETAINING WALL REFER TO LANDSCAPE DWGS

SITE DEVELOPMENT

	EXISTING	REQUIRED	PROPOSED
ZONE	C255 & R1	RM	RM-XXXX
TOTAL LOT AREA		925.00 m2	2067.32 m2
TOTAL LOT AREA - AFTER ROAD WIDENING		925.00 m2	1980.00 m2
LOT FRONTAGE		30.00 m	58.17 m
COVERAGE		20%	19.64% (388.83m2)
MAX. HEIGHT		12.20 m	13.87 m
FRONT SETBACK		(9.00 m MIN.)	4.00 m
REAR SETBACK		(7.50 m MIN.)	10.87 m
LEFT SIDEYARD		(7.50 m MIN.)	18.08 m
RIGHT SIDEYARD		(7.50 m MIN.)	8.82 m
NUMBER OF UNITS		-	19
PARKING RATE		34 (1.75 PER UNIT)	27 (1.42 PER UNIT)
PARKING SETBACK		6m	2.50m
DRIVEWAY SETBACK		0.5m	6.57m (E) 7.48m (W)
LANDSCAPED AREA		45%	21.2% (420m2)
LANDSCAPED BUFFER		3m	VARIES (SEE SITE PLAN)
PRIVACY YARD DEPTH (1st FLOOR WINDOWS)		5m	VARIES (SEE SITE PLAN)
PLAY FACILITY AREA		4% (82.67m2)	0m2
AMENITIES (UNDERGROUND)		-	126m2
SHORT-TERM BIKE ST.		-	4
LONG-TERM BIKE ST.		-	10 (0.5/Unit)
NET RESIDENTIAL AREA		-	1,225.66 m2 13,193 SF
GFA		-	1,557.39 m2 16,764 SF
DENSITY (UNIT / HECTARE)		-	96
FSI (GFA / LOT AREA)		-	0.78



KEY PLAN

#	REV. DESCRIPTION	YYYY-MM-DD
9	ISSUED FOR COORDINATION	2024-07-10
8	ISSUED FOR COORDINATION	2024-06-24
7	ISSUED FOR REVIEW	2024-02-20
6	ISSUED FOR PAC	2023-11-13
5	ISSUED FOR CLIENT REVIEW	2023-11-08
4	ISSUED FOR CLIENT REVIEW	2023-10-31
3	ISSUED FOR CLIENT REVIEW	2023-09-21
2	ISSUED FOR CLIENT REVIEW	2023-08-24
1	ISSUED FOR PAC	2023-05-11

No.	DESCRIPTION	DATE
	REVISIONS	

ISSUED FOR CONSTRUCTION
ISSUED FOR BID
ISSUED FOR BUILDING PERMIT
ISSUED FOR SITE PLAN APPROVAL
SUBMITTALS

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND MUST REPORT ANY DISCREPANCIES TO THE DESIGNER BEFORE PROCEEDING WITH CONSTRUCTION.

THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL SEALED AND SIGNED BY THE DESIGNER.

DO NOT SCALE DRAWINGS.

FCA
FAUSTO CORTESE ARCHITECTS
3590 RUTHERFORD RD. UNIT 7
VAUGHAN, ONTARIO, L4H 3T8
416-806-7000
FCORTESE@FCARCHITECTS.CA

DRAWING:
PROPOSED MULTI-UNIT RESIDENTIAL
ON
15, 21, 27 SHORE ST.
BOLTON, ON

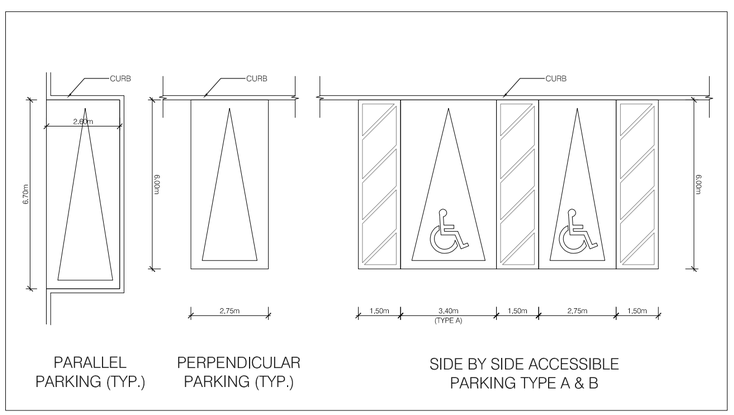
CALEDON

DRAWING:
SITE PLAN
-
-

PLOTTED: N/A

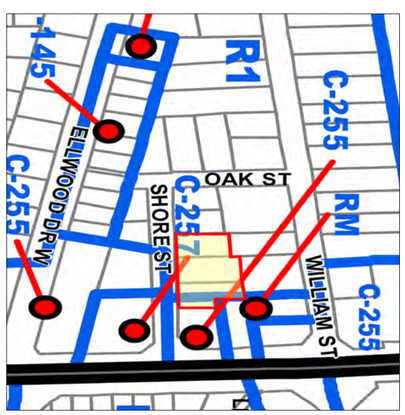
DATE:	PROJECT No:
12/08/2024	2023-04
SCALE: AS NOTED	DRAWING No: A100
DRAWN BY: S.H.	REVIEWED BY: F.C.

FILE NAME: SHORE STREET - SITE PLAN - 2024-09-20.pln
PLOT SCALE: 1=

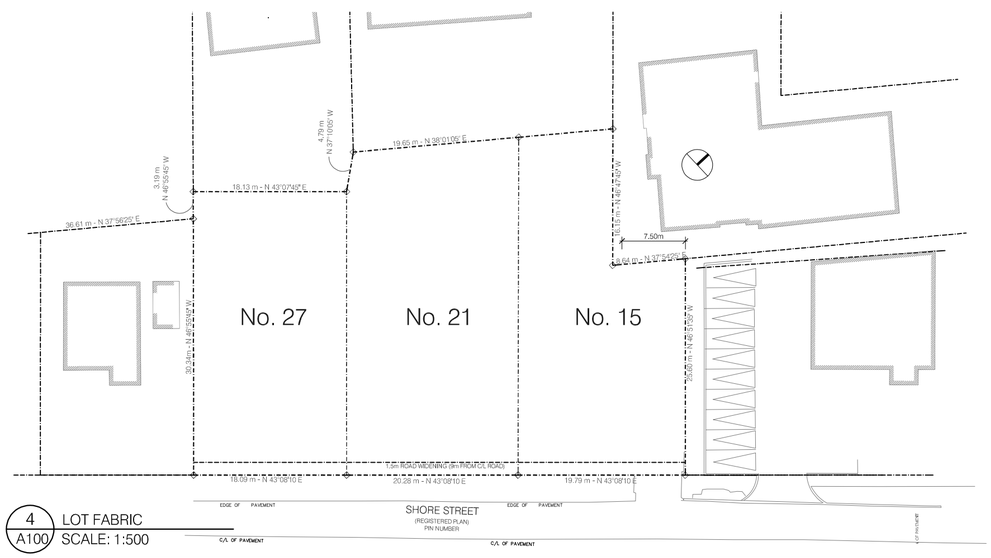


PARALLEL PARKING (TYP.) | PERPENDICULAR PARKING (TYP.) | SIDE BY SIDE ACCESSIBLE PARKING TYPE A & B

2 PARKING STANDARDS
A100 SCALE: 1:150



3 ZONING MAP
A100 SCALE: NTS

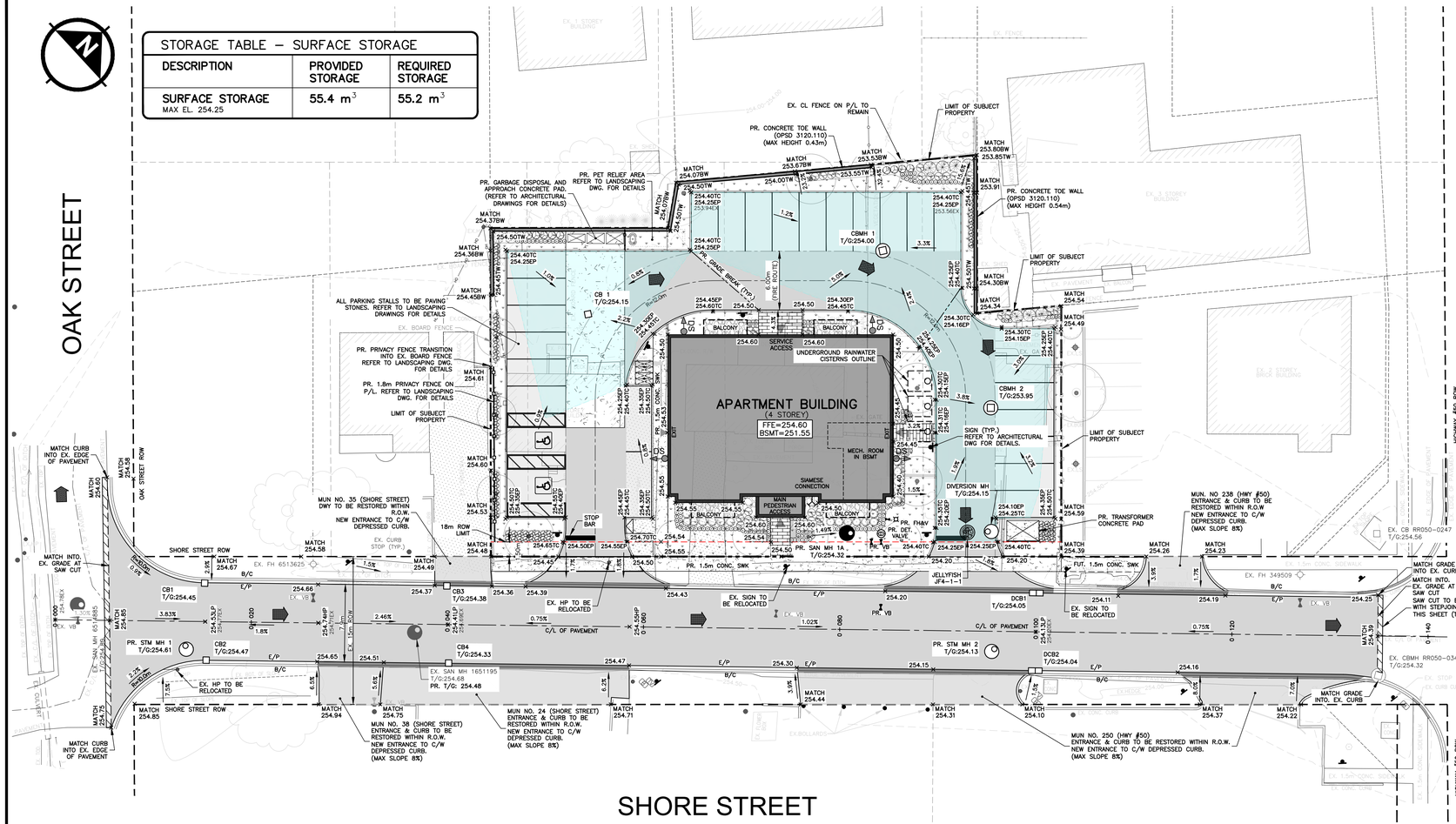


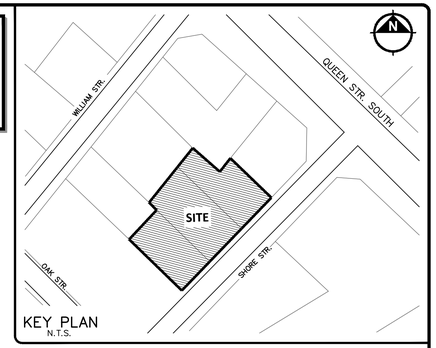
4 LOT FABRIC
A100 SCALE: 1:500

SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION

STORAGE TABLE – SURFACE STORAGE		
DESCRIPTION	**PROVIDED STORAGE**	**REQUIRED STORAGE**
SURFACE STORAGE MAX EL. 254.25	**55.4 m^3**	**55.2 m^3**





- LIMIT OF SUBJECT PROPERTY
- ROAD WIDENING SET BACK / ULTIMATE PROPERTY LINE
- VALVE AND BOX
- HYDRANT
- CB — CATCH BASIN
- DCB — DOUBLE INLET CATCHBASIN
- SANITARY MANHOLE
- STORM MANHOLE
- CATCH BASIN MANHOLE
- DETECTOR CHECK VALVE IN CHAMBER
- CONCRETE WALKWAY
- LANDSCAPED AREAS
- DS — DOWNSPOUT (C/W OVERFLOW VALVE)
- GRADE BREAK
- MAJOR OVERLAND FLOW
- TRAFFIC SIGN (REFER TO ARCHITECTURAL DWG FOR DETAILS)
- MAX. SURFACE STORAGE PONDING EXTENTS (ELEV. 254.25)

SHORE STREET

SHORE STREET TO BE URBANIZED AS PER TOWN STD DWG 202
GRADING TO BE CONFIRMED DURING DETAILED DESIGN

GRADING NOTES:

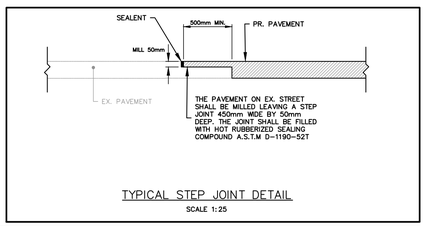
1. WITHIN SUBJECT PROPERTY LIMITS BARRIER CURB TO OPSD 600.110
2. CURB AND GUTTER WITHIN SHORE STREET RIGHT-OF-WAY TO BE OPSD 600.040
3. PARKING STALLS TO BE PAVING STONES. REFER TO LANDSCAPING DRAWINGS FOR DETAILS
4. TOP OF CURB ELEVATIONS 0.15m ABOVE EDGE OF PAVEMENT ELEVATIONS SHOWN
5. ALL BOULEVARDS WITHIN SHORE STREET R.O.W TO BE REGRADED TO NEW BACK OF CURB WITH 300mm OF TOPSOIL AND NURSERY SOD.

SERVICING NOTE:

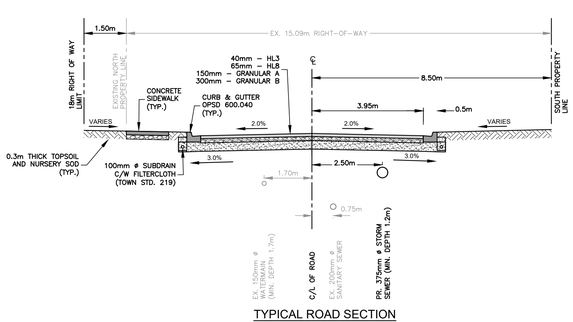
1. ALL ROOF DRAINS TO CONNECT TO UNDERGROUND INFILTRATION FACILITY SHOWN

GENERAL NOTES:

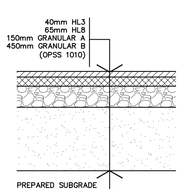
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE APPROVED ARCHITECTURAL AND LANDSCAPE PLANS.
2. THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON ENGINEERING DRAWINGS, AND WHERE SHOWN THE ACCURACY OF THE LOCATION AND ELEVATION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY EXACT LOCATION AND ELEVATION OF SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITIES OF DAMAGE.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER. DETAILS ARE NOT TO BE SCALED FROM THE DRAWINGS.
4. THE WORK AREA SHALL BE ISOLATED FROM PUBLIC ACCESS AT ALL TIMES. OPEN EXCAVATIONS SHALL BE BACKFILLED OR PLATED AT THE END OF EACH WORK DAY. ALL CONSTRUCTION WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.



TYPICAL STEP JOINT DETAIL
SCALE 1:25

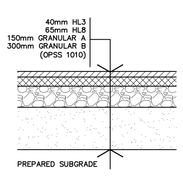


TYPICAL ROAD SECTION
SCALE 1:100



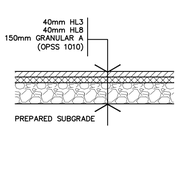
PAVEMENT STRUCTURE (PARKING LOT)
SCALE 1:20

REFER TO GEOTECHNICAL REPORT BY SOIL ENGINEERTS LTD. DATED JULY 2024



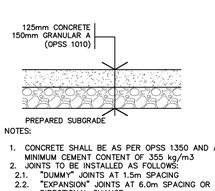
PAVEMENT STRUCTURE (SHORE STREET)
SCALE 1:20

AS PER TOWN STD DWG 201. TO BE CONFIRMED BY GEOTECHNICAL ENGINEER DURING DETAILED DESIGN.



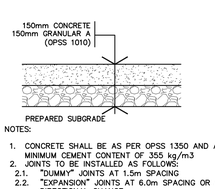
PAVEMENT STRUCTURE (EX. RESIDENTIAL DRIVEWAY RESTORATION)
SCALE 1:20

AS PER TOWN STD DWG 201. TO BE CONFIRMED BY GEOTECHNICAL ENGINEER DURING DETAILED DESIGN.



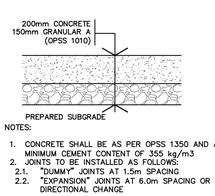
NOTES:
1. CONCRETE SHALL BE AS PER OPSS 1350 AND A MINIMUM CEMENT CONTENT OF 355 kg/m3
2. JOINTS TO BE INSTALLED AS FOLLOWS:
   2.1. "DUMMY" JOINTS AT 1.5m SPACING
   2.2. "EXPANSION" JOINTS AT 6.0m SPACING OR AT ANY DIRECTIONAL CHANGE

CONCRETE SIDEWALK (AS PER TOWN STD 102)
SCALE 1:20



NOTES:
1. CONCRETE SHALL BE AS PER OPSS 1350 AND A MINIMUM CEMENT CONTENT OF 355 kg/m3
2. JOINTS TO BE INSTALLED AS FOLLOWS:
   2.1. "DUMMY" JOINTS AT 1.5m SPACING
   2.2. "EXPANSION" JOINTS AT 6.0m SPACING OR AT ANY DIRECTIONAL CHANGE

CONCRETE SIDEWALK STRUCTURE RESIDENTIAL DRIVEWAY ENTRANCE (AS PER TOWN STD 102)
SCALE 1:20



NOTES:
1. CONCRETE SHALL BE AS PER OPSS 1350 AND A MINIMUM CEMENT CONTENT OF 355 kg/m3
2. JOINTS TO BE INSTALLED AS FOLLOWS:
   2.1. "DUMMY" JOINTS AT 1.5m SPACING
   2.2. "EXPANSION" JOINTS AT 6.0m SPACING OR AT ANY DIRECTIONAL CHANGE

CONCRETE SIDEWALK STRUCTURE COMMERCIAL DRIVEWAY ENTRANCE (AS PER TOWN STD 102)
SCALE 1:20

SUBMISSION HISTORY		
No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS			
No.	DESCRIPTION	BY	DATE

BENCHMARK NOTE:

ELEVATIONS SHOWN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM TOWN OF CALEDON BENCH MARK NO. 758057 HAVING A PUBLISHED ELEVATION OF 251.929m.

SURVEY COMPLETED BY:

GUIDO PAPA SURVEYING
9135 KEELE STREET, UNIT B7
VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23-18-550-00

SURVEY COMPLETED ON:

AUGUST 11, 2023

CONSULTANT

MUNICIPAL APPROVAL

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF URBANWORKS ENGINEERING CORP. AS TO DESIGN AND SPECIFICATION.

DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZIEVSKI

DATE

urbanworks
ENGINEERING CORPORATION
1945 Dundas Street E., Unit 200, Mississauga, ON, L4X 2T8
general@urbanworkseng.com | www.urbanworkseng.com | 905-901-0224

MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

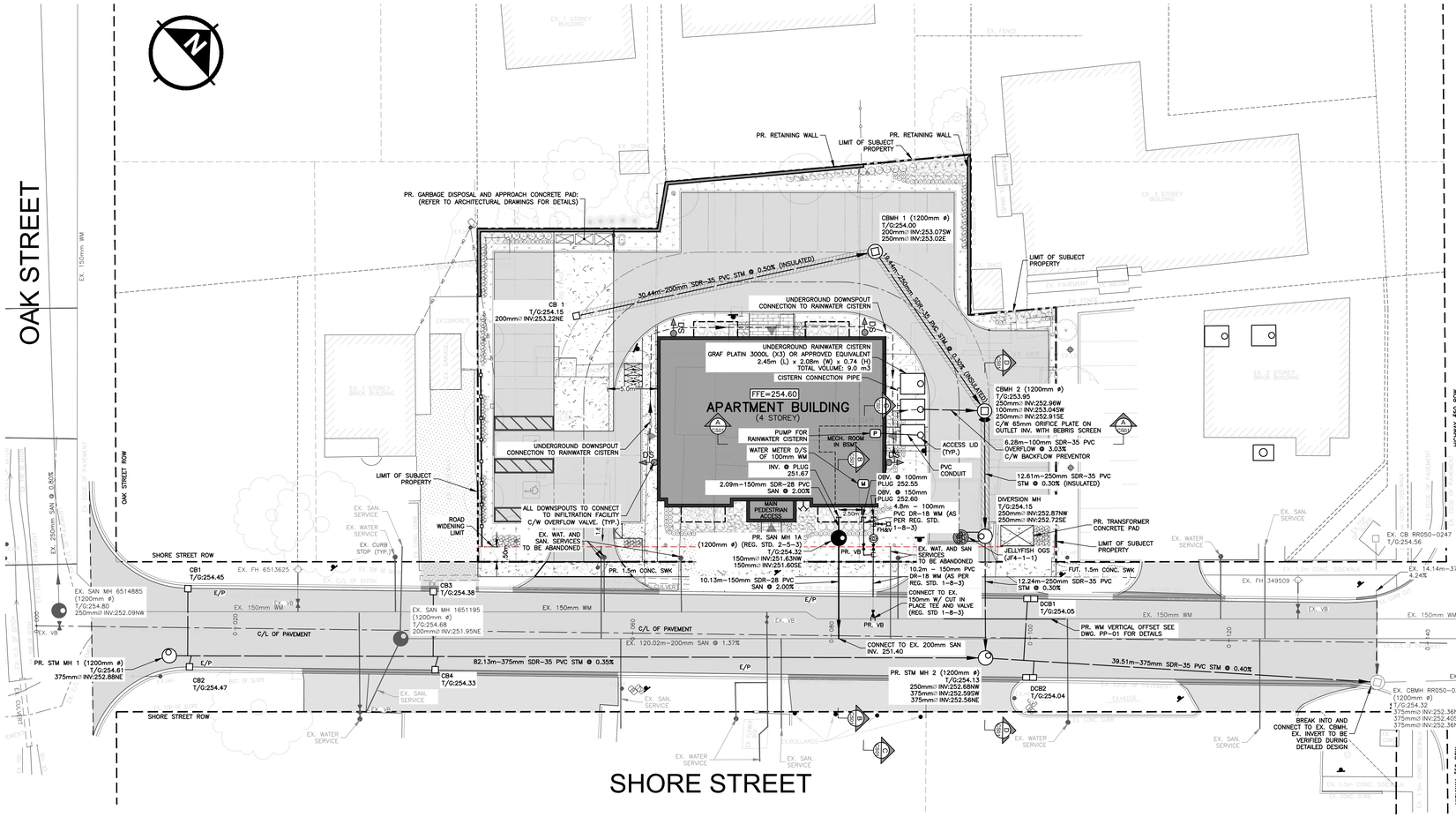
Region of Peel working with you

TOWN OF CALEDON

SCALE 0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

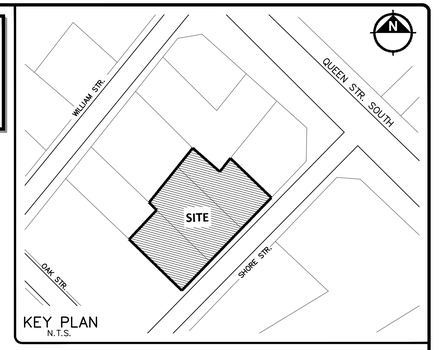
SITE GRADING PLAN

TOWN FILE: PRE-2023-0109		PROJECT No.	24-0002CA
REGION FILE: PRE-23-109B			
DATE: SEP 24, 2024	DESIGNED BY: DV	DWG. No.	SG-01
SCALE: 1:250	DRAWN BY: DV		
	CHECKED BY: TD		



SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION



KEY PLAN
N.T.S.

LIMIT OF SUBJECT PROPERTY

VALVE AND BOX
HYDRANT
WATER MAIN
CB CATCH BASIN
DCB DOUBLE INLET CATCHBASIN
SANITARY MANHOLE
SANITARY SEWER
STORM MANHOLE
STORM SEWER
CATCH BASIN MANHOLE
DCB DETECTOR CHECK VALVE IN CHAMBER
CONCRETE WALKWAY
LANDSCAPED AREAS
DS DOWNSPOUT (C/W OVERFLOW VALVE)
TRAFFIC SIGN (REFER TO ARCHITECTURAL DWG FOR DETAILS)
MAJOR OVERLAND FLOW

SUBMISSION HISTORY

No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS

No.	DESCRIPTION	BY	DATE

BENCHMARK NOTE:

ELEVATIONS SHOWN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM TOWN OF CALEDON BENCH MARK NO. 758057 HAVING A PUBLISHED ELEVATION OF 251.929m.

SURVEY COMPLETED BY:

GUIDO PAPA SURVEYING
9135 KEELE STREET, UNIT B7
VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23–18–550–00

SURVEY COMPLETED ON:

AUGUST 11, 2023

CONSULTANT

MUNICIPAL APPROVAL

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF URBANWORKS ENGINEERING CORP. AS TO DESIGN AND SPECIFICATION.

DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZEVSKI

DATE

urbanworks
ENGINEERING CORPORATION
1945 Dundas Street E., Unit 200, Mississauga, ON, L4X 2Z8
general@urbanworkseng.com | www.urbanworkseng.com|905-901-0224

MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

Region of Peel working with you

TOWN OF CALEDON

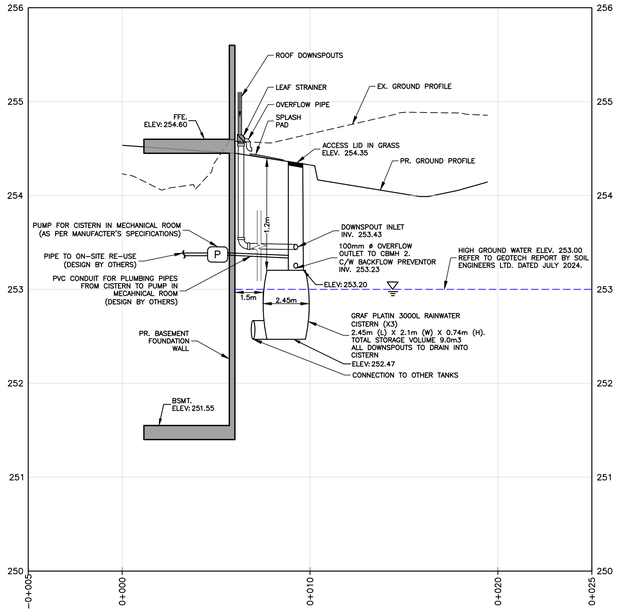
SCALE 0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

SITE SERVICING PLAN

TOWN FILE: PRE–2023–0109		PROJECT No. 24-0002CA
REGION FILE: PRE–23–109B		
DATE: JUN 2024	DESIGNED BY: DV	DWG. No. SS-01
SCALE: 1:250	DRAWN BY: DV	
	CHECKED BY: TD	

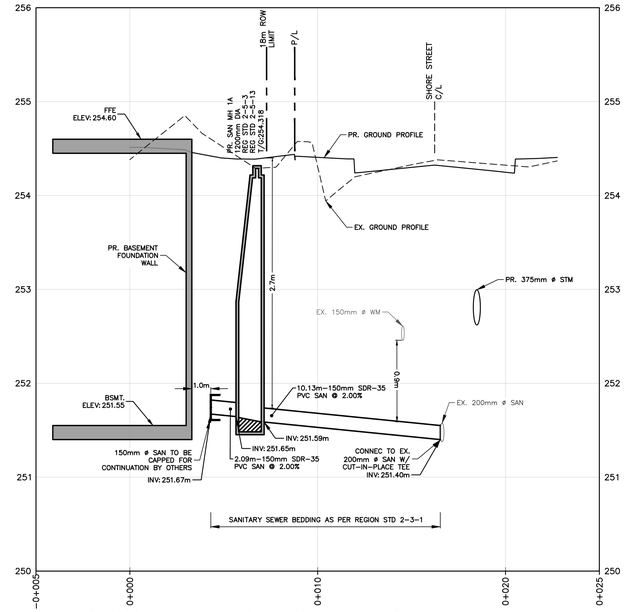
SUBMISSION DRAWING

NOT TO BE USED FOR CONSTRUCTION



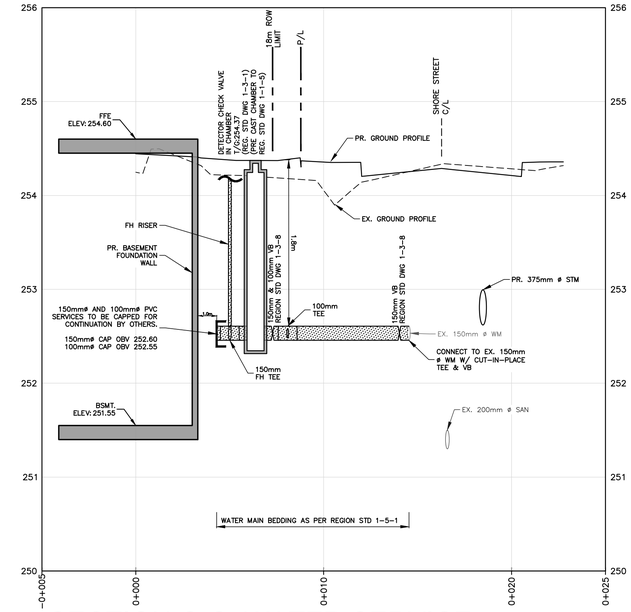
SECTION A-A : RAIN WATER STORAGE FACILITY

H SCALE: 1:150 V SCALE : 1:30



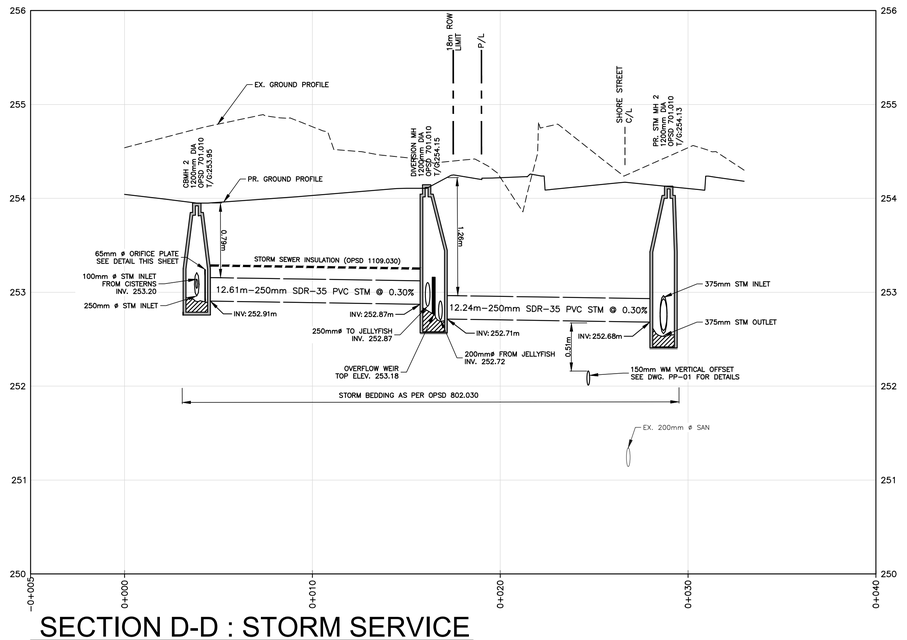
SECTION B-B : SANITARY SERVICE

H SCALE: 1:150 V SCALE : 1:30



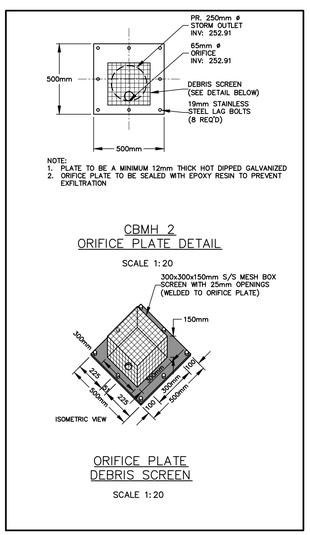
SECTION C-C: WATER SERVICE

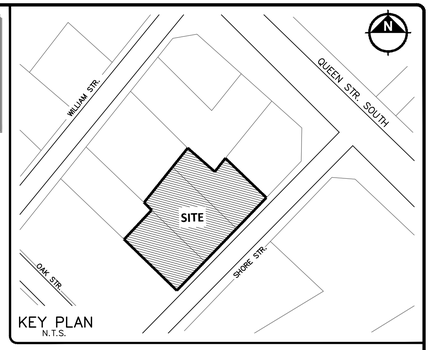
H SCALE: 1:150 V SCALE : 1:30



SECTION D-D : STORM SERVICE

H SCALE: 1:150 V SCALE : 1:30





SUBMISSION HISTORY

No.	ISSUED FOR	DATE
1	ISSUED FOR FIRST SUBMISSION	24/09/24

REVISIONS

No.	DESCRIPTION	BY	DATE

BENCHMARK NOTE:

ELEVATIONS SHOWN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM TOWN OF CALEDON BENCH MARK NO. 758057 HAVING A PUBLISHED ELEVATION OF 251.929m.

SURVEY COMPLETED BY:

GUIDO PAPA SURVEYING
9135 KEELE STREET, UNIT B7
VAUGHAN, ONTARIO
L4K 0J4

GUIDO PAPA REF. NO. 23-18-550-00

SURVEY COMPLETED ON:

AUGUST 11, 2023

CONSULTANT

MUNICIPAL APPROVAL

APPROVED AS TO FORM IN RELIANCE UPON THE PROFESSIONAL SKILL AND ABILITY OF URBANWORKS ENGINEERING CORP. AS TO DESIGN AND SPECIFICATION.

DIRECTOR OF DEVELOPMENT ENGINEERING
DAN TERZIEVSKI

DATE

urbanworks
ENGINEERING CORPORATION
1945 Dundas Street E., Unit 200, Mississauga, ON, L4X 2T8
general@urbanworkseng.com | www.urbanworkseng.com | 905-901-0224

MULTI-UNIT RESIDENTIAL DEVELOPMENT
SHORE STREET URBANIZATION

15,21,27 SHORE STREET, CALEDON

Region of Peel working with you

TOWN OF CALEDON

SCALE

0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25m

CROSS SECTIONS

TOWN FILE: PRE-2023-0109	PROJECT No.	
REGION FILE: PRE-23-109B	24-0002CA	
DATE: SEP 24, 2024	DESIGNED BY: DV	DWG. No.
SCALE: AS NOTED	DRAWN BY: DV	CS-01
	CHECKED BY: TD	

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	MUSKOKA	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 721-7863	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 721-7864	FAX: (905) 542-2769

APPENDIX F

SHORT-TERM DEWATERING AND LONG-TERM DRAINAGE FLOW RATE ESTIMATES

REFERENCE NO. 2404-W107

Short-Term Construction Dewatering Calculation (Building) - 15, 21 and 27 Shore Street, City of Caledon (2404-W107)

Dewatering Rate Formula for an Unconfined Aquifer (Powers et al., 2007):

$$Q = \frac{\pi K (H^2 - h^2)}{\ln(R_0 / r_s)} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

Where:

Q = Anticipated pumping rate (m^3/day)
K = Hydraulic Conductivity (m/day)
H = Initial Hight of static groundwater level to bottom of the saturated aquifer (m)
h = Depth of water in the well while pumping (m)
R_0 = Distance from a point of greatest drawdown to a point where there is no drawdown (Radius of influence) (r
r_s = Distance to the wellpoints from the centre of the trench (m), assumed to be half of the trench width
x = Trench Length (m)
L = Distance from a line source to the trench, R_o (m)/2

Parameter	Units	Proposed 4-Storey Building with 1-Level Basement
Q s.f. 2.0	**L/Day**	800.0
Q	**L/Day**	400.0
Q	**m^3/day**	0.3
K	**m/day**	0.0
H	**m**	4.7
h	**m**	1.7
R_0	**m**	2.8
Trench width (b)	**m**	17.2
r_s	**m**	8.6
x (a)	**m**	23.0
L	**m**	1.4
	a/b	1.3

Radius of Influence Formula (Bear, 1979):

$$R_0 = 2.45\sqrt{\frac{HK}{S_y}}t$$

Where:

R_0 = Radius of Influence (m), beyond which there is negligible drawdown
H = Distance from initial static water level to bottom of saturated aquifer (m)
K = Hydraulic conductivity (m/s)
S_v = Specific yield of the aquifer formation
t =Time (s) required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 d

Parameter	Units	
R_0	**m**	2.8
H	**m**	4.7
K	**m/s**	1.4E-08
S_v (Johnson,1967)		0.06
t	**s**	1209600

Long-Term Foundation Drinage Flow Calculation (Building) - 15, 21 and 27 Shore Street, City of Caledon (2404-W107)

Dewatering Rate Formula for an Unconfined Aquifer (Powers et al., 2007):

$$Q = \frac{\pi K (H^2 - h^2)}{\ln(R_0 / r_s)} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

Where:

Q = Anticipated pumping rate (m^3/day)
K = Hydraulic Conductivity (m/day)
H = Initial Hight of static groundwater level to bottom of the saturated aquifer (m)
h = Depth of water in the well while pumping (m)
R_0 = Distance from a point of greatest drawdown to a point where there is no drawdown (Radius of influence) (r
r_s = Distance to the wellpoints from the centre of the trench (m), assumed to be half of the trench width
x = Trench Length (m)
L = Distance from a line source to the trench, R_o (m)/2

Parameter	Units	Proposed 4-Storey Building with 1-Level Basement
Q s.f. 2.0	**L/Day**	400.0
Q	**L/Day**	200.0
Q	**m^3/day**	0.1
K	**m/day**	0.0
H	**m**	2.9
h	**m**	1.5
R_0	**m**	2.2
Trench width (b)	**m**	17.2
r_s	**m**	8.6
x (a)	**m**	23.0
L	**m**	1.1
	a/b	1.3

Radius of Influence Formula (Bear, 1979):

$$R_0 = 2.45\sqrt{\frac{HK}{S_y}}t$$

Where:

R_0 = Radius of Influence (m), beyond which there is negligible drawdown
H = Distance from initial static water level to bottom of saturated aquifer (m)
K = Hydraulic conductivity (m/s)
S_v = Specific yield of the aquifer formation
t =Time (s) required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 d

Parameter	Units	
R_0	**m**	2.2
H	**m**	2.9
K	**m/s**	1.4E-08
S_v (Johnson,1967)		0.06
t	**s**	1209600

Short-Term Construction Dewatering Calculation (Servicing) - 15, 21 and 27 Shore Street, City of Caledon (2404-W107)

Dewatering Rate Formula for an Unconfined Aquifer (Powers et al., 2007):

$$Q = \frac{\pi K (H^2 - h^2)}{\ln(R_0 / r_s)} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

Where:

Q = Anticipated pumping rate (m^3/day)
K = Hydraulic Conductivity (m/day)
H = Initial Hight of static groundwater level to bottom of the saturated aquifer (m)
h = Depth of water in the well while pumping (m)
R_0 = Distance from a point of greatest drawdown to a point where there is no drawdown (Radius of influence) (m)
r_s = Distance to the wellpoints from the centre of the trench (m), assumed to be half of the trench width
x = Trench Length (m)
L = Distance from a line source to the trench, R_o (m)/2

Parameter	Units	Storm	Storm	Sanitary	Underground Rainwater Cistern	Underground Rainwater Cistern Connection
		CBMH 1 - CBMH 2	CBMH 2 - DIVERSION MH	PLUG (Building) - PR. SAN MH 1A	3 Cisterns	Cistern - CBMH 2
Q s.f. 2.0	**L/Day**	200.0	200.0	200.0	400.0	200.0
Q	**L/Day**	100.0	100.0	100.0	200.0	100.0
Q	**m^3/day**	0.1	0.1	0.1	0.1	0.1
K	**m/day**	0.0	0.0	0.0	0.0	0.0
H	**m**	1.7	2.4	4.1	2.6	2.6
h	**m**	0.6	1.1	1.7	1.1	1.1
R_0	**m**	1.7	2.0	2.6	2.1	2.1
Trench width (b)	**m**	2.0	2.0	2.0	3.0	2.0
r_s	**m**	1.0	1.0	1.0	1.5	1.0
x (a)	**m**	19.4	12.6	2.1	8.2	6.3
L	**m**	0.9	1.0	1.3	1.0	1.0
	a/b	9.7	6.3	1.0	2.7	3.1

Radius of Influence Formula (Bear, 1979):

$$R_0 = 2.45\sqrt{\frac{HK}{S_y}}t$$

Where:

R_0 = Radius of Influence (m), beyond which there is negligible drawdown
H = Distance from initial static water level to bottom of saturated aquifer (m)
K = Hydraulic conductivity (m/s)
S_y = Specific yield of the aquifer formation
t =Time (s) required to draw the static groundwater level to the desired level (assumed to be equivalent to 14 days)

Parameter	Units					
R_0	**m**	1.7	2.0	2.6	2.1	2.1
H	**m**	1.7	2.4	4.1	2.6	2.6
K	**m/s**	1.4E-08	1.4E-08	1.4E-08	1.4E-08	1.4E-08
S_y (Johnson,1967)		0.06	0.06	0.06	0.06	0.06
t	**s**	1209600	1209600	1209600	1209600	1209600