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

NORTHCAPE INVESTMENTS INC.
C/O TRINISON MANAGEMENT CORP.

HYDROGEOLOGICAL ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT

12811 TENTH LINE
TOWN OF WHITCHURCH-STOUFFVILLE

REFERENCE NO. 1910-W052
(Rev. 1)

April 22, 2026

DISTRIBUTION

1 Copy - NorthCap Investment Inc.
1 Copy - Soil Engineers Ltd. (Richmond Hill)

LMITATIONS OF LIABILITY

This report was prepared by Soil Engineers Ltd. (SEL) for the account of Northcape Investments Inc. c/o Trinison Management Corp. for review by their designated agents, financial institutions and government agencies, and can be used for development approval purposes by the Town of Whitchurch-Stouffville/York Region and their peer reviewer and the Ontario Ministry of the Environment, Conservation and Parks, who may rely on the results of the report. The material in it reflects the judgment of Amar Deep Regmi, M.Sc. Yogirajsinh Rana, B.Sc., C.Tech., 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 report.

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 Supplementary Hydrogeological Assessment 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 site reconnaissance.

TABLE OF CONTENT

TABLES

Drawings

APPENDICES

ISSUES AND REVISIONS REGISTRY

Report Description	Date	Description of Issued and/or Revision
Draft 1	June 21, 2023	For review
Draft 2	April 9, 2026	Incorporation of the long-term Monitoring Data and updated Plans
Final	April 13, 2026	For Submission
Rev.1 (Draft)	April 21, 2026	The report was revised due to the revised design drawings
Rev.1 (Final)	April 22, 2026	For Submission

1. EXECUTIVE SUMMARY

In accordance with authorization from Mr. Toula Nessinis of Northcape Investments Inc., c/o Trinison Management Corp., Soil Engineers Ltd. (SEL) has completed a hydrogeological assessment report for the properties with municipal address of 12811 Tenth Line in the Town of Whitchurch-Stouffville (Subject Site).

The Subject Site is currently used as a farm field. Based on the review of the Conceptual Demonstration Plan prepared by Bousfields Inc. and provided on March 9, 2026, it is understood that the Subject Site is proposed to be developed as a residential subdivision consisting of townhouse blocks and a residential apartment building as well as a mixed-use residential building fronting Tenth Line. The development will be serviced by municipal infrastructure and paved roads. The residential apartment building as well as a mixed-use residential building are expected to include up to two levels of underground parking. The remaining portions of the property are designated for a park, a stormwater management facility, and environmental lands. Lands fronting the York Durham Line are identified for future development.

The findings of the Hydrogeological Assessment Reports are summarized below:

- This study has disclosed that beneath the topsoil horizon, and a layer of ploughed soil or earth fill, the Subject Site underlain by native strata of sandy silt till, and silty clay/ silty clay till, overlaying deposits of sand and silt extending to the maximum depth of the subsurface investigation.
- The findings of this study confirm that the measured groundwater level elevation ranged from 291.07 masl to <285.65 masl. The interpreted shallow groundwater flow pattern indicates that shallow groundwater partially within till material and partially within top of the sand and silt deposit beneath the Subject Site flows mainly in southwesterly direction. Furthermore, a review of the interpreted deep groundwater flow direction for the sand aquifer indicates that groundwater flows mainly in a south to southeasterly direction. A review of the recorded groundwater table in the shallow monitoring wells (Series 1, i. e. 1) against the nearby deep monitoring wells (Series 2 i.e. 100) indicates relatively similar groundwater table in both series of the monitoring wells.
- The single well response tests provided hydraulic conductivity (K) estimates that range from 1.3×10^{-5} to 1.1×10^{-6} m/sec for the subsoil units at the depths of the monitoring well screens.
- Based on the preliminary short-term dewatering assessment, the proposed mid-rise development with two levels of underground parking, with an estimated dewatering flow rate of 827,700.00, will require Environmental Activity and Sector Registry (EASR) registration, along with obtaining a discharge permit from the Town of Whitchurch- Stouffville and/or the Region of York is required if short-term dewatering effluent is proposed to be discharged to the municipal or regional sewer system.

- The proposed underground services, with a maximum estimated flow rate of 87,700.0 L/day require EASR registration. Also obtaining a discharge permit from the Township of Whitchurch-Stouffville and/or the Region of York is required if short-term dewatering effluent is proposed to be discharged to the municipal or regional sewer system.
- The groundwater seepage including safety factor of 2 and 2-year storm event with a duration of 3 hr is expected to reach up to 32,100.0 L/day for construction of a townhouse block proposed within the vicinity of BH/MW 5, with the remaining blocks will be constructed above shallow groundwater table. Therefore, filing EASR with the MECP is not required. Obtaining Discharge Permit from Town of Whitchurch-Stouffville/Region of York is required, if short-term dewatering effluent is proposed to be conveyed to the town's or region's sewer system.
- Assuming waterproofing the underground parking of the mid-rise buildings, long-term foundation drainage is not expected. As such, obtaining a permit from the MECP, Region of York/Town of Whitchurch-Stouffville is not required.
- Based on the long-term foundation drainage assessment, all of the proposed townhouse blocks will be constructed above shallow groundwater table with an exception of one (1) block proposed within the vicinity of BH/MW 5. The maximum estimated foundation drainage flow rate of 14,500 L/day is calculated for the above noted townhouse block, which is well below the MECP PTTW threshold of 379,000 L/day; therefore, applying for a PTTW with the MECP is not required for the proposed townhouse block. However, a discharge agreement with the Town of Whitchurch-Stouffville or Region of York will be required if foundation drainage is conveyed to the town or region's sewer system. Town policy requires a minimum 0.6 m separation between the underside of footings and the seasonal high groundwater level. There is a separation ranging between 0.7 m and 2.15 m for the proposed townhouse blocks, with an exemption for a proposed townhouse block within the vicinity of BH/MW5 associated with a single groundwater peak event. As such, the recorded groundwater level is considered local and temporary. The estimated long-term foundation drainage flow rate for the above noted proposed townhouse block is based on the highest recorded groundwater level in BH/MW 5. At this location overall, groundwater levels were observed to remain near-dry for most of the multi-year monitoring period except for one (1) monitoring event. As such, significant long-term foundation drainage from groundwater source is not anticipated for the proposed townhouse block within the vicinity of BH/MW 5 that was installed within the glacial till that is under impression of the precipitation.
- Groundwater quality results were evaluated against the Region of York Storm and Sanitary Sewer Use By-Law standards and Provincial Water Quality Objectives (PWQO), with the following key findings:

- Unfiltered groundwater samples showed exceedances of total manganese (BH/MW-2) and Total Suspended Solids (TSS) and chloroform (BH/MW-102) when compared against storm sewer discharge limits, while all parameters met the sanitary sewer use standards.
- Filtered groundwater samples from above noted monitoring wells met the Region of York Sorm Sewer Use By-Law.
- Comparison of groundwater samples against PWQO identified exceedances in unfiltered samples for nonylphenol, bis(2-ethylhexyl)phthalate, polychlorinated biphenyls (PCBs), total iron, total lead, total phosphorus, and 4AAP-phenolics, indicating that short-term dewatering effluent may require pre-treatment prior to discharge to the natural environment, subject to regulatory approval.

- The conceptual Zone of Influence (ZOI) for dewatering is estimated to extend approximately 30.1 m, 14.5 m , and 3.4 m from the dewatering area associated with the proposed mid-rise development, underground services a and proposed townhouse development. portion of Tenth Line and the driveway at 12875 Tenth Line are located within the conceptual Zone of Influence (ZOI) associated with the proposed mid-rise building, which includes two levels of underground parking. As a result, there is a potential risk of ground settlement affecting nearby infrastructure due to dewatering activities. However, given that the project is currently at an early stage and detailed design information for the building is not yet available, the assessment and associated recommendations should be revisited and refined once the detailed design has been completed.
- A records review indicates that the wetland and woodland areas associated with the unevaluated wetland and the tributary of Reesor Creek are located at the eastern end of the Subject Site, outside the proposed development limits and beyond the conceptual Zone of Influence (ZOI) associated with the proposed development. Accordingly, no impacts to these natural heritage features are anticipated.
- A review of MECP well records indicates that two (2) water supply wells are registered within the Subject Site. However, the water supply wells were not identified during the field investigation. Since the wells are located within the footprint of the proposed development, if encountered during earthworks, it should be properly decommissioned. Additionally, no water supply wells are located within the conceptual Zone of Influence (ZOI). Considering the early stage of the project, it is recommended a private water supply well monitoring program is conducted a couple of months in advance of construction.
- A review of the findings indicates that a total decrease of 15,755.97 m^3/year and 9,859.67 m^3/year for ET and infiltration, respectively, and an increase of 25,615.64 m^3/year for runoff are expected for the post-development Site.

2. INTRODUCTION

2.1. Project Description

In accordance with authorization from Mr. Toula Nessinis of Northcape Investments Inc., c/o Trinison Management Corp., Soil Engineers Ltd. (SEL) has completed a hydrogeological assessment report for the properties with municipal address of 12811 Tenth Line in the Town of Whitchurch-Stouffville (Subject Site).

The Subject Site is located on the east side of Tenth Line. Surrounding land uses include agricultural fields to the north and south. Tenth Line and residential and commercial properties are located to the west, and tributaries of Ressor Creek, associated wooded areas and York Durham Line are located to the east of the Subject Site. **Drawing No. 1** shows the location of the Subject Site.

The Subject Site is currently used as a farm field. Based on the review of the Conceptual Demonstration Plan prepared by Bousfields Inc. and provided on March 9, 2026, it is understood that the Subject Site is proposed to be developed as a residential subdivision consisting of townhouse blocks and a residential apartment building as well as a mixed-use residential building fronting Tenth Line. The development will be serviced by municipal infrastructure and paved roads. The residential apartment building as well as a mixed-use residential building are expected to include up to two levels of underground parking. The remaining portions of the property are designated for a park, a stormwater management facility, and environmental lands. Lands fronting the York Durham Line are identified for future development. Furthermore, a preliminary grading plan prepared by SCS Consulting group dated April 2026 was reviewed and considered for the following assessment.

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 recommendations on potential needs for mitigation plans for the potential impacts of the proposed development on the groundwater receptors and structures. Comments and recommendations are provided on any needs for applying for 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 hydrogeological assessment has been completed based on the Ontario Water Resource Act, Ontario Regulation 387/04, The Regional Municipality of York Sanitary and Storm Discharge By-Law (BL_2021_102), and a review of the provided and available proposed development Plans.

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, Toronto and Region Conservation Authority (TRCA) regulated area plans, and MECP water well records, was 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 thirty-one (31) monitoring events, and in-situ hydraulic conductivity testing was completed in the installed monitoring wells.
- *Short-Term Dewatering Needs:* Based on a review of the available design drawings, findings of the current subsurface investigation, and recommendations provided in the geotechnical investigation report, the short-term dewatering flow rate, including groundwater seepage, and anticipated water that should be collected over potential storm events, was calculated. Recommendations were provided on potential needs for a mitigation plan to mitigate potential short-term dewatering impacts to the nearby groundwater receptors (including natural heritage features and water supply wells) and structures, if applicable.
- *Long-term foundation Drainage Control Requirement:* Based on a review of the available design drawings, findings of the current subsurface investigation, and recommendations provided in the geotechnical investigation report, the total long-term foundation drainage flow rate, including groundwater seepage, and anticipated flow from infiltration source was estimated.
- *Permit Requirements:* Considering the estimated 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, and the Town of Whitchurch-Stouffville or Region of York, if required.
- *Pre- and post-development Water Balance Assessment*: A pre- and post-development water balance assessment was completed as a part of the current assessment based on a review of the TRCA water balance tool and the statistics provided to our office.

3. METHODOLOGY

3.1. Borehole Advancement and Monitoring Well Installation

Drilling boreholes and installation of monitoring wells were completed over two (2) investigation phases.

The first borehole drilling and monitoring well installation program (Series 1) was conducted on March 3, 5 and 6, 2020. It consisted of drilling nine (9) boreholes and the installation of 9 (nine) monitoring wells (BH/MWs), including two (2) pairs of nested shallow and deep monitoring wells (BH/MW 1 to BH/MW 7).

The second borehole drilling and monitoring well installation program (Series 2) included supplementary borehole drilling and monitoring well installations that were completed on March 11, 16, 17, 18 and 21, 2022. The program included the installation of six (6) monitoring wells (BH/MWs 100 series), at the request of Northcap Investment Inc. The locations of the boreholes/monitoring wells are shown on **Drawing No. 2**.

Both the drilling and monitoring well installation programs were completed by the licensed water well contractor licensed water well contractor, DBW Drilling Ltd., under the full-time supervision of a geotechnical technician from SEL, who also logged the subsoil strata encountered during borehole advancement and collected representative subsoil samples for textural classification.

The boreholes were drilled using continuous flight power augers. Detailed descriptions of the encountered subsurface soil and groundwater conditions are presented on the borehole and monitoring well logs, on the enclosed **Appendix A**, inclusive.

The monitoring wells were constructed using 50-mm diameter PVC riser pipes and screen sections, which were installed in each of the boreholes in accordance with Ontario Regulation (O. Reg.) 903. All of the monitoring wells were provided with steel, monument-type protective casings at the ground surface. The details for the monitoring well construction are provided on the enclosed Borehole Logs **Appendix A** (Figures 1 to 15).

The UTM coordinates and ground surface elevations at the borehole/monitoring well locations, together with a summary of the monitoring well construction details, are provided on **Table 3-1**.

Table 3-1 - Monitoring Well Installation Details

Well ID	Installation Date	UTM Coordinates		Ground El. (masl)	Borehole Depth (mbgs)	Screen Interval (mbgs)	Casing Dia. (mm)
		North (m)	East (m)				
BH/MW 1D	March 3, 2020	4872152.3	641648.1	293.6	8.1	4.1-7.1	50
BH/MW 1S	March 3, 2020	4872151.8	641649.0	293.6	6.1	3.1-6.1	50
BH/MW 2	March 3, 2020	4872063.1	641654.2	291.8	6.6	3.1-6.1	50
BH/MW 3	March 3, 2020	4872210.7	641738.8	295.8	6.5	3.1-6.1	50
BH/MW 4	March 6, 2020	4872121.1	641770.0	293.7	6.6	3.1-6.1	50
BH/MW 5	March 5, 2020	4872227.5	641838.3	295.8	6.5	3.1-6.1	50
BH/MW 6	March 5, 2020	4872154.6	641881.3	294.4	6.5	3.1-6.1	50
BH/MW 7D	March 6, 2020	4872183.7	641993.5	292.5	8.1	4.6-7.6	50
BH/MW 7S	March 6, 2020	4872182.5	641993.9	292.5	6.1	3.1-6.1	50
BH/MW 101	March 18, 2022	4872162.3	641622.5	293.9	14.2	10.7-13.7	50
BH/MW 102	March 21, 2022	4872101.0	641608.7	293.2	14.2	10.7-13.7	50
BH/MW 103	March 11, 2022	4872065.1	641653.2	291.8	14.0	10.7-13.7	50
BH/MW 104	March 17-18, 2022	4872194.9	641734.8	295.5	14.2	10.7-13.7	50
BH/MW 105	March 17, 2022	4872135.5	641716.6	293.4	14.2	10.7-13.7	50
BH/MW 106	March 16, 2022	4872109.4	641769.4	293.0	14.2	10.7-13.7	50

Notes:
mbgs -- metres below ground surface
masl -- metres above sea level
S: Shallow Nested Monitoring Well
D: Deep Nested Monitoring Well

3.2. Mapping of Ontario Water Well Records

SEL received the Ministry of Environment, Conservation and Parks (MECP) Water Well Records (WWRs) for registered wells located on the Subject Site, and within 500 m of the Subject Site boundaries (study area). The records indicate that eighty-five (85) registered wells are located within the 500 m study area, relative to the site's boundaries. The well locations are shown on Drawing No. 3, and the WWRs reviewed for this study are presented on **Drawing No. 3** and listed in **Appendix B** with a discussion of the review, being provided in **Section 6.1**.

3.3. Groundwater Monitoring

All fifteen (15) monitoring wells installed on the Site were used to measure and monitor groundwater levels. Series 1 monitoring wells were developed on April 8, 2020, and subsequently monitored over 31 events from 2020 to 2026, confirming stabilized groundwater conditions beneath the Subject Site. In addition, six (6) Additional monitoring wells installed in March 2022 (Series 2) were developed on March 25, 2022, and incorporated into the groundwater monitoring program, with groundwater levels recorded during over eighteen (18) events from March 2022 to January 2026, further confirming stabilized groundwater conditions. Results for all monitoring wells are presented in the **Section 6.2**.

3.4. Monitoring Well Development and Single Well Response Tests

The monitoring wells installed in 2022 underwent development in preparation for single-well response tests (SWRT) to estimate the hydraulic conductivity (K) for the subsoil strata at the depths of the monitoring well screens. Well development involved the purging and removal of several casing volumes of groundwater from each monitoring well to remove remnants of clay, silt and other debris introduced into the monitoring wells during construction, and to induce the flow of formation groundwater through the monitoring well screens, thereby improving the transmissivity of the subsoil strata formation at the well screen depths. The K estimates, derived from the SWRT's, provide an indication of the yield capacity for the groundwater-bearing subsoil strata and can be used to estimate the flow of groundwater through the groundwater-bearing subsoil strata.

The SWRT involves the placement of a slug of known volume into the monitoring well, below the groundwater table, to displace the groundwater level upward. The rate at which the groundwater level recovers to static conditions (falling-head) is tracked using a data logger/pressure transducer, and/or manually, using an electronic water level tape. The rate at which the groundwater table recovers to static conditions is used to estimate the K values for the groundwater-bearing subsoil strata at the monitoring well screen depths.

BH/MWs 7D, 101, 102, 103, 105 and 106 underwent a SWRT on June 30, 2023. BH/MW 104 was damaged, so we could not perform the SWRT on this well. BH/MWs 1S, 1D, 2, 3, 4, 5, 6 and 7S did not have enough groundwater within them to perform the SWRT. The K test estimates are provided in **Appendix D**, with a summary of the findings provided in **Section 6.4**.

4. REGIONAL AND LOCAL SETTING

4.1. Regional Geology

The Subject Site lies within the physiographic region of Southern Ontario, known as the South Slope, which is mapped on the drumlinized till plain, a surficial physiographic feature (Chapman and Putnam, 1984).

The Review of the surface soil geological map of Ontario shows that the Subject Site is located on the Halton Till Unit, native mineral soil deposits, which consist primarily of silt to silty clay matrix, being high in calcium carbonate content, which is considered clast-poor. **Drawing No. 4** presents the location of the Subject Site within the surface geology map.

The bedrock depth elevation is at approximately 185.0 metres above sea level (masl); the bedrock consists of shale, limestone, dolostone, and siltstone of the Georgian Bay formation, which were deposited during the Upper Ordovician Epoch (Bedrock Geology of Ontario, 1993).

4.2. Physical Topography

A review of the site's local topography shows that there is a decline in elevation relief towards its eastern limits. However, small hills were also observed along the north and south boundaries of the Subject Site, where the topography slopes downwards, towards the central portion of the Subject Site. Runoff from the Subject Site is expected to drain in an overall easterly direction, towards the wetland and the tributary of Reesor Creek, located adjacent to the east boundary of the Subject Site. Based on a review of the topographic map for the area, the total elevation relief across the Subject Site is about 5.0 m. **Drawing No. 5** shows the mapped topographical contours for the Subject Site and the surrounding area.

4.3. Watershed Setting

The Subject Site is located within the West Duffins Sub-Watershed of the Duffins Creek Watershed. **Drawing No. 6** shows the watershed and sub-watershed map.

4.4. Local Surface Water and Natural Features

The Subject Site is located within the Settlement Area of the Oak Ridges Moraine Planned Area. A record of wetland feature is shown east of the Subject Site along Reesor Creek. This wetland has not been evaluated per the Ontario Wetland Evaluation System (OWES) and is not considered to be Provincially Significant. Furthermore, bodies of water are scattered around the Subject Site, that are associated with these non-evaluated wetland features. Reesor Creek, which is located adjacent to the east boundary of the Subject Site, flows in a north/northwest-to-south/southeast direction, and Stouffville Creek, which originates about 100 m west of the Subject Site, flows in a north/northeast-to-south/southwest direction. Both of these tributaries drain into the West Duffins Creek.

Wooded areas can also be found along the banks of the nearby watercourses (Reesor Creek). The locations of the site and the noted natural features are shown on **Drawing No. 7**.

4.5. 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 the regional-scale source water protection mapping (Source Water Protection Information Atlas) provided by the MECP on April 6, 2026, the Subject Site is not located within a Intake Protection Zone and Issue Contributing Area (ICA), The Subject Site, however, is located within WHPA-Q1 and WHPA-Q2 areas associated with a moderate stress level, SGRA.

Additionally, the Subject Site is partially located within the Well Head Protection Area C with score of 8 and Well Head Protection Area B with Score of 10.

Considering the location of the Subject Site within WHPA-Q2, the pre- and post development water balance assessment is completed as a part of the current report.

4.6. Active Permit to Take Water Application Record Review

The MECP website was reviewed for any active PTTW application records within a 1.0 km radius of the Study Alignment on April 6, 2026. Record review indicates there is one records for active PTTW within a 1.0 km radius of the Subject Site and the details are presented in the **Table 4-1**.

Table 4-1 - Active Permit to Take Water Record Review

Permit Number	Permit Holder Name	Purpose	Specific Purpose	Max Litres per Day	Source Type	Distance (KM)
6555-CANK9P	The Regional Municipality of York	Water Supply	Municipal	2,946,240	Ground Water	0.81

5. SOIL LITHOLOGY

This study has disclosed that beneath the topsoil and a layer of ploughed soil or earth fill, the Subject Site is underlain by strata of sandy silt till/silty sand till, and silty clay/silty clay till, overlaying deposits of sand, sandy silt and silt extending to the maximum depth of the subsurface investigation. A Key Plan and the interpreted geological cross-sections, along the delineated northwest to northeast, and southwest to southeast transects, across the Subject Site are presented on **Drawing Nos. 8-1** and **8-2**.

5.1. Topsoil (All BH/MWs)

A layer of topsoil, approximately 2 to 25 cm thick, was observed at the ground surface at all the BH/MW locations. Thicker topsoil may occur in places, especially in low-lying areas that have been filled during previous farming activities.

5.2. Ploughed Soil (All BH/MWs, except BH/MWs 4 and 106)

Ploughed soil, approximately 0.5 to 1.07 m thick, was observed beneath the topsoil layer at all the borehole monitoring well locations, except BH/MWs 4 and 106, where it extends to depths of 0.7 to 1.1 m below the prevailing ground surface, and is comprised of silty clay and organics.

5.3. Earth Fill (BH/MWs 4 and 106)

A layer of dark brown to brown earth fill, approximately 1.2 to 1.3 m thick, was encountered below the topsoil layer at BH/MWs 4 and 106. It consists of silty clay with topsoil inclusions. It extends to 1.4 meters below the prevailing ground surface. The moisture contents for the retrieved subsoil samples range between 12% to 21%, indicating moist conditions.

5.4. Sandy Silt Till and Silty Sand Till (All BHs and BH/MWs, except BH/MWs 3 and 6)

Sandy silt till was encountered in all the BH/MWs, except BH/MWs 3 and 6. This unit, ranging in thickness from 0.7 to 3.8 metres, was found beneath the earth fill and ploughed soil layers in all of the boreholes, except for locations for BH/MW 3 and BH/MW 6. The sandy silt till exhibits a brown colour and possesses a variable density, ranging from loose to very dense. Its composition consists of a heterogeneous mixture of particles, spanning from clay to gravel, with sand and silt being the predominant components.

The moisture contents of the subsoil samples retrieved from this layer ranged from 7 to 18%, indicating varying degrees of moisture, from moist to very moist conditions. This deposit extends to a depth ranging from 4.0 to 5.6 metres below the surface. In the case of BH/MW 7D, the sandy silt till was encountered below a depth of 7.1 metres and extended down to the termination depth of the borehole.

The sandy silt till was found at depths of 2.6 mbgs, 4.8 mbgs and 1.7 mbgs in BH/MWs 4, 7 and 103, respectively, which have an estimated permeability of 10^{-6}, 10^{-5} and 10^{-6} cm/sec, respectively, as determined through grain size analysis. Grain size analysis was performed on three subsoil samples, and the resulting soil gradations are graphically represented in Figure 16 (**Appendix A**).

Silty sand till was encountered at BH/MWs 103 and 104, at depths ranging from 2.9 to 4.0 mbgs,

where the thickness of this unit ranges from 1.1 to 1.6 m. The moisture contents for silty sand till range from 8% to 11%, indicating moist conditions. It is brown in colour and dense in consistency, having a trace of clay and a gravelly nature with occasional cobbles and boulders.

The estimated permeability of a silty sand till unit, encountered at a depth of 3.2 mbgs, is approximately 10^{-4} cm/sec. Grain size analysis was performed on one (1) subsoil sample in Borehole 103, and the soil graduation curve is plotted in Figure 17 (**Appendix A**).

5.5. Silty Clay and Silty Clay Till (BH/MWs 3, 5, 6, 7D, 7S, 104, 105 and 106)

Silty clay deposits was encountered at BH/MWs 3, 5, 6, 7D, 7S, 104, and 106 locations, ranging from the depths from 0.7 to 1.4 mbgs, where its thickness ranges from 0.9 to 1.4 m and is present beneath the ploughed soil at BH/MWs 3, 5, 6, 7D, 7S, and beneath the earth fill at BH/MW 106, and beneath the sandy silt till at BH/MW 104. It is brown in colour and is firm to very hard in consistency, having a trace of sand and gravel with occasional layers of seams. The moisture contents for the silty clay range from 15% to 22%, indicating very moist conditions. The estimated permeability for the silty clay unit, encountered at a depth ranging from 1.7 to 2.5 mbgs, is approximately 10^{-7} to 10^{-6} to cm/sec. Grain size analysis was performed on three (3) subsoil samples, and graduation curves are plotted in Figure 18 (**Appendix A**).

Silty clay till deposits were encountered at the BH/MWs 6, 105 and 106 locations, ranging from depths of 0.8 to 2.1 mbgs, where the thickness for this unit ranges from 1.1 to 3.2 m beneath the ploughed soil layer at BH/MW 105, and beneath the silty clay unit at BH/MWs 6 and 106. It is brown in colour and is stiff to hard in consistency, having traces of sand and gravel with occasional layers of seams. The moisture content for the silty clay ranges from 12% to 19%, indicating very moist conditions. The estimated permeability for the silty clay till unit, encountered at a depth of about 3.2 mbgs, is approximately 10^{-7} cm/sec. Grain size analysis was performed on two (2) subsoil samples, and graduation curves are plotted in Figure 19 (**Appendix A**).

5.6. Oak Ridges Moraine (Sand, Silt and Sandy Silt)

5.6.1. Sandy Silt (BH/MWs 1D, 1S, 2, 4, 5, 6, 7D and 7S)

Sandy silt deposits were encountered at BH/MWs 1D, 1S, 2, 4, 5, 6, 7D and 7S locations, ranging from the depths from 4.0 to 5.6 mbgs, where the thickness for this unit ranges from 0.5 to 3.2 m beneath the sandy silt till at BH/MWs 1D, 1S, 2, 5, 7D and 7S, beneath the silty clay till at BH/MW 6, and beneath the sand unit at BH/MW 4. It is brown in colour and is very dense in consistency, having occasional clay layers. The moisture contents for the silty clay range from 10% to 21%, indicating moist to very moist conditions. The estimated permeability for the sandy silt unit, encountered at the depths, ranging from 2.5 to 5.0 mbgs, is approximately ranging from 10^{-4} to 10^{-3} cm/sec. Grain size analysis was performed on three (3) subsoil samples, and the graduation curves are plotted in Figure 21 (**Appendix A**).

5.6.2. Sand (BH/MWs 1D, 3, 4, 6, and 101 to 106, inclusive)

Sand deposits were encountered at BH/MWs 1D, 3, 4, 6 and, 101 to 106, inclusive, locations ranging from the depths from 4.0 to 10.1 mbgs, where the thickness of this unit ranges from 0.8 to 8.6 m beneath the sandy silt till at BH/MW 4, beneath the silty clay at BH/MW 3, beneath the sandy silt at BH/MWs 1D and 6 and beneath the silt at BH/MWs 101 to 106, inclusive. It is brown in colour and is very dense in consistency, having some silt to silty and occasional silt layers. The moisture contents for the sand range from 9% to 2%, indicating very moist to saturated conditions. The estimated permeability for the sandy silt unit, encountered at the depths, ranging from 6.3 to 10.9 mbgs ranges from 10^{-3} to10^{-2} cm/sec. Grain size analysis was performed on five (5) subsoil samples, and graduation curves are plotted in Figures 22 and 23 (**Appendix A**)

5.6.3. Silt (BH/MWs 3, and 101 to 106, inclusive)

Silt deposits were encountered at BH/MWs 3, and 101 to 106, inclusive, locations ranging from the depths from 4.0 to 5.6 mbgs, where the thickness for this unit ranges from 0.8 to 4.5 m beneath the sandy silt till at BH/MWs 101, 102 and 105, and beneath the silty sand till at BH/MWs 103, 104 and 106, and beneath the sand at BH/MW 3. It is brown in colour and is very dense in consistency, having traces of sand and seams. The moisture contents for the silt range from 9% to 21%, indicating very moist to wet conditions. The estimated permeability for the sandy silt unit, encountered at a depth of 6.3 mbgs, is approximately 10-5 cm/sec. Grain size analysis was performed on one (1) subsoil sample, and the graduation curve is plotted in Figure 20 (**Appendix A**).

6. GROUNDWATER STUDY

6.1. Review of Ontario Water Well Records

The MECP well record database was reviewed for records located within a radius of 500 m from the approximate Subject Site. The records indicate that Eighty-five (85) well records are located within the Study Alignment relative to the Study Alignment. A summary of data obtained from the records review is presented in **Table 6-1**.

The locations of the well records, based on the UTM coordinates provided by the records, are shown on **Drawing 3**. Details of the MECP water well records that were reviewed are provided in **Appendix B**.

Table 6-1 - MECP Well Record Summary

Water Use (Final Status)	
Final Status	**Number of Records**
Observation Wells	22
Unknown	21
Water Supply	19
Other Status	15
Test Hole	4
Abandoned-Other	3
Dewatering	1

The above summary indicates that there are two (2) records of water supply wells within the Subject Site.

6.2. Groundwater Monitoring

All fifteen (15) monitoring wells installed on the Subject Site were used to measure and monitor groundwater levels. Series 1 monitoring wells were developed on April 8, 2020, and subsequently monitored over 31 events from 2020 to 2026, confirming stabilized groundwater conditions beneath the Subject Site. In addition, six (6) Additional monitoring wells installed in March 2022 (Series 2) were developed on March 25, 2022, and incorporated into the groundwater monitoring program, with groundwater levels recorded during over 18 events from March 2022 to January 2026, further confirming stabilized groundwater conditions. Results for all monitoring wells are presented in **Appendix C-1**. A review of the recorded groundwater table indicates that the highest and lowest groundwater tables were recorded at 291.07 masl and <285.65 masl in BH/MWs 5 and 2 respectively. SEL has installed two (2) pairs of shallow and deep nested monitoring wells at the Subject Site. Considering the soil media around he monitoring well screen intervals, this could be due to low permeable shallow till unit presented partially around the shallow nested monitoring well screen. A review of groundwater tables recorded in BH/MWs 1D and 1S indicates that groundwater table in the shallow monitoring well was recorded higher or at the same level (in a few occasions) compared to groundwater table recorded in the deep monitoring well except for three (3) monitoring events in springs 2021, 2022 and 2023, suggesting a downward vertical hydraulic gradient. A review of groundwater table in shallow and deep nested BH/MWs 7D and 7S indicates that groundwater table

in deep monitoring well was measured slightly higher compared to the sallow nested monitoring well except for a monitoring event in March 2022, suggesting relatively upward vertical hydraulic gradient. A review of soil media around the well screens interval indicates that the deep nested monitoring well was partially installed within an interbedded sandy silt unit with expected higher groundwater table.

Furthermore, a review of the recorded groundwater table in the shallow monitoring wells (Series 1, i. e. 1) against the nearby deep monitoring wells (Series 2 i.e. 100) indicates relatively similar groundwater table in both series of the monitoring wells.

Four (4) selected monitoring wells BH/MW 1D, 7D, 101 and 103 were equipped with digital transducer to record groundwater fluctuation. The interpreted hydrographs are presented in **Appendix C-2**.

The monitoring program in BH/MW 1D completed between April 8, 2020 and end of September 25, 2024. A review of the findings indicates that shallow groundwater table was increased during spring of 2021, 2022, 2023 and 2024. The highest and lowest shallow groundwater tables were recorded at288.52 masl and 286.74 masl on April 23, 2024 and September 21, 2022, respectively. The interpreted hydrograph indicates that shallow groundwater table increases after precipitation with delay.

The monitoring program in BH/MW 7D completed between April 8, 2020 and end of December 24, 2025. A review of the findings indicates that shallow groundwater table was increased during spring of 2021, 2022, 2023 and 2024. The highest and lowest shallow groundwater tables were recorded at 289.08 masl and 286.81 masl on April 4, 2025 and December 19, 2025 respectively. The interpreted hydrograph indicates that shallow groundwater table increases after precipitation with slight delay.

The monitoring program in BH/MW 101 completed between March 26, 2022 and end of December 23, 2025. A review of the findings indicates that shallow groundwater table was increased during spring of 2022, 2023, 2024 and 2025. The highest and lowest shallow groundwater tables were recorded at 288.29 masl and 286.04 masl on May 2, 2022 and December 22, 2022, respectively. The interpreted hydrograph indicates that shallow groundwater table increases after precipitation with delay.

The monitoring program in BH/MW 103 completed between March 25, 2022 and end of September, 25, 2024. A review of the findings indicates that shallow groundwater table was increased during spring of 2022, 2023, 2024 and 2025. The highest and lowest shallow groundwater tables were recorded at 288.10 masl and 285.92 masl on May 22, 2022 and December 22, 2022 respectively. The interpreted hydrograph indicates that shallow groundwater table increases after precipitation with delay.

SEL has also installed deep monitoring wells (BH/MWs 101-106) within the sand and silt units beneath the glacial till. A review of groundwater fluctuation in the deep monitoring wells indicates a significant fluctuation during the monitoring program conducted between March 25, 2025 and January 7, 2026 over 18 monitoring events. The highest and lowest groundwater fluctuation of 1.85 m and

1.79 m was recorded in BH/MW 103 and BH/MW 101, respectively. The highest groundwater levels were recorded on April 10, 2023 and the lowest groundwater levels were measured on December 18, 2022. The recorded fluctuation mainly indicates that the monitored aquifer is not completely confined aquifer and groundwater fluctuates seasonally.

6.3. Shallow and Deep Groundwater Flow Pattern

The interpreted shallow groundwater flow pattern beneath the Subject Site was interpreted based on the highest shallow groundwater level elevations, as recorded at BH/MWs 1S, 1D, 2, 3, 4, 6, 7S and 7D, on April 10, 2023, suggesting that it flows mainly in southwesterly direction. The interpreted shallow groundwater flow pattern beneath the Subject Site is illustrated on **Drawing No. 9-1**.

The interpreted deep groundwater flow pattern beneath the Subject Site was interpreted based on the highest of groundwater level elevations, as recorded at BH/MWs 101, 102, 103, 105 and 106 on April 10, 2023, suggesting that it flows mainly in a south to southeasterly direction. The interpreted deeper groundwater flow pattern beneath the Subject Site is illustrated on **Drawing No. 9-2**.

6.4. Single Well Response Test Analysis

The monitoring wells at BH/MWs 7D, 101, 102, 103, 105 and 106 underwent single well response tests (SWRTs) on June 30, 2022, to assess the hydraulic conductivity (K) for saturated aquifer subsoils at the depths of the monitoring well screens. SWRT could not be completed in BH/MWs 1S, 1D, 2, 3, 4, 5 and 6 due to insufficient groundwater. In addition, a SWRT was not performed at BH/MW 104 as this monitoring well was found damaged during the site visit on June 30, 2022.

The results of the SWRTs are presented in **Appendix B**, with a summary of the findings shown in **Table 6-2**.

Table 6-2 - Summary of SWRT Results

Well ID	Ground El. (masl)	Borehole Depth (mbgs)	Screen Interval (mbgs)	Screened Subsoil Strata	Hydraulic Conductivity (K) (m/sec)
BH/MW 7D	292.5	8.1	4.6 - 7.6	Sandy Silt Till and Sandy Silt	1.1×10^{-6}
BH/MW 101	293.9	14.2	10.7 - 13.7	Sand	4.3×10^{-6}
BH/MW 102	293.2	14.2	10.7 - 13.7	Sand	5.0×10^{-6}
BH/MW 103	291.8	14.0	10.7 - 13.7	Sand	2.4×10^{-6}
BH/MW 105	293.4	14.2	10.7 - 13.7	Sand	1.3×10^{-5}
BH/MW 106	293.0	14.2	10.7 - 13.7	Sand	1.1×10^{-6}

Notes:
mbgs -- metres below ground surface masl -- metres above sea level
D: Deep Nested Monitoring Well

As shown above, the K estimates for the screened subsoils range from 1.1×10^{-6} to 1.3×10^{-5} m/sec. The results of the SWRT provide an indication of the seepage and yield capacity for the groundwater-bearing subsoil strata at the depths of the monitoring well screens.

6.5. Hydraulic Conductivity Test Using Grain Size Distribution Graphs

The Hazen Equation method was adopted to estimate the hydraulic conductivity (K) for different soil layers which may contain groundwater during the seasonal high-water table (spring) period, or if they are not encountered within the screen intervals.

The Hazen Equation method relies on the interrelationship between hydraulic conductivity and effective grain size, d10, in the soil media. This empirical relation predicts a power-law relation with K, as follow:

$$K = Ad10^2$$

where;

d10: Value of the soil grain size gradation curve as determined by sieve analysis, whereby 10% by weight of the soil particles are finer and 90% by weight of the soil particles are coarser.

A: Coefficient; it is equal to 1 when K in cm/sec and d10 is in mm

The Hazen Equation estimation provides an indication of the groundwater yield capacity for saturated soil strata at the depths where soils samples were selected for grain size analysis. The grain size distribution graphs prepared for the geotechnical investigation were used to estimate the hydraulic conductivity, with the details are presented in **Appendix A**. The results of the Hazen equation are provided in **Table 6-3**, below.

Table 6-2 - A Summary of Hydraulic Conductivity Using the Hazen Equation

Monitoring Well ID	Soil Sample ID	Soil Sample Depth (mbgs)	Soil Sample Elevation (masl)	Soil Strata	Hydraulic Conductivity (m/s)
BH/MW 4	4	2.6	291.1	Sandy Silt till, a trace of some clay, a trace of gravel	3.2×10^{-8}
BH/MW 7D	6	4.8	287.7	Sandy Silt till, a trace of some clay, a trace of gravel	2.5×10^{-7}
BH/MW 103	3	1.7	290.1	Sandy Silt till, a trace of some clay, a trace of gravel	5.3×10^{-8}
BH/MW 103	5	3.2	288.6	Silty Sand Till, Gravelly a Trace of Clay	9.6×10^{-7}
BH/MW 104	4	2.5	293	Silty Clay, A trace of Some sand	2.3×10^{-8}
BH/MW 3	7	6.3	289.5	Silt, trace of fine sand and clay	6.7×10^{-7}
BH/MW 6	6	4.8	289.6	Sandy Silt, a trace of clay, Occ a trace of gravel	2.1×10^{-7}
BH/MW 104	9	2.5	293.0	Sandy Silt, a trace of clay, Occ a trace of gravel	5.3×10^{-6}
BH/MW 106	6B	5	288.0	Sandy Silt, a trace of clay, Occ a trace of gravel	1.4×10^{-6}
BH/MW 105	10	10.9	282.5	Sand, Fine to Medium-grained, traces of silt and gravel	2.0×10^{-4}
BH/MW 1D	8	7.9	285.7	Sand, fine to medium grained, some silt to silty	1.6×10^{-5}
BH/MW 101	7	6.3	287.6	Sand, fine to medium grained, some silt to silty	1.0×10^{-5}
BH/MW 103	7	6.3	285.5	Sand, fine to medium grained, some silt to silty	6.3×10^{-6}

Monitoring Well ID	Soil Sample ID	Soil Sample Depth (mbgs)	Soil Sample Elevation (masl)	Soil Strata	Hydraulic Conductivity (m/s)
BH/MW 106	8	7.8	285.2	Sand, fine to medium grained, some silt to silty	1.2 x 10^{-5}

6.6. Groundwater Quality

four (4) sets of field-filtered and unfiltered groundwater samples were collected for analysis from the monitoring wells at BH/MWs 2 and 102, on June 30, 2022, using a dedicated sampling bailer. The monitoring wells were purged of three (3) well casing volumes of groundwater prior to sample collection. Upon sampling, all of the sample bottles were placed in ice and packed in a cooler at about 4^{o} C for shipment to the analytical laboratory. The groundwater samples were submitted for analysis for comparison against the York Region Storm and Sanitary Sewer Use By-Law standards. Sample analysis was performed by SGS Environmental Services, which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Results of the analysis are provided in **Appendix E**, with a discussion of the findings provided below. The submitted samples consisted of unfiltered groundwater, with results presented as totals for various parameters analyzed. A second set of selected samples, underwent field filtration during sample collection, prior to analyses for metals and Total Phosphorous (TP). This was performed in order to evaluate the sources for any potentially elevated metals and phosphorous in a dissolved form, indicated from the results of the total analysis (unfiltered samples). The chains of custody number for the submitted samples that underwent analysis are 032720 and 023141 (SGS Group).

The results of the analysis from BH/MW 2 for the unfiltered groundwater indicate one (1) exceedance when evaluated against the Region of York Storm and Sanitary Sewer Use By-Law standards. The exceedance, together with the storm and sanitary standards criteria, is presented in **Table 6-4**.

Table 6-3 – Groundwater Quality Sample-BH/MW 2

Parameter	BH/MW 2 – Groundwater Quality Results (Unfiltered Groundwater) (mg/L)-Total	BH/MW 2 – Groundwater Quality Results (Filtered Groundwater) (mg/L)-Dissolved	Region of York Sanitary Sewer Use Limits (mg/L)	Region of York Storm Sewer Use Limits (mg/L)
Manganese	0.302	0.00011	5	0.15

As shown above, the concentration for total manganese exceeded the Region of York Storm Sewer Use By-Law standards for the sample obtained from BH/MW 2. However, it meets the limits for the Region of York Sanitary Sewer Use By-Law standards. The results also indicate no exceedances for field-filtered groundwater sample compared to the York Region Storm and Sanitary Sewer Use By-Law standards.

The results of the analysis for BH/MW 102 for the unfiltered groundwater indicate two (2) exceedances, when evaluated against the Region of York Storm and Sanitary Sewer Use By-Law standards. The exceedances, together with the storm and sanitary standards criteria, are presented in **Table 6-5**.

Table 6-4 - Groundwater Quality Samples-BH/NW 102

Parameter	BH/MW 102 – Groundwater Quality Results (Unfiltered Groundwater) (mg/L)-Total	BH/MW 102 – Groundwater Quality Results (Filtered Groundwater) (mg/L)-Dissolved	Region of York Sanitary Sewer Use Limits (mg/L)	Region of York Storm Sewer Use Limits (mg/L)
Total Suspended Solids (TSS)	32	-	350	15
Chloroform	0.0022	-	0.04	0.002

As shown above, the concentration for Total Suspended Solids (TSS) and total chloroform exceeded the Region of York Storm Sewer Use By-Law standards for the unfiltered groundwater sample obtained from BH/MW 102. However, it meets the limits for the Region of York Sanitary Sewer Use By-Law standards. The results also indicate no exceedances for field-filtered groundwater sample compared to the York Region Storm and Sanitary Sewer Use By-Law standards.

Additionally, one (1) set of groundwater samples was collected for analysis from the monitoring well BH/MW101, on January 7, 2026, using a dedicated sampling bailer. The monitoring well was purged of three (3) well casing volumes of groundwater prior to sample collection. Upon sampling, all of the sample bottles were placed in ice and packed in a cooler at about 4^{o} C for shipment to the analytical laboratory. The groundwater sample was submitted for analysis for comparison evaluation of the analysis results against the PWQO (Provincial Water Quality Objective). Sample analysis was performed by SGS Environmental Services, which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Results of the analysis are provided in **Appendix E**.

Table 6-5 - Groundwater Quality Exceedances Result (Unfiltered Sample) -PWQO

Exceeded Parameter	Groundwater Quality Results (Unfiltered Sample) (mg/L)	Provincial Water Quality Objective (PWQO)	Detection Limit (mg/L)
Nonylphenol	<0.001	0.00004	0.001
Bis(2-ethylhexyl)phthalate	<0.002	0.0006	0.002
Polychlorinated Biphenyls (PCBs)-Total	<0.0001	0.000001	0.0001
Iron	1.03	0.3	0.007
Lead	0.00274	0.001	0.00009
Total Phosphorus	0.050	0.01	0.003
4AAP-Phenolics	0.002	0.001	0.001

The results suggest that any short-term, construction dewatering effluent should be acceptable for disposal to the natural environment after pre-treatment has been implemented to lower concentrations for Nonylphenol, Bis(2-ethylhexyl)phthalate, Polychlorinated Biphenyls, Iron, Lead, Total Phosphorus, 4AAP-Phenolics prior to its discharge disposal.

The assessment above is provided solely for comparing groundwater quality against the limits set by the York Region Sewer Use By-Law Standards and PWQO. Any discharge should adhere to the respective policies of the jurisdiction. The final design for any dewatering effluent pre-treatment

system is the responsibility of the contractors responsible for construction.

Pre-treatment to lower TSS could involve use of a settling weir tanks and/or filter bags during construction. The final design for any construction dewatering effluent pre-treatment system is the responsibility of contractors responsible for construction. The final design for any long-term foundation drainage systems effluent pre-treatment system will be the responsibility of the mechanical engineer responsible for the design of the long-term foundation drainage system network.

7. GROUNDWATER CONTROL

7.1. Proposed Development Plan Review

Based on the review of the Conceptual Demonstration Plan prepared by Bousfields Inc. provided on March 9, 2026, it is understood that the Subject Site is proposed to be developed as a residential subdivision consisting of townhouse blocks and a residential apartment building as well as a mixed-use residential building fronting Tenth Line. The development will be serviced by municipal infrastructure and paved roads. The residential apartment building as well as a mixed-use residential building are expected to include up to two levels of underground parking. The remaining portions of the Subject Site are designated for a park, a stormwater management facility, and environmental lands. Lands fronting the York Durham Line are identified for future development. Reviewed plan is presented in **Appendix F**.

Furthermore, a preliminary grading plan prepared by SCS Consulting group dated April 2026 was reviewed and considered for the following assessment. It is important to note that the details designs are not available for the review at the time of the preparation of this report. Therefore, the preliminary dewatering assessment for each component is provided, and once the details design becomes available for review the following assessment should be revised.

7.2. A Review of the Geotechnical Investigation Report

A review of the draft Geotechnical investigation report, prepared by SEL Dated March 2026 indicates following:

- The topsoil must be removed prior to project construction, and can only be used for landscaping purposes.
- The ploughed soil should be further assessed to determine its suitability for reuse at the time of construction. Badly weathered or ploughed soils with high concentration of topsoil must also be sub-excavated and sorted.
- In the area of the previous structures, any debris and organic containing material must be removed and disposed off-site. The existing earth fill must be removed and assessed before reuse on site.
- The sound native soils and engineered fill are suitable for supporting the low-rise structures on conventional footings. For medium rise structures, the foundations should be supported on the native soil stratum.
- In accordance to the Town of Whitchurch-Stouffville requirement, the underground or basement structures should be designed such that the underside of footings is founded at least 0.6 m above the seasonal high groundwater level, and be provided with a perimeter drainage system connected to a positive outlet.

- If the underground or basement structure is to be founded in the wet silts or sand below the groundwater table, the submerged structure must be waterproofed and designed to resist the hydrostatic pressure.
- Any excavation extending below the water-bearing strata must be stabilized by construction dewatering or depressurization. Details of appropriate dewatering methods should be referred to the hydrogeological assessment.
- For the proposed townhouse development, conventional spread and strip footings can be used to support the house structures. The footings must be placed onto the engineered fill or sound native soil below the earth fill and weathered/ploughed soils.
- For the construction of the multi-storey residential apartment building as well as a mixed-use residential building with up to 2 levels of underground parking garage, it is anticipated that the foundations will extend to approximately 8 m below the finished grade. Once the building design becomes available, additional boreholes must be completed to assess and verify the ground condition within the footprint of the building for the future development. For design of the underground structures supported on conventional spread and strip footings, the underside of footings should be maintained at least 0.6 m above the groundwater level.
- Where the separation between the highest groundwater level and the underground structure is less than 0.6 m or the underground structures are submerged into the groundwater, the underground structure must be either be provided with a cut-off wall surrounding the underground structure or the structure must be water-proofed and designed to resist the hydrostatic uplift pressure by a raft foundation.

7.3. Dewatering Calculation Methodology

7.3.1. Groundwater Seepage Flow Rate Estimate – Townhouse Blocks, SWM Pond and Underground Services

The pumping rate calculation for the construction of the proposed development was performed based on the assumption that each excavation will act as a trench (considering the proposed dimensions). 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 (m3/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_0	=	Distance from a point of greatest drawdown to a point where there is zero drawdown (radius of influence) (m)
r_s	=	Distance to the points from the centre of the trench, assumed to be half of the trench width (m)
X	=	Trench Length (m)
L	=	Distance from a line source to the trench, Ro (m)/2

The calculated pumping rate was multiplied by a factor of safety of 2.0 to account for uncertainties and natural variability in the range of hydraulic conductivity.

7.3.2. Groundwater Seepage Flow Rate Estimate – Mid Rise Buildings

Finite Element Modeling (FEM) tool was utilized the anticipated short-term dewatering flow rate from groundwater source for the proposed buildings with 2-level underground parking structure.

7.3.3. Conceptual Zone of Influence for Dewatering

Furthermore, the conceptual Zone of Influence (ZOI) for dewatering, also known as Radius of Influence (R_0), was calculated based on the anticipated maximum drawdown required and the highest hydraulic conductivity recorded at the Subject Site using Sichardt's relationship. The equation used is shown as:

$$R_0 = 3000 \times dH \times K^{0.5}$$

Where:

R_0	=	Zone of Influence for dewatering (m)
dH	=	the drawdown (m)
K	=	the hydraulic conductivity (m/s)

7.3.4. Stormwater Flow Estimate

The amount of runoff that could accumulate in the construction excavation was 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 at 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° 59' 15" N, 79° 13' 45" W which are within the Subject Site the rainfall depth considering 2-year storm event over a 3-hour period per day is approximately 30.98 mm and a 100-year storm event over a 12-hour period per day is 103.2 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 basement structure was calculated using the estimated rainfall depth multiplied by the estimated area of the proposed excavation footprint area for the building.

7.4. Preliminary Short-Term Dewatering Flow Rate Estimate

7.4.1. Proposed Mid-Rise Development

The ground surface within the proposed development footprint is relatively flat. The highest ground surface elevation recorded at BH/MW locations is considered for the current dewatering assessment, as proposed grade elevations were not available at the time of the preparation of this report. The base of excavation elevation for the construction of the foundation for the 2-level underground parking structure is considered at El. 283.7 masl, which is 1.5 meters below the assumed lowest Finished Floor Elevation (FFE) of 285.2 masl as recommended by a geotechnical engineer for the construction of the raft foundation. Furthermore, dimensions of the proposed underground parking is not available for review. As such, one (1) excavation box was assumed extending beneath both proposed buildings.

As a conservative approach, the highest known groundwater level, recorded at 287.9 masl recorded in the BH/MW 103, is considered for the current assessment. The highest groundwater level is 2.7 m above the underground parking level 2 FFE. As such, groundwater seepage is anticipated during the excavation and construction of the proposed 2-level underground parking. The hydraulic conductivity of 3.72×10^{-6} m/sec estimated using in-situ hydraulic conductivity testing was considered for Oak Ridge Moraine Aquifer Complex (combined silty sand, sandy silt and sand). Furthermore, hydraulic conductivity for the silty sand till and sandy silt till material is considered at 9.6×10^{-7} using the Hazen equation.

Shoring design is not available for review at the time of preparation of the current report. As such, a permeable shoring system extending along the perimeter of the proposed excavation box has been considered to estimate the groundwater seepage flows for short-term dewatering. The assumptions considered for the dewatering flow rate calculations are summarized in **Tables 7-1** and **7-2**.

Table 7-1 - Summary of the Assumptions for the Proposed Residential and Mixed-Use Development

Proposed Development	Approximate Underground Parking Dimensions (m)	Assumed FFE (masl)	Assumed Base of Excavation (masl)	Assumed Base of Foundation El. (masl)	Groundwater Level (masl)	Assumed Shoring System
Proposed Residential as well as Mixed-use Buildings with 2-level underground parking	130 m x 39 m[1]	285.2	283.7[2]	283.7	287.9	Permeable Shoring

Notes:
mbgs metres below ground surface
masl metres above sea level
[1]Assuming one excavation box extending beneath both proposed buildings
[2]Assumed 1.5 m below the proposed lowest FFE since the raft foundation is proposed in the geotechnical investigation report.

The anticipated groundwater flow rates for short-term dewatering were estimated using a numerical analysis. Slide 9.025, released October 17, 2022, developed by Rocscience Inc., was used to compute the anticipated flow rates utilizing the Finite Element Modelling (FEM) method. The estimated groundwater flow rates, along with the reviewed plans (selected drawings) are presented in **Appendix F (Page 1)**.

Table 7-2 – Summary of the Preliminary Short-Term Dewatering Flow Rates -Mid-Rise Buildings

Proposed Development	Groundwater Seepage (L/day)	Groundwater Seepage -S.F.* 2.0 (L/day)	Anticipated Flow over Storm Event (L/day)	Total Dewatering Flow Rates-S.F. 2.0 (L/day)
Proposed Residential as well as Mixed-use Buildings with 2-level underground parking	335,300.0	670,600.0	157,100.0	827,700.0

*S. F: Safety Factor

Additionally, stormwater flow, considering a 100-year storm event for a duration of 12 hours, was considered to estimate the maximum stormwater that can be collected during the excavation and construction period. The additional flow that can be expected in the occurrence of a 100-year storm event is approximately 523,200.0 L/day during construction.

The preliminary estimated Zone of Influence (ZoI) for dewatering for the proposed mid-rise buildings with the 2-level underground parking is 30.1 m away from the dewatering area, where the drawdown is 5.2 m and hydraulic conductivity is 3.72 x 10^{-6} m/s.

7.4.2. Proposed Underground Services

The following assumptions are considered for the dewatering assessment for the installation of the underground services;

- It is understood that the proposed development will be provided with the underground services.

- The shallow groundwater flow pattern map, prepared based on the groundwater levels measured on April 10, 2023, was utilized for the assessment. Additionally, in some portions of the Subject Site, the actual measured groundwater elevations from the nearby monitoring wells were considered.
- The hydraulic conductivity of 3.72 x 10^{-6} m/sec estimated using in-situ hydraulic conductivity testing was considered for Oak Ridge Moraine Aquifer Complex (combined silty sand , sandy silt and sand) also hydraulic conductivity for the silty sand till and sandy silt till material is considered at 9.6 x 10^{-7} using the Hazen equation.
- The length of the active trench for underground services was assumed to be 50 meters at a nearby monitoring well location as the details were not available at the time of preparation of this report.
- The storm event of 2 years was also considered for the short-term construction dewatering flow rate estimates.
- The dewatering target for the proposed excavation was considered 1.0 m below the proposed deepest excavation to facilitate excavation and construction in dry and stable subsoil conditions.
- The depth of the excavation for the underground services was assumed 4 mbgs as the details were not available for review.

Based on the aforementioned assumptions and the reviewed plans, groundwater seepage is not anticipated along the proposed alignments in the vicinity of BH/MW-1D, BH/MW-3, BH/MW-4, BH/MW-5, and BH/MW-6. However, groundwater seepage is expected in the vicinity of BH/MW-2. **Table 7-3** presents the details considered for the current assessment.

Table 7-3 - Summary of the preliminary Short-Term Dewatering – Proposed Underground Services

	BH/MW 1D	BH/MW 2	BH/MW 104	BH/MW 106	BH/MW 5	BH/MW 6
Proposed Grading El. (masl)	293.24	292.96	292.89	291.92	293.55	292.64
Proposed Invert El. (masl)	289.24	288.96	288.89	287.92	289.55	288.64
Open Trench Dimensions (m)	2.0 x 50	2.0 x 50	2.0 x 50	2.0 x 50	2.0 x 50	2.0 x 50
The highest Recorded Groundwater Level (masl)	287.99	288.50	290.00	288.00	291.05	289.50
Anticipated Groundwater Seepage (L/day) (S.F. 2)*	NE	NE	39,200.0	31,300.0	42,300.0	37,200.0

	BH/MW 1D	BH/MW 2	BH/MW 104	BH/MW 106	BH/MW 5	BH/MW 6
Anticipated Groundwater Seepage with S. F. 2.0 (L/day)	NE	NE	78,400.0	62,600.0	84,600.0	74,400.0
Anticipated Storm Water (L/day)	3,100.0	3,100.0	3,100.0	3,100.0	3,100.0	3,100.0
Total Anticipated Short-Term Dewatering Flow Rate (L/day)	NE	NE	81,500.0	65,700.0	87,700.0	77,500.0
Anticipated Conceptual ZOI for Dewatering (m)	NE	NE	12.2	6.2	14.5	10.8
Maximum Anticipated Drawdown (m)	NE	NE	2.1	1.1	2.5	1.9

Notes:
mbgs metres below ground surface
masl metres above sea level
*S.F.: Safety Factor

The summary of construction dewatering flow rates for the underground services is presented in **Appendix F** (**Pages 2**).

The anticipated dewatering flow rates, including groundwater seepage with a safety factor of 2.0 during storm events with a duration of 3 hr/day for up to 50 m of active excavation trench for the proposed underground service installation, range from 65,600.0 to 87,700.0 L/day. Furthermore, as presented in **Table 7-3** construction of the services will be completed above shallow groundwater table, where the anticipated discharge flow that is only expected during storm event can reach up to 3,100.0 L/day for an open trench with dimensions of 2.0 m by 50.0 m.

Furthermore, the estimated flow rates are based on the highest recorded shallow groundwater table. As such, if excavation and construction of the proposed underground services are completed during summer and fall, lower or no groundwater seepage is expected.

Additionally, a potential 100-year storm event with a duration of 12 hours is expected to reach up to 10,400.0 L/day, considering a maximum active trench with dimensions and width as mentioned in the above tables (2.0 m x 50 m).

7.4.3. Proposed Townhouse Development

The following are the assumptions and proposed development details for the preliminary short-term construction dewatering estimate for the proposed townhouse blocks.

The comparison of the groundwater contour map against the assumed base of the excavation for the construction of the basements indicates that groundwater seepage control will not be required for the construction of the majority of the town house blocks except the townhouses proposed near the BH/MW 5 area where the monitoring well was screened within the glacial till. Additionally, the storm

flow rates during construction are calculated and are provided in **Table 7-4**.

The following assumptions were used for the preliminary dewatering assessment for the Residential blocks,

- The proposed residential development will include townhouse blocks, as indicated in the development plan.
- It is understood that the residential units will be provided with one-level basement structures. The base of excavation for the construction of the proposed basements was considered at a depth of 3.0 metres below the proposed grading level.
- Excavation boxes with different dimensions were considered for proposed blocks as specified in **Table 7-4**.
- For the assessment of the short-term dewatering flow rate, the highest recorded shallow groundwater elevation from the interpreted groundwater contour map located in the vicinity of the proposed blocks or the residential structure was utilized.
- The shallow groundwater flow pattern map, prepared based on the stabilized groundwater levels measured on April 10, 2023 was utilized for the assessment.
- The storm event of 2 years -3 months was also considered for the short-term construction dewatering.

Details of assumptions based on a review of the provided drawings and findings of the current groundwater monitoring and subsurface investigations that were considered for each proposed townhouse block are presented in **Table 7-4**.

Table 7-4 - Summary of the preliminary Short-Term Dewatering – Proposed Townhouse Blocks

	BHMW 1 RLTH (5.6 m)	BH/MW 2 RLTH (5.6 m)	BH/MW 104 B2B (6.4 m)	BH/MW 4 RLTH (6.1 m)	BH/MW 5 RLTH (6.1 m)	BH/MW 6 RLTH (6.1 m)
Proposed Grading El. (masl)	293.24	292.96	292.89	291.92	293.83	292.25
Assumed Base of Excavation for Construction of Basement and Footigs (masl)	290.24	289.96	289.89	288.92	290.83	289.25
Assumed Excavation Length (m)	19.57	19.57	21.88	19.62	21.02	19.59
Assumed Excavation Width (m)	28.00	28.00	44.10	36.60	30.50	36.60
The highest Recorded Groundwater Level (masl)	288.09	288.55	288.29	288.00	291.00	288.50
Anticipated Groundwater Seepage (L/day) (S.F.2.0)*	NE	NE	NE	NE	12,200.0	NE
Anticipated Storm Water (L/day)	17,000.0	17,000.0	29,900.0	22,300.0	19,900.0	22,300.0
Total Anticipated Short-Term Dewatering Flow Rate (L/day)	17,000.0	17,000.0	29,900.0	22,300.0	32,100.0	22,300.0

	BHMW 1 RLTH (5.6 m)	BH/MW 2 RLTH (5.6 m)	BH/MW 104 B2B (6.4 m)	BH/MW 4 RLTH (6.1 m)	BH/MW 5 RLTH (6.1 m)	BH/MW 6 RLTH (6.1 m)
Anticipated Conceptual ZOI for Dewatering (m)	NE	NE	NE	NE	3.4	NE
Maximum Anticipated Drawdown (m)	NE	NE	NE	NE	1.2	NE

Notes:
mbgs metres below ground surface
masl metres above sea level
*S.F.: Safety Factor

The groundwater seepage including safety factor of 2 and 2-year storm event with a duration of 3 hr is expected to reach up to 32,100.0 L/day.

Additionally, a potential 100-year storm event with a duration of 12 hours is expected to range from 56, 600.0 L/day to 99,700.0 L/day, considering the active excavation area dimensions outlined in the table above.

7.4.4. Proposed Stormwater Management Pond

A review of the preliminary grading plan dated April 2026 indicates that the proposed access road for the stormwater block is located within the stormwater block area of the Subject Site. Furthermore, a comparison of the proposed road elevations with the highest recorded groundwater elevations indicates that dewatering will not be required for the proposed access road or for the partial excavation associated with the proposed stormwater management pond. Additionally, a review of the grading plan indicates that the majority of proposed excavation area for the proposed stormwater management block is located in the adjacent site.

7.5. Preliminary Long-Term Foundation Drainage Flow Rate Estimate

7.5.1. Proposed Mid-Rise Development

Based on the review of the geotechnical assessment report dated March 2026, it recommended that if the foundation of the building is below water table, then the proposed structure should be water proofed. As such, for no long-term dewatering is required for the proposed mid-rise development.

7.5.2. Proposed Townhouse Development

It is understood that, in accordance with Town of Whitchurch- Stouffville policy, long-term foundation drainage collection using sump and pumping systems is not permitted. A minimum separation of 0.6 m is required between the seasonal high groundwater level and the underside of footings or foundations; otherwise, the underground structure must be fully waterproofed to eliminate the need for long-term foundation drainage control.

A review of the assumed underside-of-footing elevations for the proposed townhouse blocks relative to the highest recorded shallow groundwater levels indicates that the majority of the blocks meet this criterion. An exception applies to the townhouses proposed near the BH/MW5 area when compared against the highest recorded shallow groundwater level measured during the spring season. BH/MW 5 was installed within the glacial till unit, where coarse material and occasional silt seems and layers

were contacted within the well screen interval. It is expected that the shallow groundwater table in the monitoring well is under direct impression of the precipitation, and the reported silt seems and coarse material that were contacted within the screen interval, facilitate the infiltration due to the precipitation. As such, the high recorded groundwater table during one monitoring event is considered local and temporary.

As discussed above, the highest groundwater elevation of 291.07 masl was recorded during a single event on April 10, 2023, over the course of the multi-year groundwater monitoring program. During the remainder of the monitoring period, the groundwater levels at this monitoring well location were observed to be near-bottom of the monitoring well, with recorded elevations ranging from 289.94 masl to below <289.74 masl. As such, based on the overall monitoring data, significant long-term foundation drainage is not anticipated as the proposed townhouse blocks will be constructed within the glacial till. Nevertheless, long-term foundation drainage flow rates have been calculated for information purposes.

The following are the assumptions and proposed development details for the preliminary long-term foundation drainage flow rate estimate for the proposed townhouse blocks.

The comparison of the groundwater contour map against the assumed base of the excavation for the construction of the basements indicates that groundwater seepage control will not be required for the construction of majority of the townhouse blocks except the townhouses proposed in the area near BH/MW 5 location. Additionally, the storm flow rates during construction are calculated and are provided in **Table 7-5**.

The following assumptions were used for the preliminary long-term foundation drainage assessment for the Residential blocks,

- The proposed residential development will include townhouse blocks, as indicated in the development plan.
- It is understood that the residential units will be provided with one-level basement structures. The base of excavation for the construction of the proposed basements was considered at a depth of 3.0 metres below the proposed grading level.
- Excavation boxes with different dimensions were considered for proposed blocks as specified in **Table 7-5**.
- For the assessment of the long-term foundation drainage flow rate, the highest recorded shallow groundwater elevation from the interpreted groundwater contour map located in the vicinity of the proposed blocks or the residential structure was utilized.
- The shallow groundwater flow pattern map, prepared based on the stabilized groundwater levels measured on April 10, 2023 was utilized for the assessment.
- The storm event of 2 years with a duration of 3 hours was also considered to estimate the infiltration rate along the perimeter of the proposed blocks.

Details of assumptions based on a review of the provided drawings and findings of the current groundwater monitoring and subsurface investigations that were considered for each proposed townhouse block are presented in **Table 7-5**.

Table 7-5 - Summary of the preliminary Long-term foundation drainage – Proposed Townhouse Blocks

	BHMW 1 RLTH (5.6 m)	BH/MW 2 RLTH (5.6 m)	BH/MW 104 B2B (6.4 m)	BH/MW 4 RLTH (6.1 m)	BH/MW 5 RLTH (6.1 m)	BH/MW 6 RLTH (6.1 m)
Proposed Grading El. (masl)	293.24	292.96	292.89	291.92	293.83	292.25
Assumed Base of Footings (masl)	290.24	289.96	289.89	288.92	290.83	289.25
Assumed Basement Length (m)	19.57	19.57	21.88	19.62	21.02	19.59
Assumed Basement Width (m)	28.00	28.00	44.10	36.60	30.50	36.60
The highest Recorded Groundwater Level (masl)	288.09	288.55	288.29	288.00	291.00	288.50
Anticipated Groundwater Seepage (L/day) (S.F. 2)*	NE	NE	NE	NE	11,000.0	NE
Anticipated Infiltration (L/day)	3,000.0	3,000.0	4,100.0	3,500.0	3,200.0	3,500.0
Total Anticipated Long-Term Flow Rate (L/day)	3,000.0	3,000.0	4,100.0	3,500.0	14,500.0	3,500.0
Anticipated Conceptual ZOI for Dewatering (m)	NE	NE	NE	NE	0.5	NE
Maximum Anticipated Drawdown (m)	NE	NE	NE	NE	0.2	NE

Notes:
mbgs metres below ground surface
masl metres above sea level
*S.F.: Safety Factor

The groundwater seepage is not anticipated for the proposed townhouse blocks. However, a potential groundwater seepage with a safety factor of 2.0 and infiltration may reach up to 14,500.0 L/day for proposed townhouse blocks within the vicinity of BH/MW 5.

Based on a review of the long-term foundation drainage assessment, Town policy requires a minimum separation of 0.6 m between the underside of footing and the seasonal high groundwater level, otherwise waterproofing is required and long-term foundation drainage is not permitted. A comparison of the assumed footing elevations with the monitored groundwater levels indicates that the majority of the townhouse blocks meet this separation requirement where there is a separation ranging between 0.7 m and 2.15 m, with a localized exception near BH/MW5 associated with a single groundwater peak event over multiple years of monitoring program. At this location overall, groundwater levels were observed to remain near-dry for most of the multi-year monitoring period. As such, significant long-term foundation drainage from groundwater source is not anticipated for the proposed townhouse block within the vicinity of BH/MW 5 that was installed within the glacial till as previously explained; however, long-term foundation drainage flow rate has been calculated for information purposes.

7.6. Permit Requirements

Short-Term Construction Dewatering: Based on the recent amendment to O.Reg. 63/16, which came into effect on July 1, 2025, an EASR registration will be required if water takings of more than 50,000 L/day are required. If it is identified that an EASR is required for the Subject Site, a hydrogeological assessment report will need to be submitted in support of the application. **Table 7-6** summarises the findings of the preliminary short-term dewatering assessment.

Table 7-6 – Summary of Preliminary MECP EASR and Permit Requirement

Proposed Development	Estimated Maximum Dewatering Flow Rates with safety factor and Storm Event	Permit Requirements
Mid-Rise Development with 2-Level Under Ground Parking	827,700.0	Filing EASR Required with the MECP. Obtaining Discharge Permit from Township of Stouffville/Region of York is required, if short-term dewatering effluent is proposed to be conveyed to the city's or region's sewer system.
Underground Services	65,600.0 to 87,700.0 L/day	Filing EASR Required with the MECP. Obtaining Discharge Permit from Township of Whitchurch-Stouffville/Region of York is required, if short-term dewatering effluent is proposed to be conveyed to the town's or region's sewer system
Town House Development	32,100.0 L/day	Filing EASR is not Required with the MECP. Obtaining Discharge Permit from Township of Whitchurch-Stouffville/Region of York is required, if short-term dewatering effluent is proposed to be conveyed to the town's or region's sewer system

Long-Term Foundation Drainage: As per the recent amendment to O.Reg. 387/04 that came into effect on July 1, 2025, PTTW registration will be required if the water taking exceeds 379,000.0 L/day. Assuming waterproofing the mid-rise buildings, long-term foundation drainage is not expected for the proposed mid-rise building.

Furthermore, the maximum estimated long-term foundation drainage flow rate of 14,500.0 L/day is below the MECP PTTW threshold limit of 379,000.0 L/day for the proposed townhouse block within the vicinity of BH/MW5. As such, applying for PTTW with MECP is not required. However, obtaining a discharge agreement from the Region of York is required if the foundation drainage is proposed to be conveyed to the Town or Region's sewer system.

Additionally, based on a review of the long-term foundation drainage assessment, Town policy requires a minimum separation of 0.6 m between the underside of footing and the seasonal high groundwater level, otherwise waterproofing is required and long-term foundation drainage is not permitted. A comparison of the proposed footing elevations with the monitored groundwater levels indicates that the majority of the townhouse blocks meet this separation requirement, with a localized exceedance near BH/MW5 associated with a single groundwater peak event. Overall, groundwater

levels were observed to remain near-dry for most of the multi-year monitoring period. As such, significant long-term foundation drainage from groundwater source is not anticipated for the proposed townhouse blocks; however, long-term foundation drainage flow rates have been calculated for information purposes.

7.7. Potential Dewatering Impacts and Mitigation Plan-Preliminary

7.7.1. Short-Term Discharge Water Quality

Groundwater quality results were evaluated against the Region of York Storm and Sanitary Sewer Use By-Law standards and Provincial Water Quality Objectives (PWQO), with the following key findings:

- Unfiltered groundwater samples showed exceedances of total manganese (BH/MW-2) and Total Suspended Solids (TSS) and chloroform (BH/MW-102) when compared against storm sewer discharge limits, while all parameters met the sanitary sewer use standards.
- Filtered groundwater samples from above noted monitoring wells met the Region of York Sorm Sewer Use By-Law.
- Comparison of groundwater samples against PWQO identified exceedances in unfiltered samples for nonylphenol, bis(2-ethylhexyl)phthalate, polychlorinated biphenyls (PCBs), total iron, total lead, total phosphorus, and 4AAP-phenolics, indicating that short-term dewatering effluent may require pre-treatment prior to discharge to the natural environment, subject to regulatory approval.

7.7.2. Ground Settlement

The conceptual Zone of Influence (ZOI) for dewatering is estimated to extend approximately 30.1 m, 14.5 m from the dewatering area associated with the proposed mid-rise development and proposed underground services.

A portion of Tenth Line and the driveway at 12875 Tenth Line are located within the conceptual Zone of Influence (ZOI) associated with the proposed mid-rise building, which includes two levels of underground parking. As a result, there is a potential risk of ground settlement affecting nearby infrastructure due to dewatering activities. However, given that the project is currently at an early stage and detailed design information for the building is not yet available, the assessment and associated recommendations should be revisited and refined once the detailed design has been completed. In addition, there are no existing structures located within the ZOI for the proposed underground services.

7.7.3. Surface Water, Wetlands and Areas of Natural Significance

A records review indicates that the wetland and woodland areas associated with the unevaluated wetland and the tributary of Reesor Creek are located at the eastern end of the Subject Site, outside the proposed development limits and beyond the conceptual Zone of Influence (ZOI) associated with the proposed development. Accordingly, no impacts to these natural heritage features are anticipated.

7.7.4. Water Supply Wells and Zone of Influence

A review of MECP well records indicates that two (2) water supply wells are registered within the Subject Site. However, the water supply wells were not identified during the field investigation. Since the wells are located within the footprint of the proposed development, if encountered during earthworks, it should be properly decommissioned. Additionally, no water supply wells are located within the conceptual Zone of Influence (ZOI).

Considering the early stage of the project, it is recommended a private water supply well monitoring program is conducted a couple of months in advance of construction.

8. PRE AND POST DEVELOPMENT WATER BALANCE ASSESSMENT

8.1. Pre- and Post-Development Water Balance Assessment

A pre- and post-development water balance analyses were completed to compare pre-development and post-development hydrological conditions to evaluate potential changes in recharge and runoff volumes due to the proposed development. The discussion below provides details on the methodology used and the results obtained from the analysis. A summary of the calculations is provided in **Appendix G**.

8.2. Site Water Balance Component

A site-scale water balance analysis was completed following the Toronto and Region Source Protection Authority (TRSPA) tool provided by TRCA. The water balance method roughly estimates annual evapotranspiration, infiltration and runoff volumes. The modified water balance components were used for the pre- and post-development water balance analyses. **Table 9-1** summarizes the details for the water balance parameters adopted from the TRSP tool.

Table 8-1- Summary of Water Balance Components

Precipitation (mm/year)	Evapotranspiration (mm/year)	Infiltration (mm/year)	Runoff (mm/year)
867	491	253	123

8.3. Methodology

A site-scale water balance analysis was completed in order to estimate the components of the hydrological cycle for the Subject Site, and was modelled using the following equation:

$$P = DGS + ET + R + I$$

Where:

P= Precipitation, which represents the sum of all rainfall and snowfall

DGS=Change in groundwater storage

ET= Evapotranspiration

R= Runoff

I= Infiltration

Based on the TRCA tool; (https://trca.ca/conservation/drinking-water-source-protection/trspa-water-balance-tool/), the evapotranspiration in pervious areas at the Site is 491 mm/yr, runoff is 123 mm/yr and infiltration (groundwater recharge) is 253 mm/yr.

Although groundwater storage experiences both gains and losses on a short-term basis, the net change in groundwater storage (DGS) over the long-term is generally zero. For this reason, the change in groundwater storage (zero (0)) has not been included in the water balance calculations.

Evapotranspiration (ET) refers to the transfer of water from vegetation and the soil surface to the

atmosphere in the form of water vapour. The term considers evaporation from the soil surface and from man-made surfaces together with transpiration from plants.

8.4. Site Water Balance Component

Water balance analyses were completed for pre-development and post-development conditions, separately, with the details presented below:

8.4.1. Pre-Development Water Balance

The Subject Site is currently used as a farm field. Based on a review of the pre- and post-development areas provided via email on March 12, 2026, from SCS Consulting Group, the total Subject Site area is 10,570.0 m^2. The pre-development water balance for the Subject Site is calculated by multiplying the existing undeveloped Site areas (Landscaped and Existing Green Areas) by the various, averaged annualized depth estimates for precipitation, ET, infiltration and runoff. The average annual area-based estimates for each water balance component are summarized in **Table 8-2**.

Table 8-2 - Summary of Pre-Development Volumetric Water Balance Components

Pre-Development Site Breakdown Areas	Coverage Area (m^2)	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Impervious Surfaces (Buildings, Roads, Parking Lot and paved areas)	0.00	0.00	0.00	0.00	0.00
Pervious Surfaces (Green Areas)	50,660.00	43,922.22	24,874.06	12,816.98	6,231.18
Total	50,660.00	43,922.22	24,874.06	12,816.98	6,231.18

8.4.2. Post-Development Water Balance

The total Subject Site area for the post-development is 50,660.0 $m^{2,}$ out of which the impervious area and pervious areas of 11,689.0 m^2 and 38,971.0 m^2 are proposed, respectively. The post-development change in impervious areas was obtained by referencing the pre- and post-development plans provided via email on March 12, 2026, from SCS Consulting Group.

The post-development water balance is calculated using the same depth-based components that were used for the pre-development water balance calculations, i.e., average annual precipitation and average annual ET. The estimates for runoff and ET for impervious surfaces are 90% and 10% of the average annual precipitation, respectively. The estimated post-development water balance volumes are provided in **Table 8-3** below. The existing and proposed building coverage area was obtained by reviewing the pre- and post-development plans provided via email on March 12, 2026, from SCS Consulting Group.

Table 8-3 - Summary of Post-Development Volumetric Water Balance Components

Post-Development Site Breakdown Areas	Coverage Area (m^2)	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Proposed Impervious Area (Parks-Hard Landscape)	705.00	611.24	61.13	0.00	550.11

Post-Development Site Breakdown Areas	Coverage Area (m^2)	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Proposed Impervious Area (Rear Lot Townhouses-RLTH)	13,882.00	12,035.69	1,203.57	0.00	10,832.12
Proposed Impervious Area (Back to Back Townhouse-B2B)	5,706.00	4,947.10	494.71	0.00	4,452.39
Proposed Impervious Area (Mixed Use Residential Area)	7,104.00	6,159.17	615.92	0.00	5,543.25
Proposed Impervious Area (8.5 m Lane Way)	8,495.00	7,365.17	736.52	0.00	6,628.65
Proposed Impervious Area (20 m ROW)	2,154.00	1,867.52	186.75	0.00	1,680.77
Proposed Impervious Area (SWM Block)	925.00	801.98	80.20	0.00	721.78
Proposed Pervious Area (Parks)	3,995.00	3,463.67	1,961.54	1,010.74	491.38
Proposed Pervious Area (Rear Lot Townhouses-RLTH)	1,542.00	1,336.91	757.12	390.12	189.67
Proposed Pervious Area (Back to Back Townhouse- B2B)	634.00	549.68	311.30	160.40	77.98
Proposed Pervious Area (Mixed Use Residential Area)	547.00	474.25	268.58	138.39	67.28
Proposed Pervious Area (20 m ROW)	1,466.00	1,271.02	719.80	370.90	180.32
Proposed Pervious Area (SWM Block)	925.00	801.97	454.17	234.02	113.78
Proposed Pervious Area (Open Space/ Environmental Area/Future Development	2,580.00	2,236.86	1,266.78	652.74	317.34
Total	50,660.00	43,922.22	9,118.09	2,957.31	31,846.82

8.5. Site Water Balance

The volumetric comparisons in evapotranspiration, infiltration and runoff between the pre-developed and post-developed Site are summarized in **Table 8-4**.

Table 8-4- Pre- and Post-Development Volumetric Water Balance Gain/Loss

	Precipitation (m^3/year)	Evapotranspiration (m^3/year)	Infiltration (m^3/year)	Run off (m^3/year)
Pre-Development	43,922.22	24,874.06	12,816.98	6,231.18
Post-Development	43,922.22	9,118.09	2,957.31	31,846.82
Loss (-) and Gain (+)		-15,755.97	-9,859.67	25,615.64

A review of the findings indicates that a total decrease of 15,755.97 m^3/year and 9,859.67 m^3/year for ET and infiltration, respectively, and an increase of 25,615.64 m^3/year for runoff are expected for the post-development Site.

Pre- and post-water balance components for the Subject Site were also assessed. The results are presented in **Table 8-5**

Table 8-5- Pre- and Post-Development Water Balance Components Gain/Loss

Pre-Development Site Breakdown Areas	Precipitation (mm/year)	Evapotranspiration (mm/year)	Infiltration (mm/year)	Run off (mm/year)
Pre-Development	867.00	491.00	253.00	123.00
Post-Development	867.00	179.98	58.38	628.64
Loss (-) and Gain (+)	-	-311.02	-194.62	505.64

A review of **Table 8-5** indicates that a total loss of 63 % and 77% in ET and infiltration, and a total gain of 411% is anticipated in runoff for the post-development Subject Site, respectively.

9. CONCLUSION

- The Subject Site lies within the Physiographic Region of Southern Ontario known as the South Slope, which is mapped on the drumlinized till plain, surficial physiographic feature.
- The Subject Site is located within the West Duffins Sub-Watershed of the Duffins Creek Watershed.
- The Subject Site is located within the Settlement Area of the Oak Ridges Moraine Planned Area. A record of wetland feature is shown east of the Subject Site along Reesor Creek. This wetland has not been evaluated per the Ontario Wetland Evaluation System (OWES) and is not considered to be Provincially Significant. Furthermore, bodies of water are scattered around the Subject Site, that are associated with these non-evaluated wetland features. Reesor Creek, which is located adjacent to the east boundary of the Subject Site, flows in a north/northwest-to-south/southeast direction, and Stouffville Creek, which originates about 100 m west of the Subject Site, flows in a north/northeast-to-south/southwest direction. Both of these tributaries drain into the West Duffins Creek. Wooded areas can also be found along the banks of the nearby watercourses (Reesor Creek).
- A review of the local topography ground surface exabits an overall easterly direction, towards the wetland and the tributary of Reesor Creek, located adjacent to the east boundary of the Subject Site.
- This study has disclosed that beneath the topsoil horizon, and a layer of ploughed soil or earth fill, the Subject Site underlain by native strata of sandy silt till, and silty clay/ silty clay till, overlaying deposits of sand and silt extending to the maximum depth of the subsurface investigation.
- The findings of this study confirm that the measured groundwater level elevation ranged from 291.07 masl to <285.65 masl. The interpreted shallow groundwater flow pattern indicates that shallow groundwater partially within till material and partially within top of the sand and silt deposit beneath the Subject Site flows mainly in southwesterly direction. Furthermore, a review of the interpreted deep groundwater flow direction for the sand aquifer indicates that groundwater flows mainly in a south to southeasterly direction. Furthermore, a review of the recorded groundwater table in the shallow monitoring wells (Series 1, i. e. 1) against the nearby deep monitoring wells (Series 2 i.e. 100) indicates relatively similar groundwater table in both series of the monitoring wells.
- The single well response tests provided hydraulic conductivity (K) estimates that range from 1.3×10^{-5} to 1.1×10^{-6} m/sec for the subsoil units at the depths of the monitoring well screens.
- Based on the preliminary short-term dewatering assessment, the proposed mid-rise development with two levels of underground parking, with an estimated dewatering flow rate of 827,700.00, will require Environmental Activity and Sector Registry (EASR) registration,

along with obtaining a discharge permit from the Town of Whitchurch- Stouffville and/or the Region of York is required if short-term dewatering effluent is proposed to be discharged to the municipal or regional sewer system.

- The proposed underground services, with a maximum estimated flow rate of 87,700.0 L/day require EASR registration. Also obtaining a discharge permit from the Township of Whitchurch-Stouffville and/or the Region of York is required if short-term dewatering effluent is proposed to be discharged to the municipal or regional sewer system.
- The groundwater seepage including safety factor of 2 and 2-year storm event with a duration of 3 hr is expected to reach up to 32,100.0 L/day for construction of a townhouse block proposed within the vicinity of BH/MW 5, with the remaining blocks will be constructed above shallow groundwater table. Therefore, filing EASR with the MECP is not required. Obtaining Discharge Permit from Town of Whitchurch-Stouffville/Region of York is required, if short-term dewatering effluent is proposed to be conveyed to the town's or region's sewer system.
- Assuming waterproofing the underground parking of the mid-rise buildings, long-term foundation drainage is not expected. As such, obtaining a permit from the MECP, Region of York/Town of Whitchurch-Stouffville is not required.
- Based on the long-term foundation drainage assessment, all of the proposed townhouse blocks will be constructed above shallow groundwater table with an exception of one (1) block proposed within the vicinity of BH/MW 5. The maximum estimated foundation drainage flow rate of 14,500 L/day is calculated for the above noted townhouse block, which is well below the MECP PTTW threshold of 379,000 L/day; therefore, applying for a PTTW with the MECP is not required for the proposed townhouse block. However, a discharge agreement with the Town of Whitchurch-Stouffville or Region of York will be required if foundation drainage is conveyed to the town or region's sewer system. Town policy requires a minimum 0.6 m separation between the underside of footings and the seasonal high groundwater level. There is a separation ranging between 0.7 m and 2.15 m for the proposed townhouse blocks, with an exemption for a proposed townhouse block within the vicinity of BH/MW5 associated with a single groundwater peak event. As such, the recorded groundwater level is considered local and temporary. The estimated long-term foundation drainage flow rate for the above noted proposed townhouse block is based on the highest recorded groundwater level in BH/MW 5. At this location overall, groundwater levels were observed to remain near-dry for most of the multi-year monitoring period except for one (1) monitoring event. As such, significant long-term foundation drainage from groundwater source is not anticipated for the proposed townhouse block within the vicinity of BH/MW 5 that was installed within the glacial till that is under impression of the precipitation.
- Groundwater quality results were evaluated against the Region of York Storm and Sanitary

Sewer Use By-Law standards and Provincial Water Quality Objectives (PWQO), with the following key findings:

- Unfiltered groundwater samples showed exceedances of total manganese (BH/MW-2) and Total Suspended Solids (TSS) and chloroform (BH/MW-102) when compared against storm sewer discharge limits, while all parameters met the sanitary sewer use standards.
- Filtered groundwater samples from above noted monitoring wells met the Region of York Sorm Sewer Use By-Law.
- Comparison of groundwater samples against PWQO identified exceedances in unfiltered samples for nonylphenol, bis(2-ethylhexyl)phthalate, polychlorinated biphenyls (PCBs), total iron, total lead, total phosphorus, and 4AAP-phenolics, indicating that short-term dewatering effluent may require pre-treatment prior to discharge to the natural environment, subject to regulatory approval.

- The conceptual Zone of Influence (ZOI) for dewatering is estimated to extend approximately 30.1 m, 14.5 m , and 3.4 m from the dewatering area associated with the proposed mid-rise development, underground services a and proposed townhouse development. portion of Tenth Line and the driveway at 12875 Tenth Line are located within the conceptual Zone of Influence (ZOI) associated with the proposed mid-rise building, which includes two levels of underground parking. As a result, there is a potential risk of ground settlement affecting nearby infrastructure due to dewatering activities. However, given that the project is currently at an early stage and detailed design information for the building is not yet available, the assessment and associated recommendations should be revisited and refined once the detailed design has been completed.
- A records review indicates that the wetland and woodland areas associated with the unevaluated wetland and the tributary of Reesor Creek are located at the eastern end of the Subject Site, outside the proposed development limits and beyond the conceptual Zone of Influence (ZOI) associated with the proposed development. Accordingly, no impacts to these natural heritage features are anticipated.
- A review of MECP well records indicates that two (2) water supply wells are registered within the Subject Site. However, the water supply wells were not identified during the field investigation. Since the wells are located within the footprint of the proposed development, if encountered during earthworks, it should be properly decommissioned. Additionally, no water supply wells are located within the conceptual Zone of Influence (ZOI). Considering the early stage of the project, it is recommended a private water supply well monitoring program is conducted a couple of months in advance of construction.
- A review of the findings indicates that a total decrease of 15,755.97 m^3/year and 9,859.67 m^3/year for ET and infiltration, respectively, and an increase of 25,615.64 m^3/year

for runoff are expected for the post-development Site.

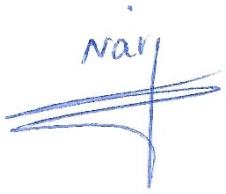
10. Closure

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.

Amar Deep Regmi, M.Sc.
Project Coordinator

Yogirajsinh Rana, B.Sc., C.Tech.
Project Manager



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

11. REFERENCES

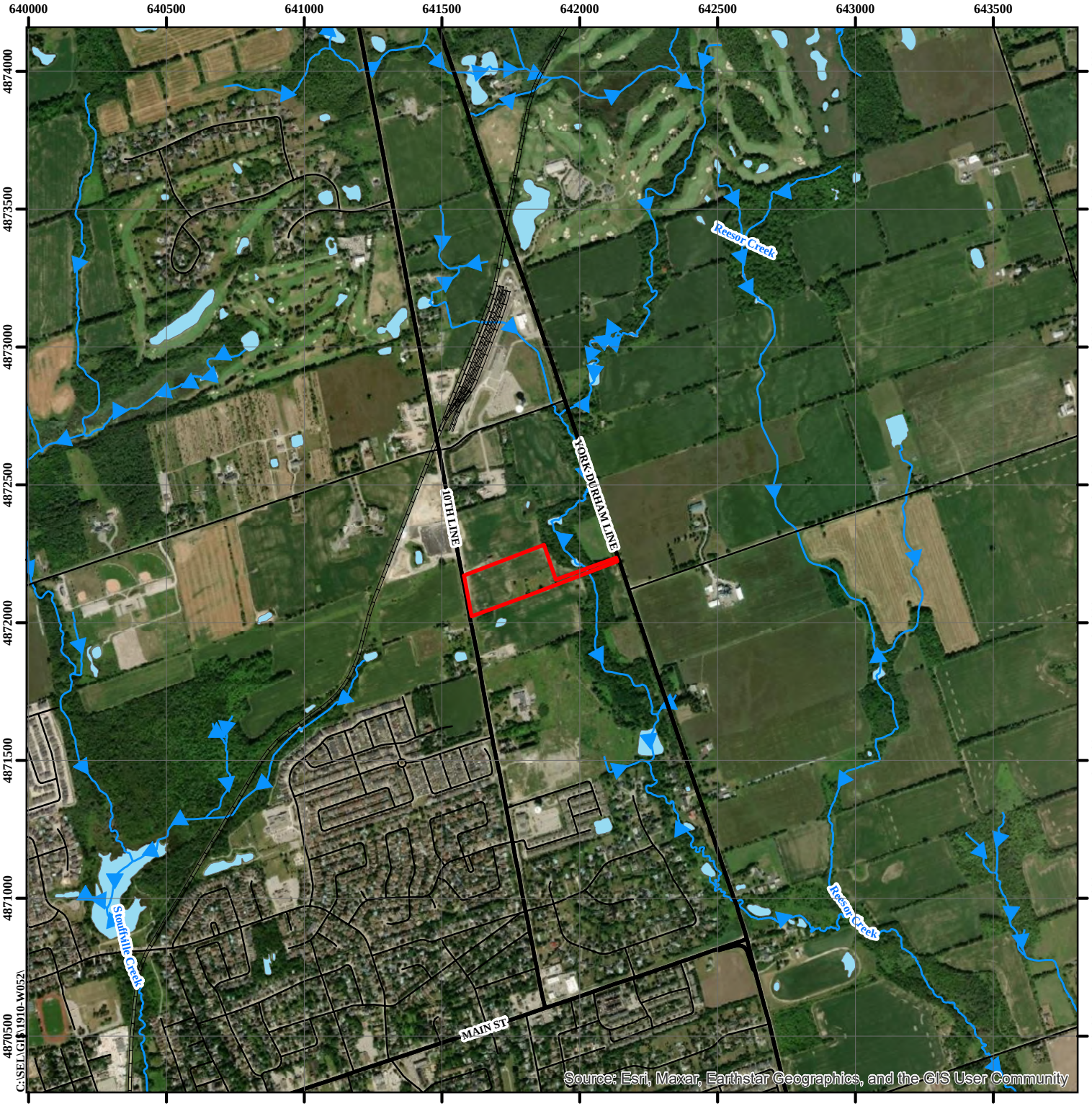
1. The Physiography of Southern Ontario (Third Edition), L. J. Chapman and D. F. Putnam, 1984.
2. Bedrock Geology of Ontario, 1993, Data set 6, Ministry of Northern Development
3. Holden, K. M., Thomas, J. and Karrow, P.K., 1992 Bedrock Topography of the Markham Area, Southern Ontario, Ontario Geological Survey, Open file map 196, Scale 50,000
4. Chapman, L.J. and D.F. Putnam, 1984. The Physiography of Southern Ontario. Ontario.
5. Freeze, A. and Cherry, J., 1979. Groundwater, Prentice-Hall Inc., New Jersey.
6. Geological Survey. Ontario Geological Survey (OGS), 2003. Surficial Geology of Southern Ontario. Miscellaneous Release – Data 128 – revised.
7. Geological Survey. Ontario Geological Survey (OGS), 2007. Bedrock Geology of Ontario. Miscellaneous Release – MRD 219.
8. Ministry of the Environment, Conservation and Parks, 2026, Source Protection Information Atlas Interactive Map.
9. Ministry of Natural Recourses and Forestry, 2026. Natural Heritage Interactive Map.
10. Toronto and Region Conservation Authority, 2026, 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	GRAVENHURST	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. 1910-W052



N

Legend

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

Soil Engineers Ltd.

Title: Site Location Plan

Project:
Hydrogeological Assessment
Proposed Residential Development
12811 Tenth Line Town of
Whitchurch-Stouffville

Reference No. 1910-W052

Date: May 19, 2023

Scale:
0 80 160 320 480 640 800
Metres

Drawing No. 1

Source: Ontario Ministry of Natural Resources and Forestry

641600
641800
642000
4872200
4872000

BH/MW 101
BH/MW 1D
BH/MW 1S
BH/MW 102
BH/MW 103
BH/MW 2
BH/MW 3
BH/MW 104
BH/MW 105
BH/MW 4
BH/MW 106
BH/MW 5
BH/MW 6
BH/MW 7D
BH/MW 7S

RESIDENTIAL BUILDING 4 ST 84 Units
RESIDENTIAL BUILDING 4 ST 77 Units
6.4m B2B THs 12 units
6.4m B2B THs 14 units
6.4m B2B THs 10 units
6.4m B2B THs 10 units
5.6m RLTHs 5 units
5.6m RLTHs 5 units
5.6m RLTHs 4 units
5.6m RLTHs 5 units
6.1m RLTHs 4 units
6.1m RLTHs 5 units
6.1m RLTHs 6 units
6.1m RLTHs 6 units
6.1m RLTHs 6 units
6.1m RLTHs 6 units
6.1m RLTHs 6 units

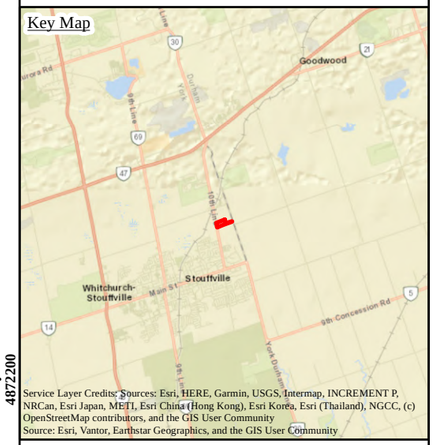
ENVIRONMENTAL LANDS 0.032 ha
PARK 0.470 ha
WOODLOT
OPEN SPACE
FUTURE DEVELOPMENT BLOCK 0.040 ha
ENVIRONMENTAL LANDS - 0.152 ha
STORMWATER MANAGEMENT POND - 0.185 ha
Tributary of Reesor Creek
YORK-DURHAM LINE
10TH LINE
STREET 'A'
FUTURE
FUTURE
20
20

D:\Previous gis\GIS 2\1910-W052\

N

References: Ontario Ministry of Natural Resources and Forestry
© King's Printer for Ontario, 2025

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, Vantor, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site
- Major Road
- Waterbody
- Watercourse
- 2022 Borehole and Monitoring Well (6)
- 2020 Borehole and Monitoring Well (9)

Soil Engineers Ltd.

Borehole and Monitoring Well Location Plan

Hydrogeological Assessment
Proposed Midrise Buildings
with 1 to 2 - levels of Underground Garage
12779 and 12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

Date: April 06, 2026

Scale:
0 10 20 40 60 80 100
Metres

Drawing No. 2

641000 641500 642000 642500

4872500 4872000 4871500

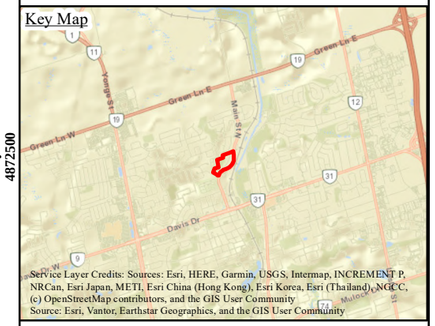
BETHESDA ROAD
10TH LINE
YORK-DURHAM LINE
WEBB ROAD
GREENWOOD ROAD
FLUTE STREET
NOAHS FARM TRAIL
FORSYTH FARM DRIVE
CLARINET LANE
DRUM STREET
Reesor Creek

D:\Previous gis\GIS 21910-W052\

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) King's Printer for Ontario, 2026. Water Well Information System Ministry of the Environment, Conservation and Parks, 2026

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, Vantor, Earthstar Geographics, and the GIS User Community

Legend

- 500 Metres From Subject Site Boundary
- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Waterbody
- Watercourse
- Unknown (21)
- Abandoned-Other (3)
- Dewatering (1)
- Observation Wells (22)
- Other Status (15)
- Test Hole (4)
- Water Supply (19)

Soil Engineers Ltd.

MECP Well Location Plan

Hydrogeological Assessment
Proposed Midrise Buildings
with 1 to 2 - levels of Underground Garage
12779 and 12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

Date: March 27, 2026

Scale:

0 30 60 120 180 240 300
Metres

Drawing No 3.

N

Legend

- Approximate Boundary of Subject Site
- Halton Till
  Material: predominantly silt to silty clay matrix, high in matrix carbonate content and clast poor
- Major Road
- Local Road
- Railway

Soil Engineers Ltd.

Title: Quarternary and Surface Geology Map

Project:

Hydrogeological Assessment
Proposed Residential Development
12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

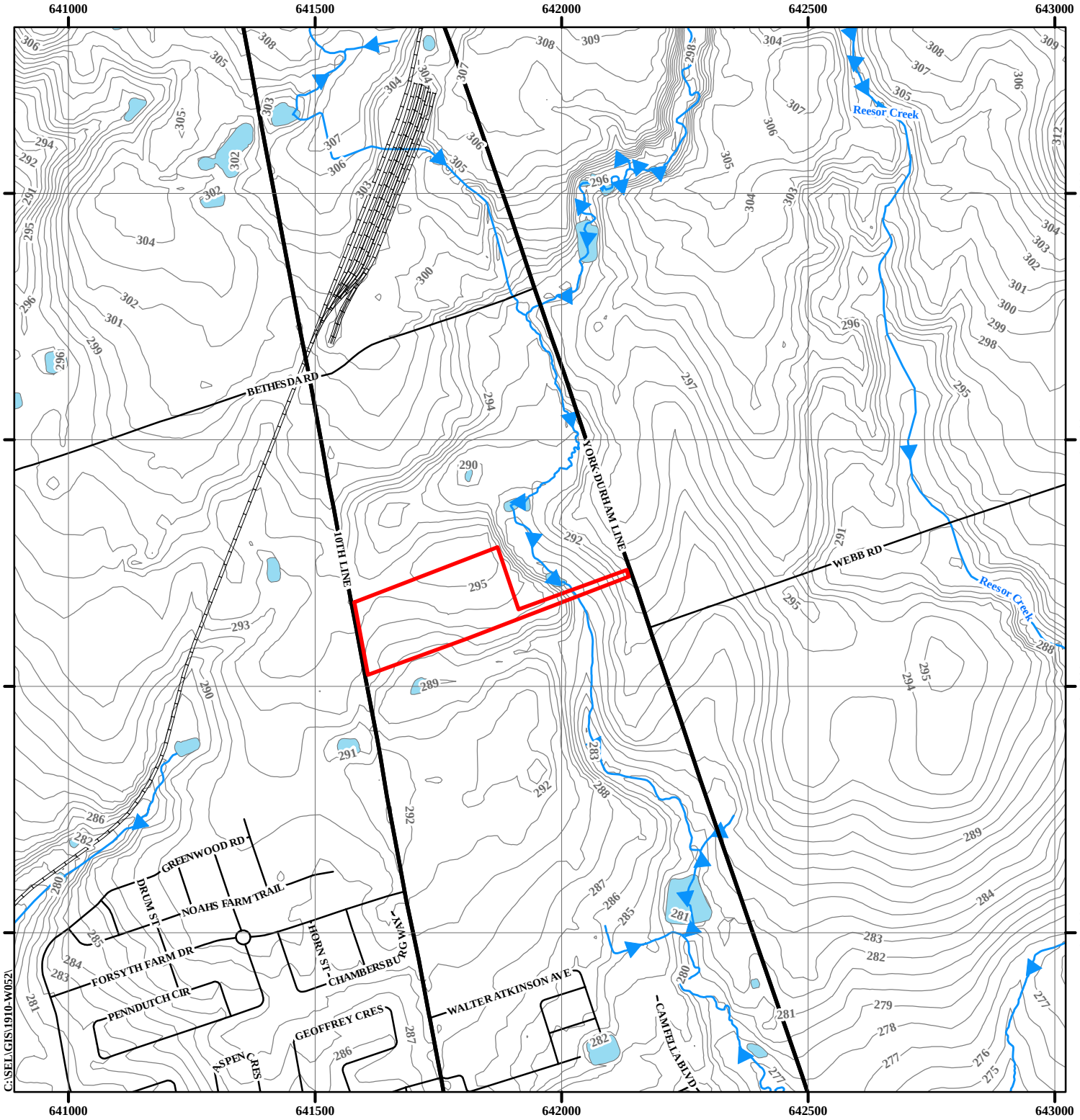
Date: May 19, 2023

Scale:

0 75 150 225 300 375

Metres

Drawing No. 4



N

Legend

- Approximate Boundary of Subject Site
- Waterbody
- Watercourse
- Major Road
- Local Road
- Railway
- 100 — Topographic Contour (masl)

Soil Engineers Ltd.

Title: Topographic Map

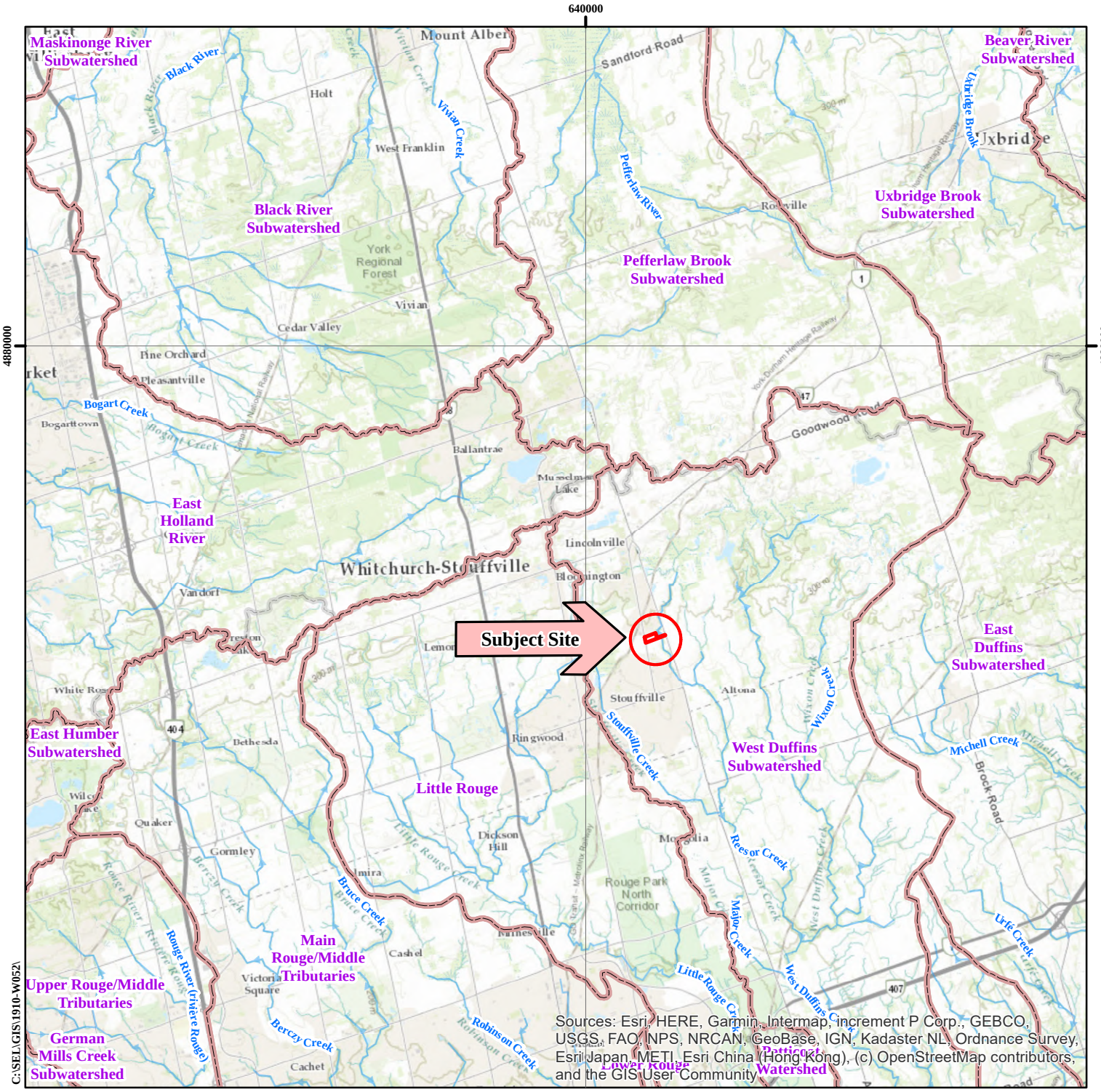
Project:
Hydrogeological Assessment
Proposed Residential Development
12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

Date: May 19, 2023

Scale:
0 55 110 220 330 440 550
Metres

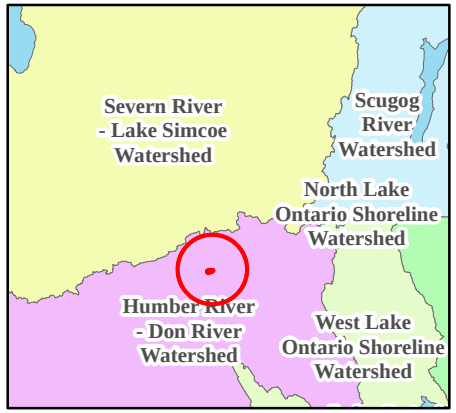
Drawing No. 5



C:\SEL\GIS\1910-W052\

N

Watershed:



Legend

- Approximate Boundary of the Subject Site
- Watershed Boundaries
- Waterbody
- Watercourse
- Expressway/Major Road

Soil Engineers Ltd.

Title: Watershed and Subwatershed Map

Project:
Hydrogeological Assessment
Proposed Residential Development
12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

Date: May 19, 2023

Scale:
0 1,600 3,200 4,800 6,400 8,000
Metres

Drawing No. 6

This mapping was produced by SEL and should be used for information purposes only.
Data sources used in its production are of varying quality and accuracy and all boundaries should be considered approximate.

641000
641500
642000
642500
4872500
4872000
4871500

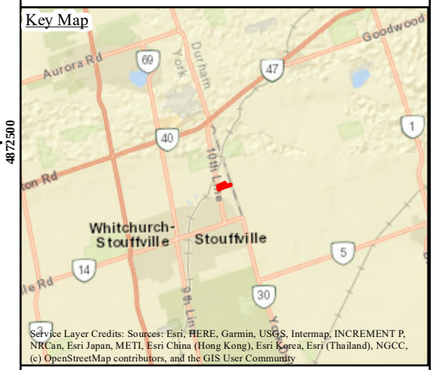
BETHESDA ROAD
10TH LINE
YORK-DURHAM LINE
WEBB ROAD
GREENWOOD ROAD
DRUM STREET
FLUTE STREET
NOAHS FARM TRAIL
FORSYTH FARM DRIVE
Reesor Creek
Tributary of Reesor Creek
Natural Linkage Area
Countryside Area
Settlement Area

D:\Previous gis\GIS_A\1910-W052\

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 King's Printer for Ontario, 2026

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

Legend

- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Railway
- Watercourse
- Waterbody
- Wooded Area *Wooded Area*
- Wetland (classified as Provincial)
- Wetland (Not evaluated per OWES)
- Oak Ridges Moraine (Countryside Area)
- Oak Ridges Moraine (Natural Linkage Area)
- Oak Ridges Moraine (Settlement Area)

Soil Engineers Ltd.

Natural Features and Protection Area Plan

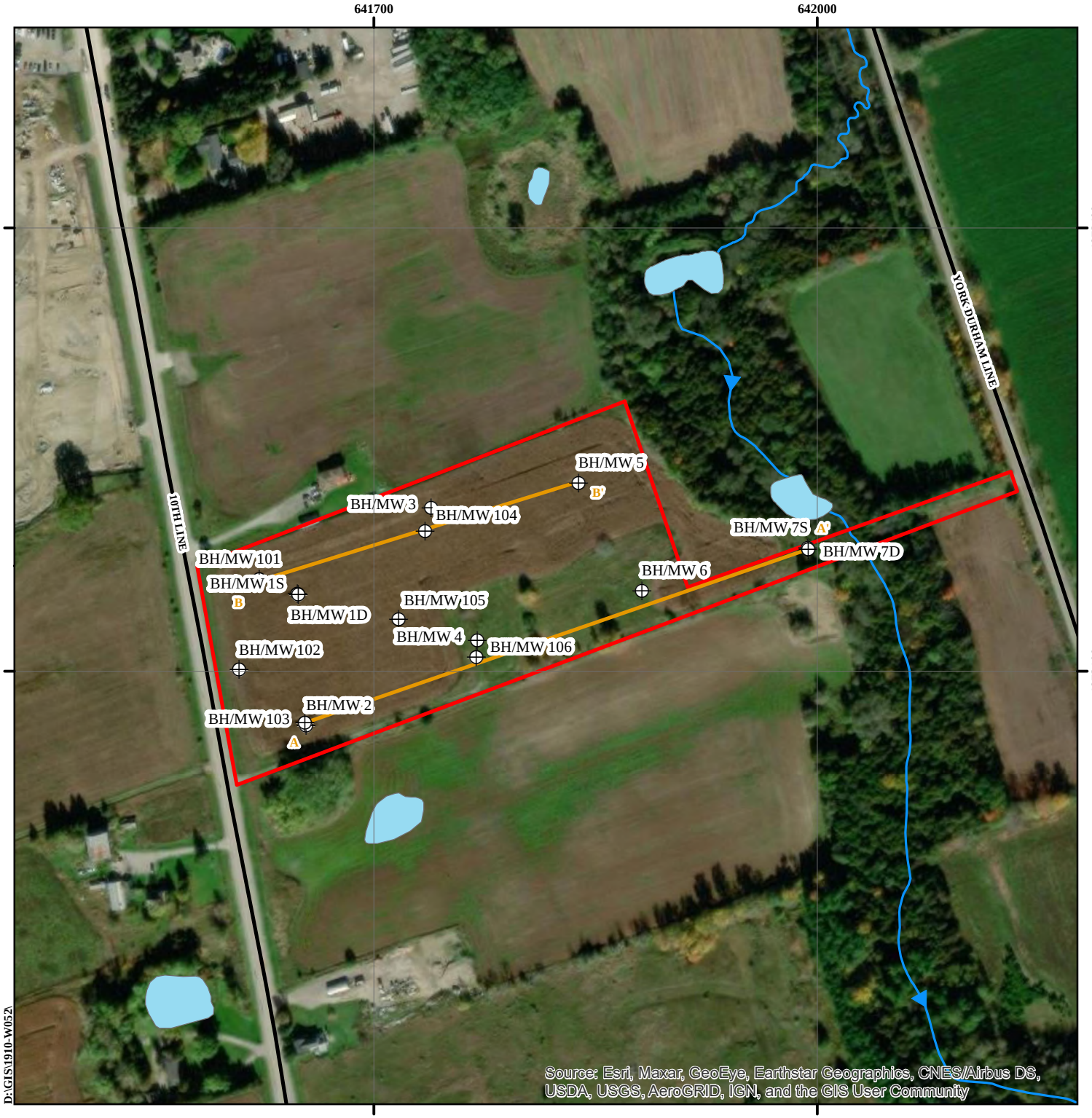
Hydrogeological Assessment Proposed
Residential Development
12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

Date: April 06, 2026

Scale:
0 60 120 180 240 300
Metres

Drawing No. 7



N

Legend

- Approximate Boundary of Subject Site
- Borehole with Monitoring Well
- Major Road
- Waterbody
- Watercourse
- A A' Cross-Section Direction
- 100 Topographic Contour (masl)

Soil Engineers Ltd.

Title: Cross-Section Key Plan

Project:

Hydrogeological Assessment
Proposed Residential Development
12811 Tenth Line
Town of Whitchurch-Stouffville

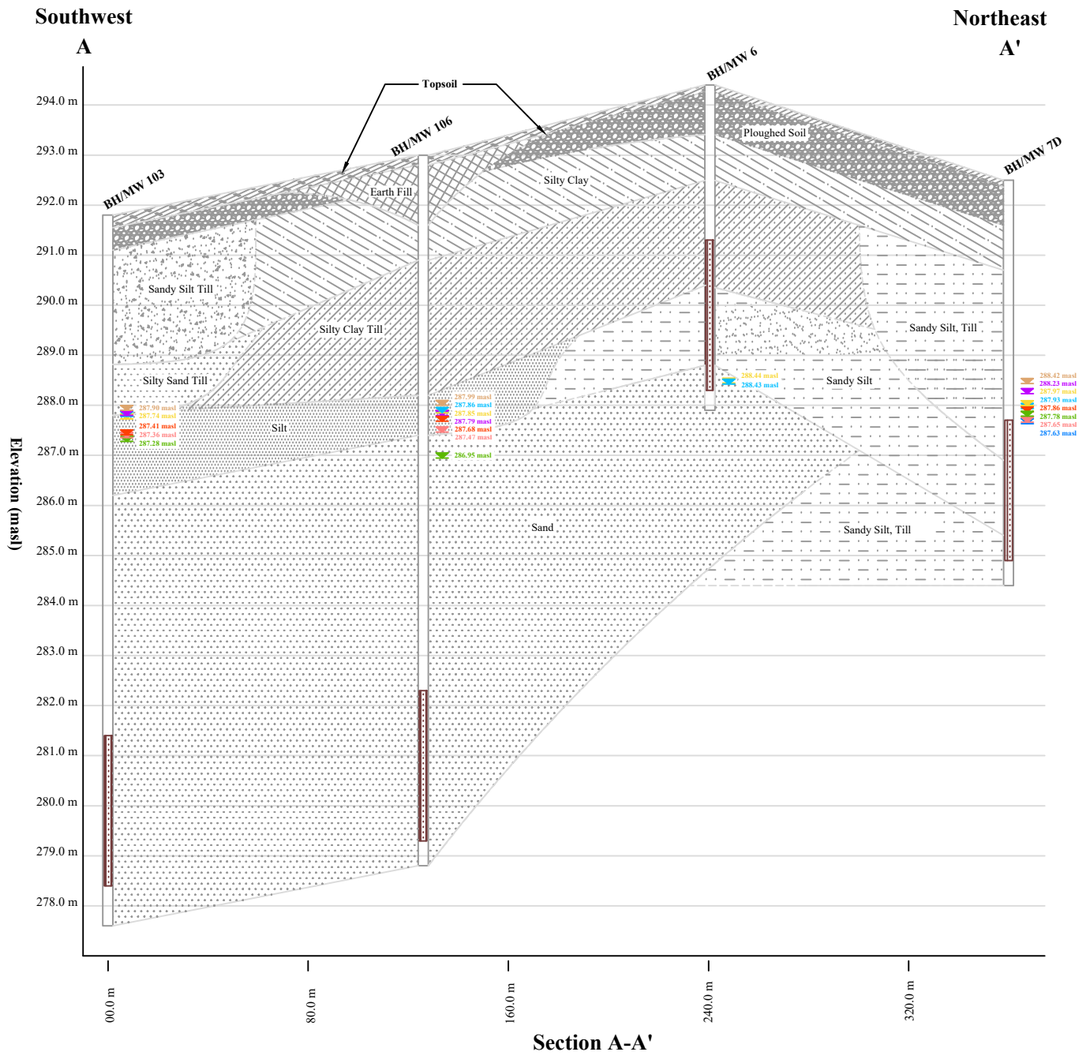
Reference No. 1910-W052

Date: May 29, 2023

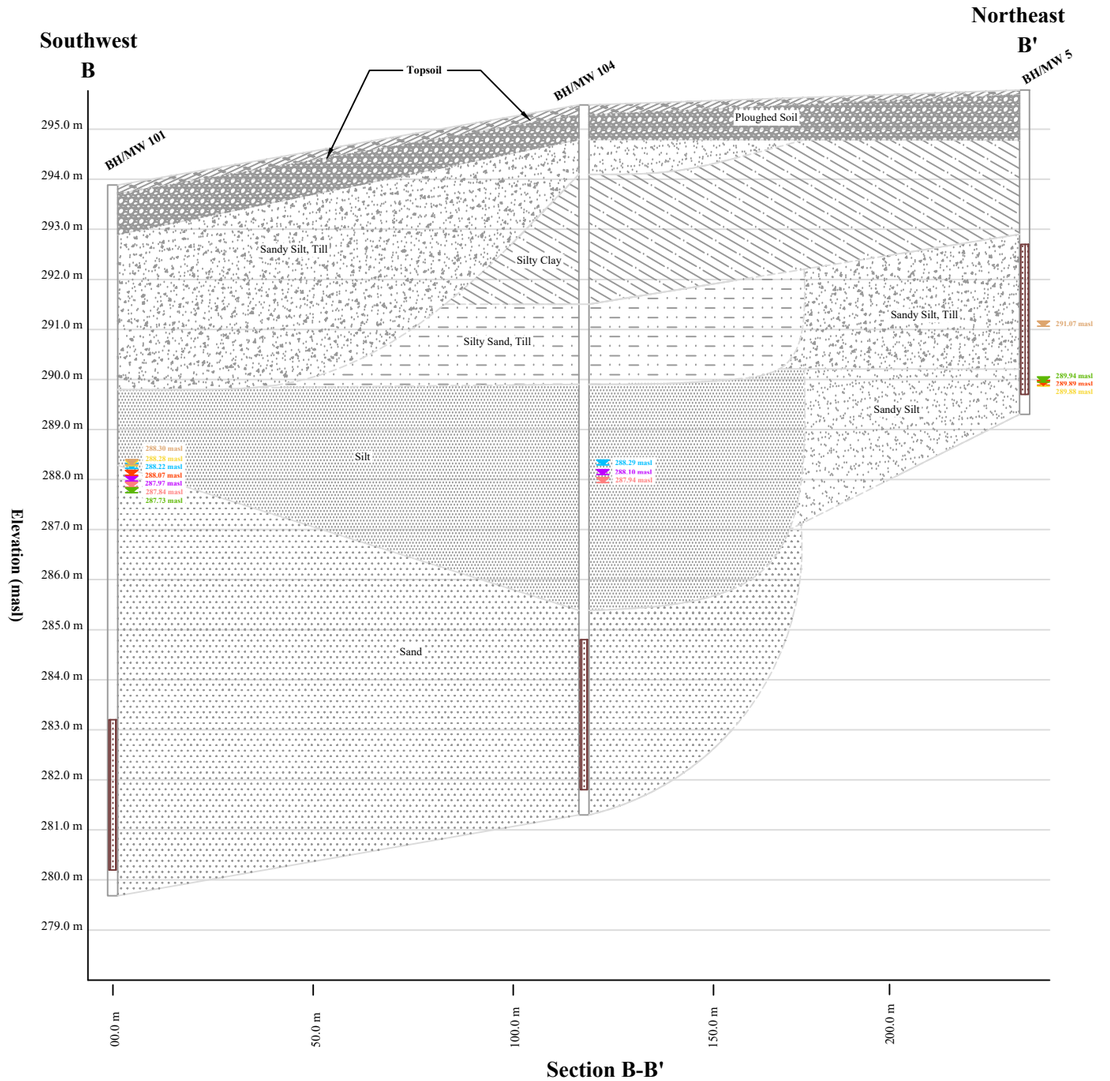
Scale:

0 15 30 60 90 120 150
Metres

Drawing No. 8-1



Section A-A'



Section B-B'

Topsoil
Ploughed Soil
Earth Fill
Silty Clay
Silty Clay, Till
Sandy Silt, Till
Sandy Silt
Silt
Sand
3.0 m Screen

Spring Readings

- Water Table on March 3, 2022
- Water Table on March 25, 2022
- Water Table on April 27, 2022
- Water Table on May 24, 2022
- Water Table on April 10, 2022
- Water Table on May 26, 2023
- Water Table on March 12, 2024
- Water Table on May 22, 2024

Soil Engineers Ltd.
CONSULTING SOIL, FOUNDATION & ENVIRONMENTAL ENGINEERS

Title: Geological Cross-Section (A-A' and B-B')

Project: Hydrogeological Assessment
Proposed Residential Development
12811 Tenth Line Town of Whitchurch-Stouffville, Ontario

Reference No:	Date:	Scale: V	Scale: H	Drawing No.
1910-W052	April 07, 2026	1:100	A = 1:2000 B = 1:1250	8-2

641600 641800 642000

4872200 4872000

BH/MW 1D (288.09)
BH/MW 2 (288.57)
BH/MW 3 (289.65)
BH/MW 4 (287.85)
BH/MW 5 (291.07)
BH/MW 6 (288.44)
BH/MW 7D (288.42)

291.00 288.50 288.00 289.00 289.50 290.00 290.50 280.50

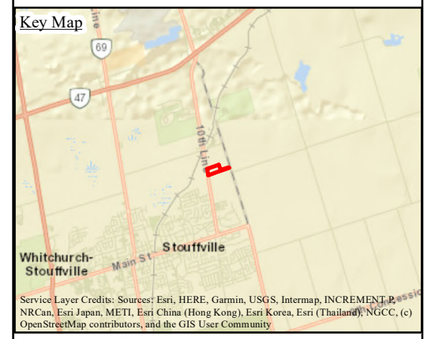
10TH LINE
YORK-DURHAM LINE
Tributary of Reesor Creek

D:\Previous gis\GIS 2\1910-W052\

N

References: Ontario Ministry of Natural Resources and Forestry

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

Legend

- Approximate Boundary of Subject Site
- Waterbody
- Watercourse
- Borehole with Monitoring Well
- Contour 1 m
- Contour 0.25 m
- Major Road
- Highest Interpreted Shallow Groundwater Elevation Contour
- Highest Inferred Shallow Groundwater Elevation Contour
- Interpreted Shallow Groundwater Flow Direction
- (291.07) Highest Shallow Groundwater Level Measured on April 10, 2023

Soil Engineers Ltd.

Shallow Groundwater Flow Pattern Plan

Hydrogeological Assessment
Proposed Midrise Buildings
with 1 to 2 - levels of Underground Garage
12779 and 12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

Date: April 06, 2026

Scale:

0 10 20 40 60 80 100
Metres

Drawing No. 9

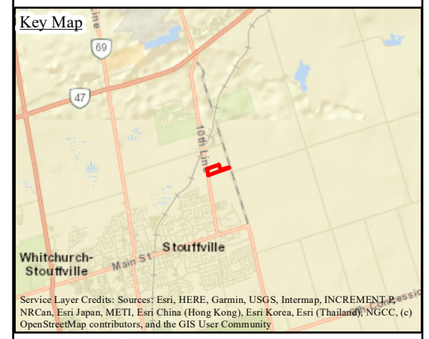
641600
641800
642000
4872200
4872000

BH/MW 101
(288.30)
BH/MW 102
(288.12)
BH/MW 103
(287.90)
BH/MW 105
(288.11)
BH/MW 106
(287.99)
288.25
288.00
10TH LINE
YORK-DURHAM LINE
Tributary of Reesor Creek

N

References: Ontario Ministry of Natural Resources and Forestry
© King's Printer for Ontario, 2026

Key Map



Legend

- Approximate Boundary of Subject Site
- Waterbody
- Watercourse
- Borehole with Monitoring Well
- Contour 1 m
- Contour 0.25 m
- Major Road
- Highest Interpreted Deep Groundwater Elevation Contour
- Highest Inferred Deep Groundwater Elevation Contour
- Interpreted Deep Groundwater Flow Direction
- (291.07) Highest Deep Groundwater Level Measured on April 10, 2023

Soil Engineers Ltd.

Deep Groundwater Flow Pattern Plan

Hydrogeological Assessment
Proposed Midrise Buildings
with 1 to 2 - levels of Underground Garage
12779 and 12811 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1910-W052

Date: April 06, 2026

Scale:

0 10 20 40 60 80 100
Metres

Drawing No. 9-2

D:\Previous gis\GIS 2019\1910-W052\

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	GRAVENHURST	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

Appendix A

Borehole Logs and Grain Size Distribution Graphs

REFERENCE NO. 1910-W052

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.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 1D

FIGURE NO.: 1

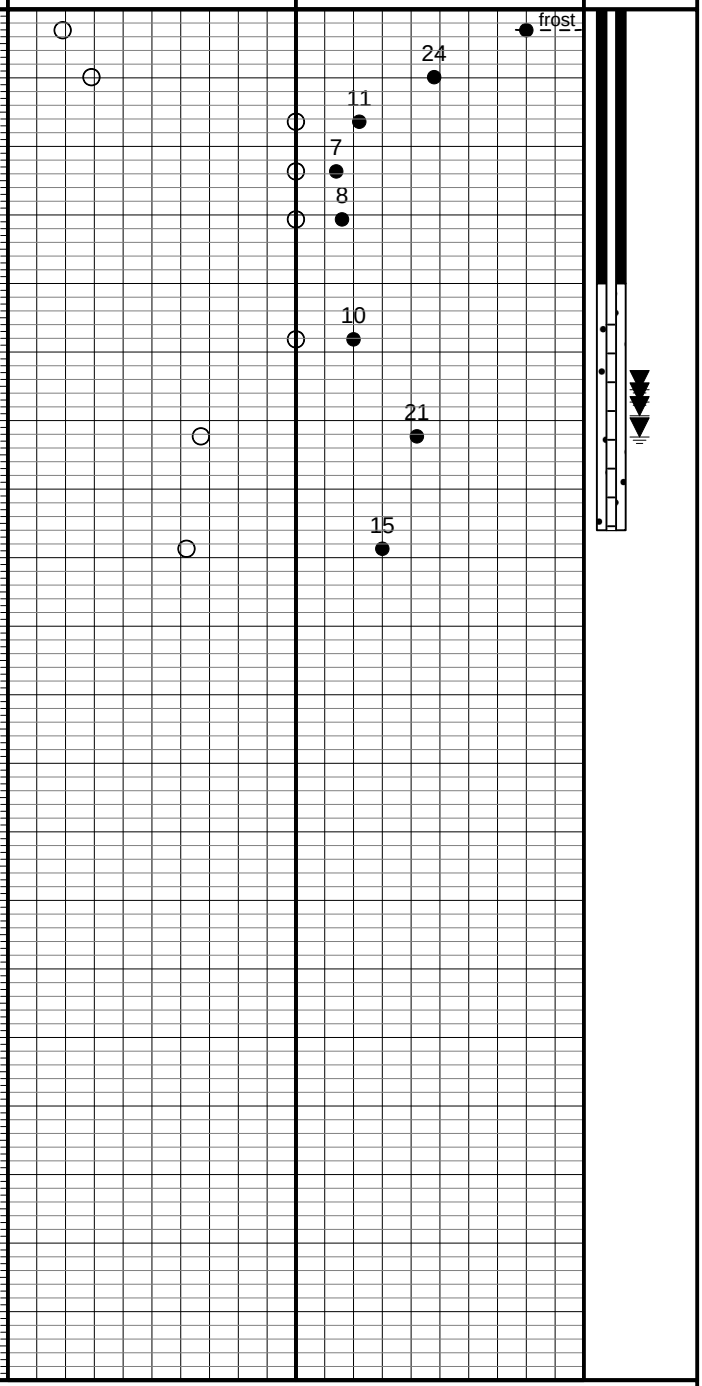
PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 3, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
293.6	Ground Surface				
0.0 / 292.6	**8 cm TOPSOIL** **PLOUGHED SOIL**	1	DO	19	0
1.0 / 289.6	Brown, compact to very dense **SANDY SILT TILL** a trace to some clay, a trace of gravel occ. sand seams, cobbles and boulders	2	DO	29	1
		3	DO	50/13	2
		4	DO	50/13	
		5	DO	50/13	3
4.0 / 286.4	Brown, very dense **SANDY SILT** occ. clay seams	6	DO	50/13	4
		7	DO	67	5
7.2 / 285.5	Brown, very dense **SAND** fine-grained, some silt	8	DO	62	6
8.1	**END OF BOREHOLE**				7
					8
					9
					10
					11
					12
					13
					14
					15
					16
					17
					18
					19
					20



Installed 50 mm Ø monitoring well to 7.6 m completed with 3.0 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 protective steel casing.

Water level reading:
W.L. @ El. 287.38 masl on Mar 03, 2022
W.L. @ El. 287.89 masl on Mar 25, 2022
W.L. @ El. 288.07 masl on Apr 27, 2022
W.L. @ El. 287.69 masl on May 24, 2022
W.L. @ El. 288.09 masl on Apr 10, 2023
W.L. @ El. 287.90 masl on May 26, 2023
W.L. @ El. 287.55 masl on Mar 12, 2024
W.L. @ El. 288.11 masl on May 22, 2024

Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 1S

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 3, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES: Number	SAMPLES: Type	SAMPLES: 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
293.6	Ground Surface							
0.0	**8 cm TOPSOIL** **PLOUGHED SOIL**				0		frost	
292.6								
1.0	Brown, compact to very dense **SANDY SILT TILL** a trace to some clay, a trace of gravel occ. sand seams, cobbles and boulders				1			
289.6					2			
4.0	Brown, very dense **SANDY SILT** occ. clay seams				3			
287.5					4			
6.1	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 6.1 m completed with 3.0 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a protective steel casing. **Water level reading:** W.L. @ El. 287.63 masl on Mar 03, 2022 W.L. @ El. 287.83 masl on Mar 25, 2022 W.L. @ El. 288.07 masl on Apr 27, 2022 W.L. @ El. 287.70 masl on May 24, 2022 W.L. @ El. 287.99 masl on Apr 10, 2023 W.L. @ El. 287.92 masl on May 26, 2023 W.L. @ El. 287.66 masl on Mar 12, 2024 W.L. @ El. 288.12 masl on May 22, 2024				5			
					6			
					7			
					8			
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			
					20			

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 2

FIGURE NO.: 3

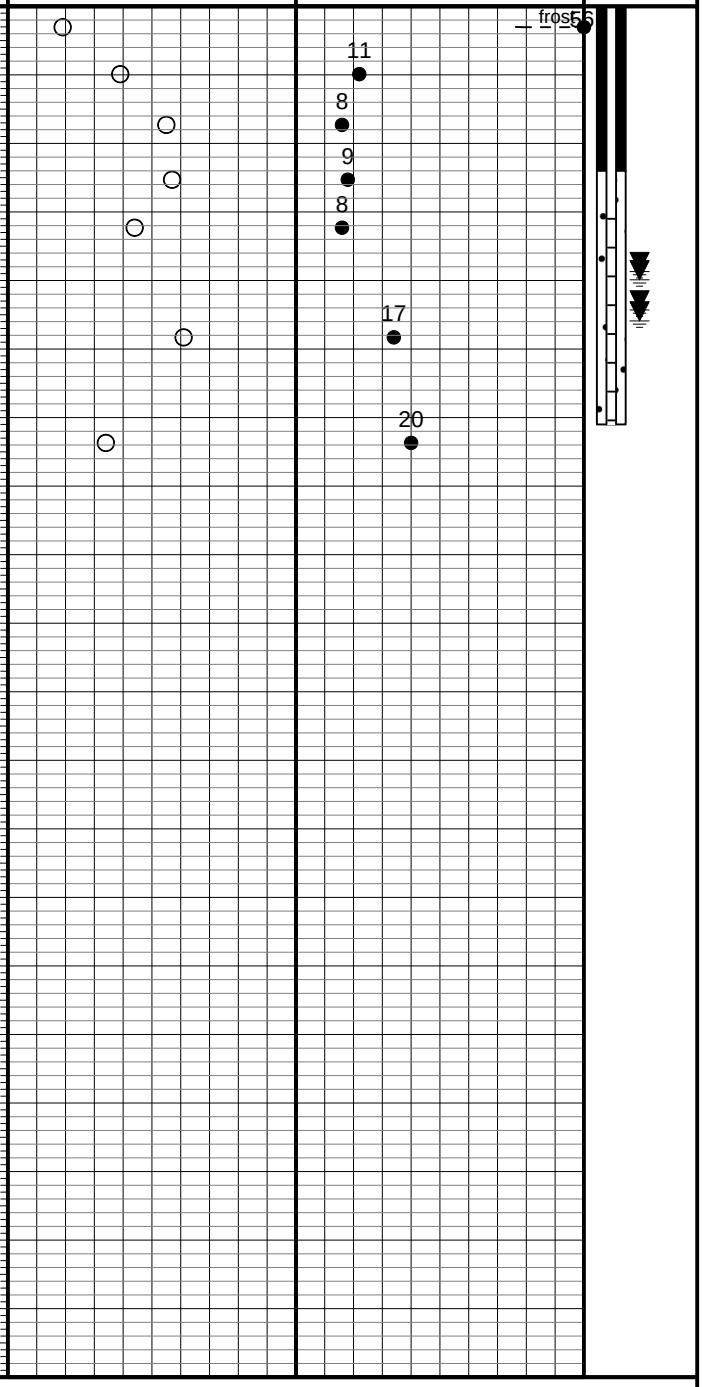
PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 3, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
291.8	Ground Surface			
0.0 / 291.1	**10 cm TOPSOIL** **PLOUGHED SOIL**	1	AS	7
0.7	Brown, dense to very dense **SANDY SILT TILL** a trace to some clay, a trace of gravel occ. sand seams, cobbles and boulders	2	DO	39
		3	DO	55
		4	DO	57
		5	DO	44
287.8				
4.0	Brown, very dense to dense **SANDY SILT** occ. clay seams	6	DO	61
285.2		7	DO	34
6.6	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 6.1 m completed with 3.0 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a protective steel casing. **Water level reading:** W.L. @ El. 287.16 masl on Mar 03, 2022 W.L. @ El. 287.88 masl on Mar 25, 2022 W.L. @ El. 287.76 masl on Apr 27, 2022 W.L. @ El. 287.32 masl on May 24, 2022 W.L. @ El. 288.57 masl on Apr 10, 2023 W.L. @ El. 287.55 masl on May 26, 2023 W.L. @ El. 287.27 masl on Mar 12, 2024 W.L. @ El. 287.70 masl on May 22, 2024			



Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 3

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 3, 2020

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
295.8	Ground Surface							
0.0 / 295.1	**5 cm TOPSOIL** **PLOUGHED SOIL**	1	DO	8	0		frost	
0.7	Brown, very stiff to hard	2	DO	21	1		15	
	SILTY CLAY	3	DO	25	2		19	
	traces of sand and gravel occ. silt seams and layers	4	AS	40			19	
		5	DO	37	3		17	
291.8 / 4.0	Brown, very dense				4			
	SAND	6	DO	50/13			5	
	fine-grained some silt				5			
290.2 / 5.6	Brown, very dense							
289.3 / 6.5	**SILT** traces of sand and clay	7	DO	50/13	6		18	
	END OF BOREHOLE				7			
	Installed 50 mm Ø monitoring well to 6.1 m completed with 3.0 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a protective steel casing. **Water level reading:** Dry on Mar 03, 2022 Dry on Mar 25, 2022 Dry on Apr 27, 2022 Dry on May 24, 2022 Dry on Apr 10, 2023 Dry on May 26, 2023 Dry on Mar 12, 2024 W.L. @ El. 289.95 masl on May 22, 2024				8			
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			
					20			

Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 4

FIGURE NO.: 5

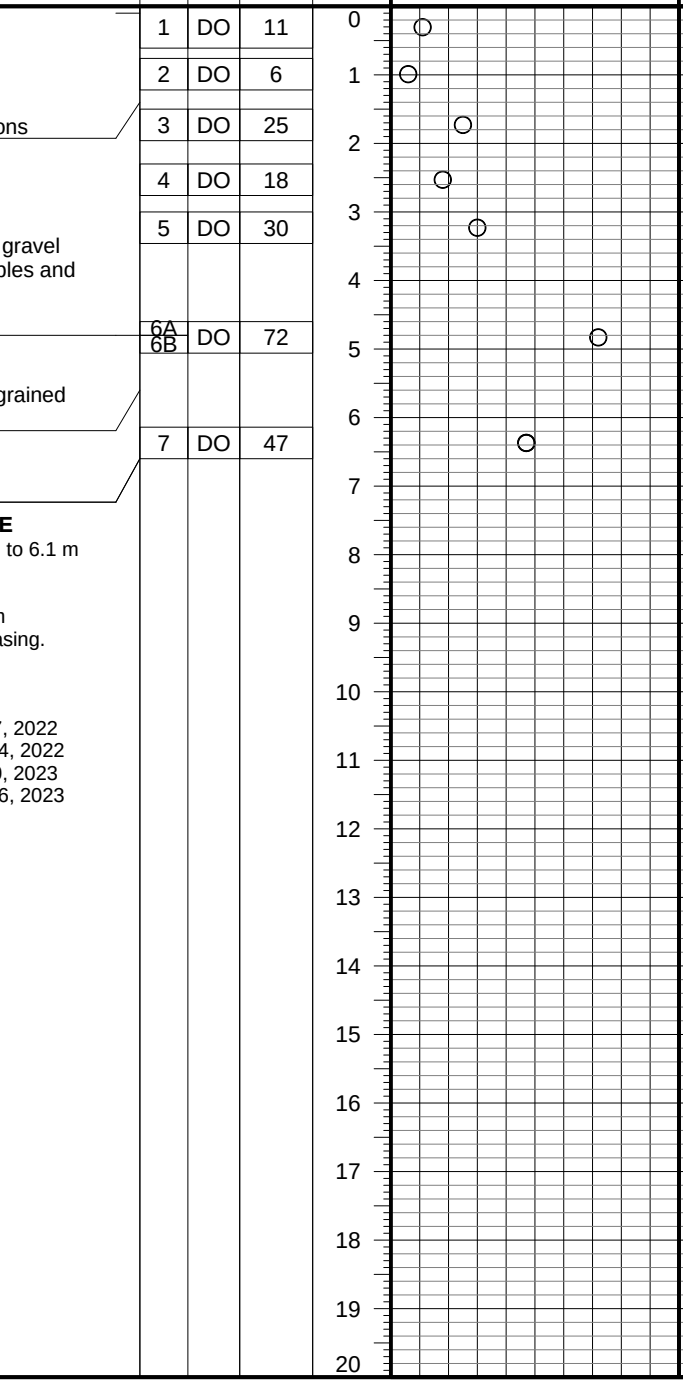
PROJECT DESCRIPTION: Proposed Residential Development

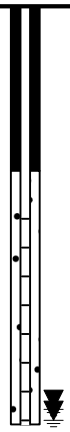
METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 6, 2020

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
293.7	Ground Surface							
0.0	**10 cm TOPSOIL**	1	DO	11	0			
	Dark brown to brown							
292.3	**EARTH FILL**	2	DO	6	1			
1.4	silty clay							
	occ. rootlets and topsoil inclusions	3	DO	25	2			
	Brown, compact to dense							
		4	DO	18	3			
	SANDY SILT TILL							
		5	DO	30				
	a trace to some clay, a trace of gravel				4			
	occ. silt seams and layers, cobbles and boulders							
288.9		6A						
4.8	Brown, very dense	6B	DO	72	5			
288.1	**SAND**							
5.6	fine-to-medium grained to fine-grained				6			
	some silt to silty							
287.1	Brown, dense	7	DO	47				
6.6	**SANDY SILT**				7			
	occ. clay seams							
	END OF BOREHOLE				8			
	Installed 50 mm Ø monitoring well to 6.1 m							
	completed with 3.0 m screen				9			
	Sand backfill from 2.4 m to 6.1 m							
	Bentonite seal from 0.0 m to 2.4 m				10			
	Provided with a protective steel casing.							
	Water level reading:				11			
	Dry on Mar 03, 2022							
	Dry on Mar 25, 2022				12			
	W.L. @ El. 287.77 masl on Apr 27, 2022							
	W.L. @ El. 287.61 masl on May 24, 2022				13			
	W.L. @ El. 287.85 masl on Apr 10, 2023							
	W.L. @ El. 287.66 masl on May 26, 2023				14			
	Dry on Mar 12, 2024							
	Dry on May 22, 2024				15			
					16			
					17			
					18			
					19			
					20			





Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 5

FIGURE NO.: 6

PROJECT DESCRIPTION: Proposed Residential Development

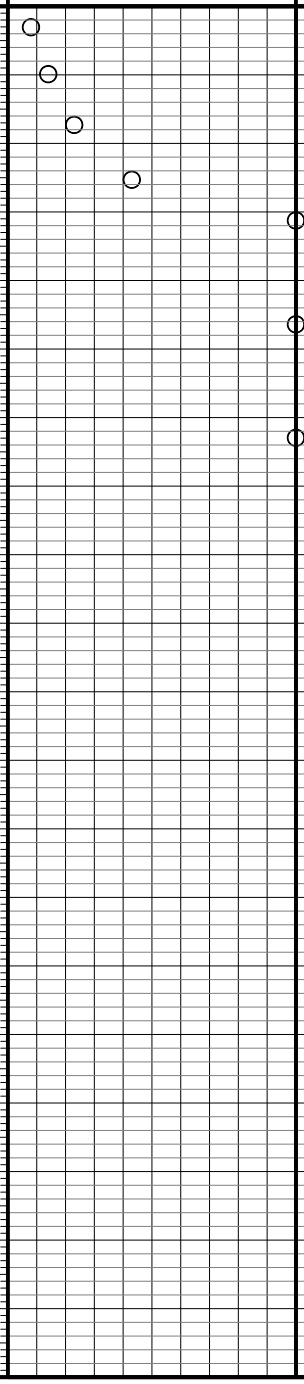
METHOD OF BORING: Flight-Auger

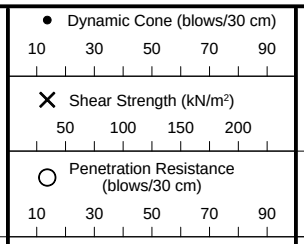
PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

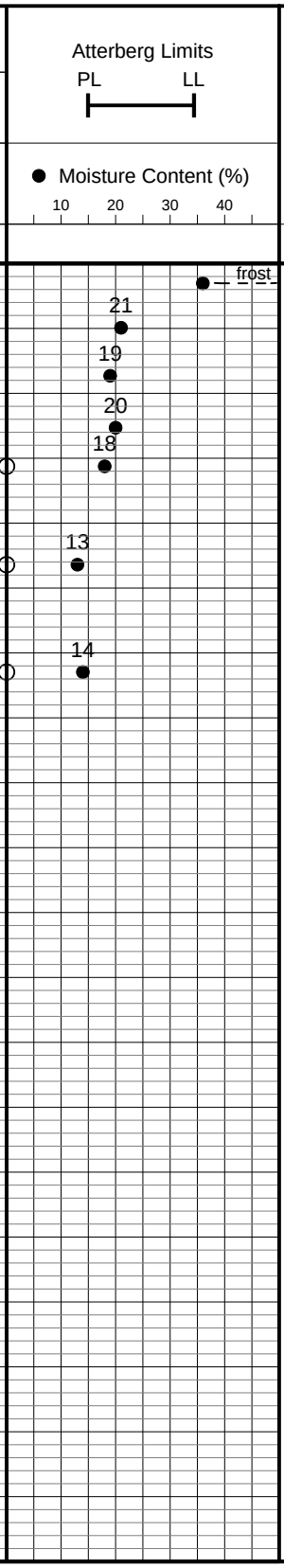
DRILLING DATE: March 5, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
295.8	Ground Surface			
0.0	**10 cm TOPSOIL**	1	DO	8
294.8	**PLOUGHED SOIL**	2	DO	14
1.0	Brown, stiff to hard			
	SILTY CLAY	3	DO	23
	traces of sand and gravel	4	DO	43
292.9	occ. silt seams and layers			
2.9	Brown, very dense	5	DO	50/10
	SANDY SILT TILL			
	a trace to some clay, a trace of gravel occ. silt seams and layers, cobbles and boulders	6	DO	50/8
290.2				
5.6	Brown, very dense **SANDY SILT**	7	DO	50/10
289.3	occ. clay seams			
6.5	**END OF BOREHOLE**			

Installed 50 mm Ø monitoring well to 6.1 m
completed with 3.0 m screen
Sand backfill from 2.4 m to 6.1 m
Bentonite seal from 0.0 m to 2.4 m
Provided with a protective steel casing.
Water level reading:
Dry on Mar 03, 2022
Dry on Mar 25, 2022
Dry on Apr 27, 2022
Dry on May 24, 2022
W.L. @ El. 291.07 masl on Apr 10, 2023
W.L. @ El. 289.89 masl on May 26, 2023
W.L. @ El. 289.94 masl on Mar 12, 2024
W.L. @ El. 289.88 masl on May 22, 2024







Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 6

FIGURE NO.: 7

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

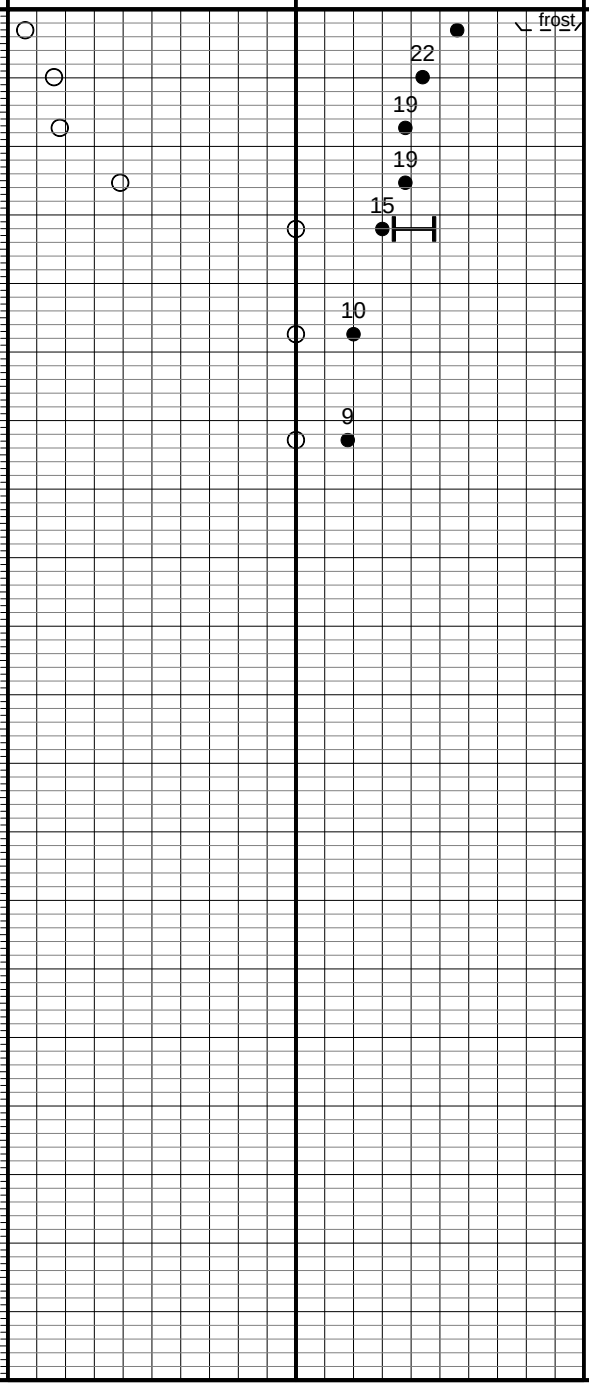
PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 5, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
294.4	Ground Surface			
0.0	**15 cm TOPSOIL**	1	DO	6
293.4	**PLOUGHED SOIL**			
1.0	Brown, very stiff to hard	2	DO	16
	SILTY CLAY	3	DO	18
	a trace of sand	4	DO	39
291.5	occ. silt seams and layers			
2.8	Brown, hard	5	DO	50/10
290.4	**SILTY CLAY TILL**			
4.0	some sand, a trace of gravel			
	occ. sand seams, cobbles and boulders	6	DO	50/13
	Brown, very dense			
288.8	**SANDY SILT**			
5.6	occ. clay seams			
287.9	Brown, very dense	7	DO	50/13
6.5	**SAND**			
	fine-grained, some silt			
	END OF BOREHOLE			

Installed 50 mm Ø monitoring well to 6.1 m
completed with 3.0 m screen
Sand backfill from 2.4 m to 6.1 m
Bentonite seal from 0.0 m to 2.4 m
Provided with a protective steel casing.

Water level reading:
W.L. @ El. 288.44 masl on Mar 03, 2022
W.L. @ El. 288.43 masl on Mar 25, 2022
W.L. @ El. 288.43 masl on Apr 27, 2022
W.L. @ El. 288.44 masl on May 24, 2022
W.L. @ El. 288.44 masl on Apr 10, 2023
W.L. @ El. 288.44 masl on May 26, 2023
W.L. @ El. 288.44 masl on Mar 12, 2024
W.L. @ El. 288.44 masl on May 22, 2024



Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 7D

FIGURE NO.: 8

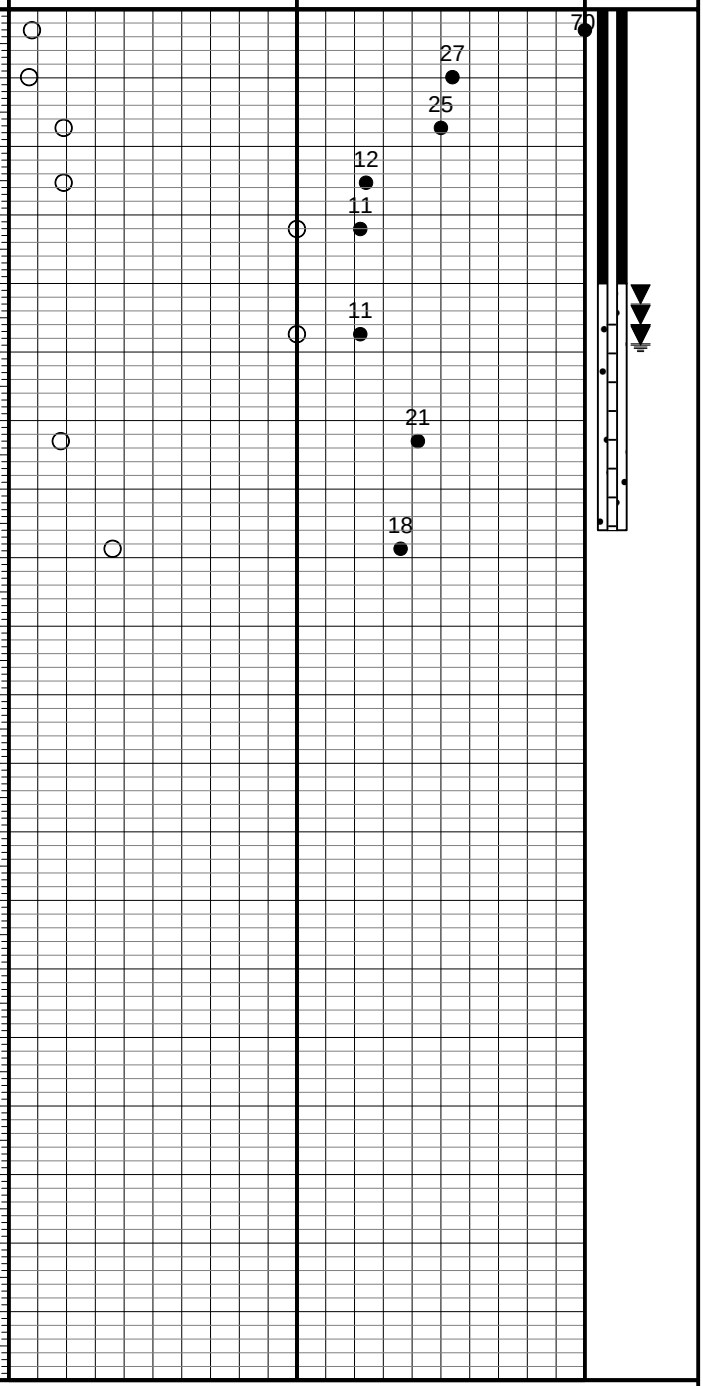
PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 6, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
292.5	Ground Surface				
0.0	**15 cm TOPSOIL**	1	DO	8	0
291.6	**PLOUGHED SOIL**	2	DO	7	1
0.9	Brown, firm, weathered				
290.7	**SILTY CLAY**	3	DO	19	2
1.8	a trace of sand occ. silt seams and layers	4	DO	19	
	Brown, compact to very dense	5	DO	50/10	3
	SANDY SILT TILL				4
	traces of clay and gravel occ. sand seams and layers, cobbles and boulders	6	DO	50/13	5
286.9	Brown, compact				
5.6	**SANDY SILT**	7	DO	18	6
285.4	occ. clay seams				7
7.1	Grey, dense				
284.4	**SANDY SILT TILL**	8	DO	36	8
8.1	traces of clay and gravel occ. silt seams and layers, cobbles and boulders				9
	END OF BOREHOLE				10
	Installed 50 mm Ø monitoring well to 7.6 m completed with 3.0 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 protective steel casing.				11
	Water level reading: W.L. @ El. 287.63 masl on Mar 03, 2022 W.L. @ El. 288.23 masl on Mar 25, 2022 W.L. @ El. 287.93 masl on Apr 27, 2022 W.L. @ El. 287.65 masl on May 24, 2022 W.L. @ El. 288.42 masl on Apr 10, 2023 W.L. @ El. 287.86 masl on May 26, 2023 W.L. @ El. 287.78 masl on Mar 12, 2024 W.L. @ El. 287.97 masl on May 22, 2024022 W.L. @ El. 287.93 masl on Apr 27, 2022 W.L. @ El. 287.65 masl on May 24, 2022 W.L. @ El. 288.42 masl on Apr 10, 2023 W.L. @ El. 287				12
					13
					14
					15
					16
					17
					18
					19
					20



Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 7S

FIGURE NO.: 9

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 6, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES: Number	SAMPLES: Type	SAMPLES: 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
292.5	Ground Surface							
0.0	**15 cm TOPSOIL** **PLOUGHED SOIL**				0			
291.6 0.9	Brown, firm, weathered				1			
290.7 1.8	**SILTY CLAY** a trace of sand occ. silt seams and layers				2			
	Brown, compact to very dense				3			
	SANDY SILT TILL				4			
	traces of clay and gravel occ. sand seams and layers, cobbles and boulders				5			
286.9 5.6	Brown, compact				6			
286.4 6.1	**SANDY SILT** occ. clay seams				7			
	END OF BOREHOLE				8			
	Installed 50 mm Ø monitoring well to 6.1 m completed with 3.0 m screen Sand backfill from 2.4 m to 6.1 m Bentonite seal from 0.0 m to 2.4 m Provided with a protective steel casing. **Water level reading:** W.L. @ El. 287.49 masl on Mar 03, 2022 W.L. @ El. 288.24 masl on Mar 25, 2022 W.L. @ El. 287.76 masl on Apr 27, 2022 W.L. @ El. 287.49 masl on May 24, 2022 W.L. @ El. 288.27 masl on Apr 10, 2023 W.L. @ El. 287.69 masl on May 26, 2023 W.L. @ El. 287.62 masl on Mar 12, 2024 W.L. @ El. 287.80 masl on May 22, 2024				9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			
					19			
					20			

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 101

FIGURE NO.: 10

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Hollow-Stem

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 18, 2022

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
293.9	Ground Surface							
0.0	**18 cm TOPSOIL**	1	DO	3	0		14	
	PLOUGHED SOIL	2	DO	34	1		9	
1.0	Brown, dense **SANDY SILT TILL** a trace to some clay, a trace of gravel occ. sand seams, cobbles and boulders	3	DO	45	2		10	
		4	DO	42	3		11	
289.9		5	DO	41	4		9	
4.0	Brown, very dense **SILT** sandy, with sand seams	6	DO	76	5		19	
288.3					6			
5.6	Brown, very dense **SAND** fine to fine to medium grained some silt to silty occ. silt layers	7	DO	57	7		18	
		8	DO	71	8		16	
		9	DO	55	9		18	
		10	DO	47	10		17	
		11	DO	32	11		13	
279.7		12	DO	59	12			
14.2	**END OF BOREHOLE**				13			
	Installed 50 mm Ø monitoring well to 13.7 m completed with 3.1 m screen Sand backfill from 10.1 to 13.7 m Bentonite seal from 0.0 m to 10.1 m Provided with a momument steel casing **Water level reading:** W.L. @ El. 287.97 masl on Mar 25, 2022 W.L. @ El. 288.22 masl on Apr 27, 2022 W.L. @ El. 287.84 masl on May 24, 2022 W.L. @ El. 288.30 masl on Apr 10, 2023 W.L. @ El. 288.07 masl on May 26, 2023 W.L. @ El. 287.73 masl on Mar 12, 2024 W.L. @ El. 288.28 masl on May 22, 2024 W.L. @ El. 288.11 masl on May 22, 2024				14			
					15			
					16			
					17			
					18			
					19			
					20			

Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 102

FIGURE NO.: 11

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Hollow-Stem/ Tri-cone

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 21, 2022

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
293.2	Ground Surface							
	3 cm TOPSOIL	1	DO	5	0		13	
	PLOUGHED SOIL	2	DO	11	1		10	
1.1	Brown, loose to very dense **SANDY SILT TILL** a trace to some clay, a trace of gravel occ. sand seams, cobbles and boulders	3	DO	32	2		12	
		4	DO	29	3		10	
		5	DO	56				
289.2					4			
4.0	Brown, very dense **SILT** sandy, with sand seams	6	DO	67	5		10	
		7	DO	79	6		21	
286.1					7			
7.1	Brown, very dense **SAND** fine to fine to medium grained a trace of silt to silty occ. silt layers	8	DO	95	8		19	
		9	DO	41	9		19	
		10	DO	73	10		14	
		11	DO	78	11		18	
279.2		12	DO	50/10	12		14	
14.0	**END OF BOREHOLE**				13			
	Installed 50 mm Ø monitoring well to 13.7 m completed with 3.1 m screen Sand backfill from 10.1 to 13.7 m Bentonite seal from 0.0 m to 10.1 m Provided with a momument steel casing **Water level reading:** W.L. @ El. 287.95 masl on Mar 25, 2022 W.L. @ El. 288.02 masl on Apr 27, 2022 W.L. @ El. 287.61 masl on May 24, 2022 W.L. @ El. 288.12 masl on Apr 10, 2023 W.L. @ El. 287.83 masl on May 26, 2023 W.L. @ El. 287.52 masl on Mar 12, 2024 W.L. @ El. 288.02 masl on May 22, 2024 W.L. @ El. 288.12 masl on May 22, 2024				14			
					15			
					16			
					17			
					18			
					19			
					20			

Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 103

FIGURE NO.: 12

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger/ Hollow-Stem

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 11, 2022

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
291.8	Ground Surface							
0.0	**25 cm TOPSOIL** **PLOUGHED SOIL**	1	DO	5	0			
0.7	Brown, loose to very dense **SANDY SILT TILL** a trace to some clay, a trace of gravel occ. sand seams, cobbles and boulders	2	DO	21	1		10	
		3	DO	31	2		8	
		4	DO	50/15			11	
288.9					3		8	
2.9	Brown, dense **SILTY SAND TILL** gravelly, a trace of clay occ. cobbles and boulders	5	DO	39				
287.8					4			
4.0	Brown, very dense to compact **SILT** sandy, with sand seams	6	DO	45	5		17	
286.2								
5.6	Brown, very dense **SAND** fine to fine to medium grained a trace of silt to silty occ. silt layers	7	DO	28	6		16	
		8	DO	24	7		16	
		9	DO	27	8		16	
		10	DO	17	9		15	
		11	DO	31	10		17	
277.6		12	DO	33	11		17	
14.2	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 13.4 m completed with 3.1 m screen Sand backfill from 9.8 to 13.4 m Bentonite seal from 0.0 m to 9.8 m Provided with a momument steel casing **Water level reading:** W.L. @ El. 287.80 masl on Mar 25, 2022 W.L. @ El. 287.78 masl on Apr 27, 2022 W.L. @ El. 287.36 masl on May 24, 2022 W.L. @ El. 287.90 masl on Apr 10, 2023 W.L. @ El. 287.41 masl on May 26, 2023 W.L. @ El. 287.28 masl on Mar 12, 2024 W.L. @ El. 287.74 masl on May 22, 2024 W.L. @ El. 287.70 masl on May 22, 2024					12 13 14 15 16 17 18 19 20			

Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 104

FIGURE NO.: 13

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Hollow-Stem

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 17/18, 2022

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
295.5	Ground Surface							
0.0	**20 cm TOPSOIL** **PLOUGHED SOIL**	1	DO	7	0		17	
0.7 294.1	Brown, compact **SANDY SILT TILL**	2	DO	14	1			
1.4	Brown, stiff to hard **SILTY CLAY** traces of sand and gravel occ. silt seams and layers	3	DO	12	2		17	
		4	DO	33			19	
		5	DO	27	3		19	
291.5					4			
4.0 289.9	Brown, dense **SILTY SAND TILL** gravelly, a trace of clay occ. cobbles and boulders	6	DO	56	5		11	
5.6	Brown, compact **SILT** traces of sand and clay occ. sand seams	7	DO	54	6		14	
		8	DO	79	7		17	
		9	DO	48	8		19	
285.4					9			
7.1	Brown, very dense **SAND** fine-grained some silt	10	DO	52	10		18	
		11	DO	34	11		17	
281.3		12	DO	46	12		16	
14.2	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 13.7 m completed with 3.1 m screen Sand backfill from 10.1 to 13.7 m Bentonite seal from 0.0 m to 10.1 m Provided with a momument steel casing **Water level reading:** W.L. @ El. 288.10 masl on Mar 25, 2022 W.L. @ El. 288.29 masl on Apr 27, 2022 W.L. @ El. 287.94 masl on May 24, 2022 W.L. @ El. Damaged masl on Apr 10, 2023 W.L. @ El. Damaged masl on May 26, 2023 W.L. @ El. Damaged masl on Mar 12, 2024 W.L. @ El. Damaged masl on May 22, 2024 W.L. @ El. 289.95 masl on May 22, 2024				13 14 15 16 17 18 19 20			

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 105

FIGURE NO.: 14

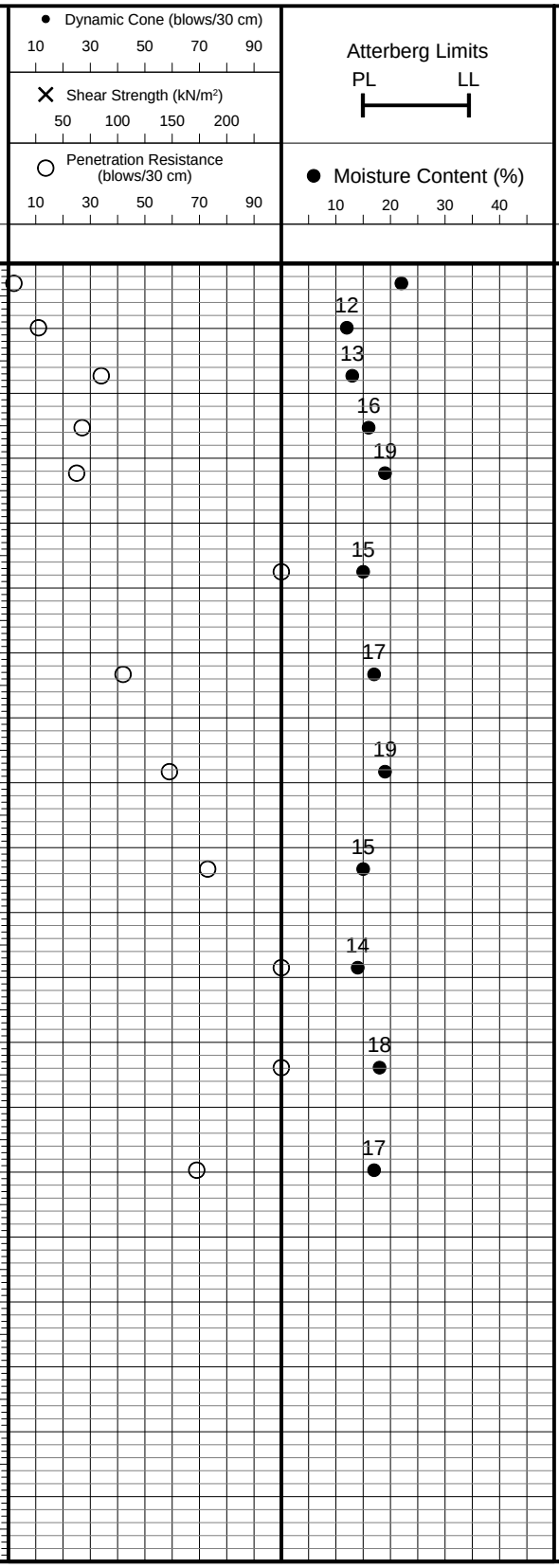
PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Hollow-Stem/ Tri-cone

PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 17, 2022

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
293.4	Ground Surface				
0.0	**25 cm TOPSOIL** **PLOUGHED SOIL**	1	DO	2	0
0.8	Brown, stiff to hard **SILTY CLAY TILL** sandy, a trace of gravel occ. cobbles and boulders	2	DO	11	1
		3	DO	34	2
		4	DO	27	
		5	DO	25	3
289.4					4
4.0	Brown, very dense **SANDY SILT TILL** a trace to some clay, a trace of gravel occ. sand seams, cobbles and boulders	6	DO	50/15	5
287.8					
5.6	Brown, very dense **SILT** sandy, with sand seams	7	DO	42	6
286.3					7
7.1	Brown, very dense **SAND** fine to fine to medium grained a trace of silt to silty occ. silt layers	8	DO	59	8
		9	DO	73	9
		10	DO	50/15	10
		11	DO	50/8	11
		12	DO	69	12
279.2					13
14.2	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 13.7 m completed with 3.1 m screen Sand backfill from 10.1 to 13.7 m Bentonite seal from 0.0 m to 10.1 m Provided with a momument steel casing **Water level reading:** W.L. @ El. 287.90 masl on Mar 25, 2022 W.L. @ El. 288.01 masl on Apr 27, 2022 W.L. @ El. 287.63 masl on May 24, 2022 W.L. @ El. 288.11 masl on Apr 10, 2023 W.L. @ El. 287.84 masl on May 26, 2023 W.L. @ El. 287.08 masl on Mar 12, 2024 W.L. @ El. 288.03 masl on May 22, 2024 Dry on May 22, 2024				14 15 16 17 18 19 20



WATER LEVEL

Soil Engineers Ltd.

JOB NO.: 1910-W052

LOG OF BOREHOLE NO.: BH/MW 106

FIGURE NO.: 15

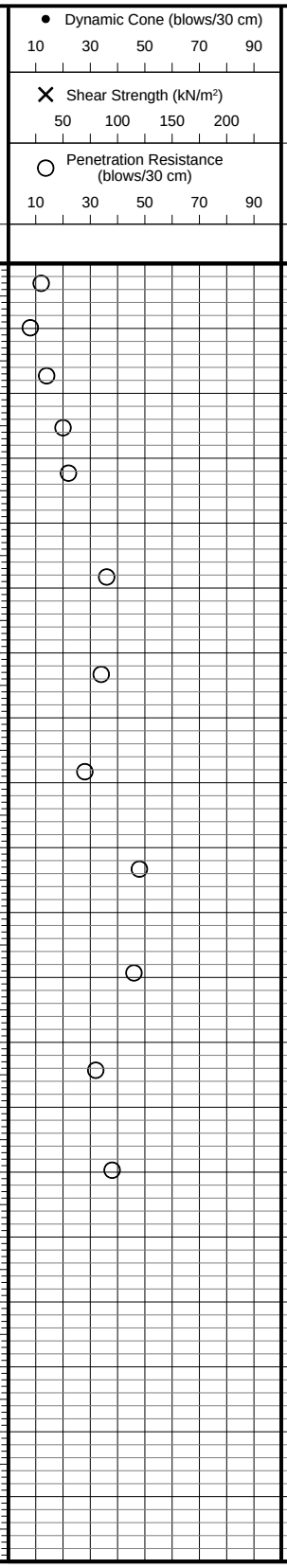
PROJECT DESCRIPTION: Proposed Residential Development

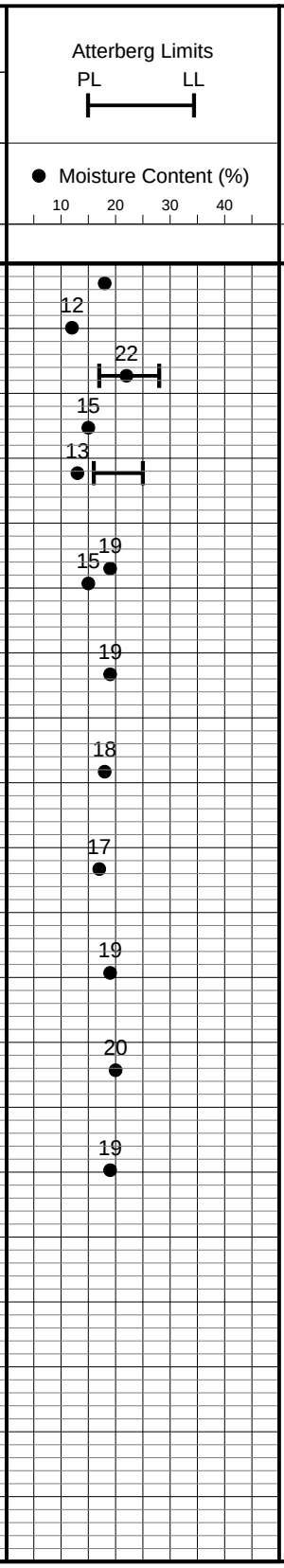
METHOD OF BORING: Hollow-Stem

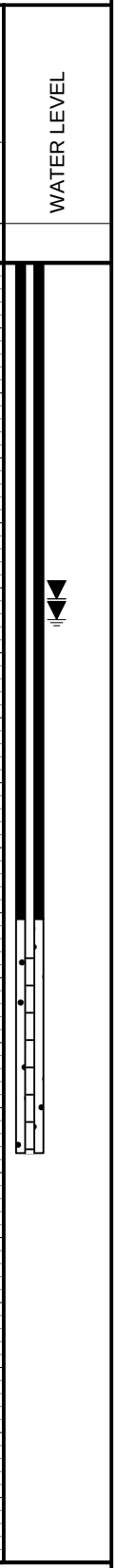
PROJECT LOCATION: 12811 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: March 16, 2022

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
293.0	Ground Surface				
0.0	**20 cm TOPSOIL**	1	DO	12	0
	Dark brown to brown				
	EARTH FILL	2	DO	8	1
291.6	sand to silty clay				
1.4	occ. topsoil inclusions				
	Brown, stiff	3	DO	14	2
290.9	**SILTY CLAY**				
2.1	some sand	4	DO	20	
	Brown, very stiff				3
	SILTY CLAY TILL	5	DO	22	
	sandy, a trace of gravel				
	occ. cobbles and boulders				4
288.2		6A			
4.8	Brown, dense	6B	DO	36	5
	SILT				
287.4	sandy, traces of clay and gravel				
5.6	Brown, very dense				6
	SAND	7	DO	34	
	fine to fine to medium grained				
	some silt to silty				7
	occ. silt layers				
		8	DO	28	8
		9	DO	48	9
					10
		10	DO	46	
	brown / grey				11
		11	DO	32	
					12
					13
278.8		12	DO	38	14
14.2	**END OF BOREHOLE**				
					15
	Installed 50 mm Ø monitoring well to 13.7 m				
	completed with 3.1 m screen				16
	Sand backfill from 10.1 to 13.7 m				
	Bentonite seal from 0.0 m to 10.1 m				17
	Provided with a momument steel casing				
	Water level reading:				18
	W.L. @ El. 287.79 masl on Mar 25, 2022				
	W.L. @ El. 287.86 masl on Apr 27, 2022				19
	W.L. @ El. 287.47 masl on May 24, 2022				
	W.L. @ El. 287.99 masl on Apr 10, 2023				20
	W.L. @ El. 287.68 masl on May 26, 2023				
	W.L. @ El. 286.95 masl on Mar 12, 2024				
	W.L. @ El. 287.85 masl on May 22, 2024				
	W.L. @ El. 289.88 masl on May 22, 2024				







Soil Engineers Ltd.

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

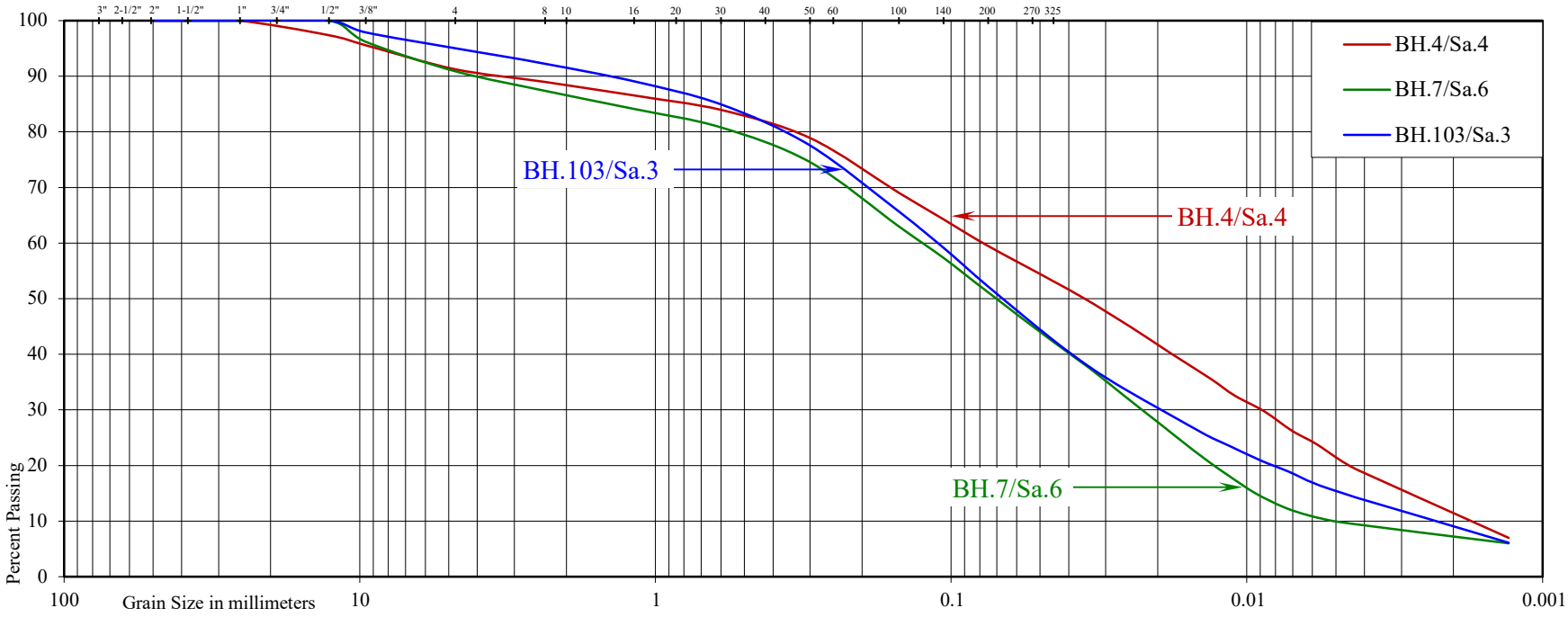
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

Borehole No:	4	7D	103
Sample No:	4	6	3
Depth (m):	2.6	4.8	1.7
Elevation (m):	291.1	287.7	290.1

BH./Sa.	4/4	7/6	103/3
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	12	11	16
Estimated Permeability (cm./sec.) =	10^{-6}	10^{-5}	10^{-6}

Classification of Sample [& Group Symbol]: SANDY SILT TILL

a trace to some clay, a trace of gravel

Figure: 16

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

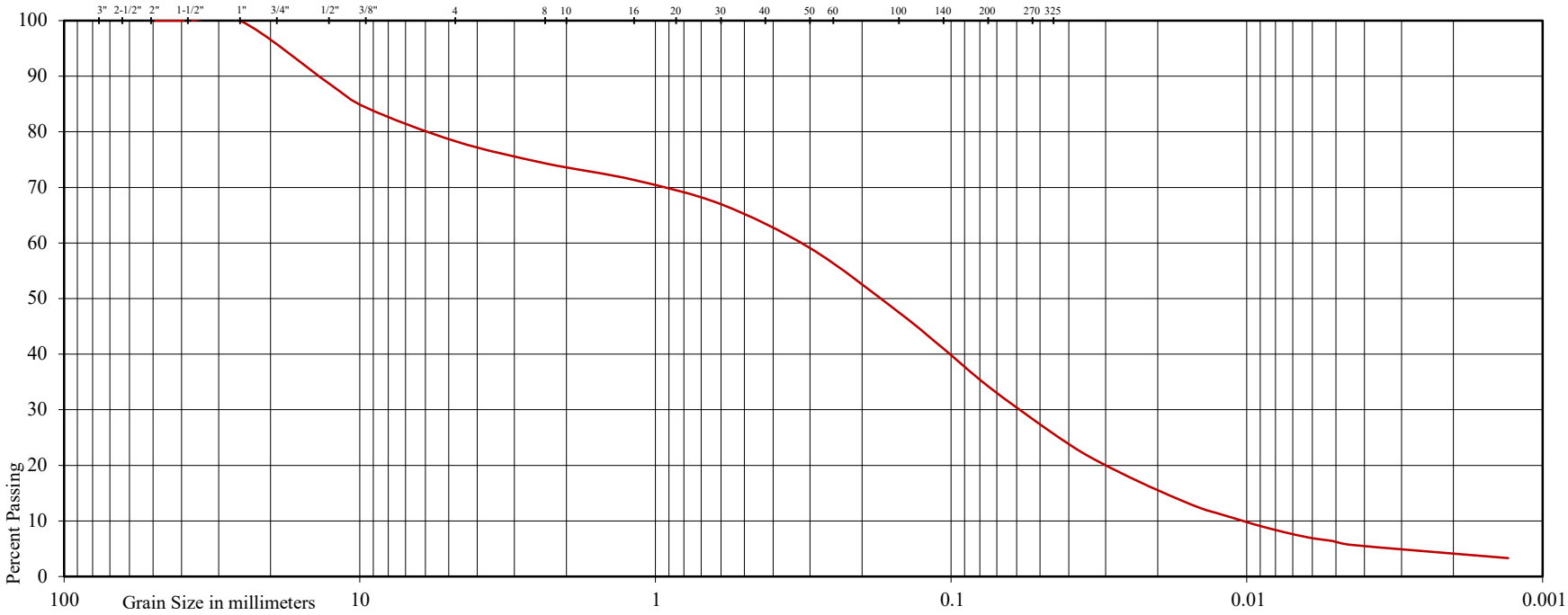
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

BH./Sa. 103/5

Liquid Limit (%) = -

Borehole No: 103

Plastic Limit (%) = -

Sample No: 5

Plasticity Index (%) = -

Depth (m): 3.2

Moisture Content (%) = 8

Elevation (m): 288.6

Estimated Permeability (cm./sec.) = 10^{-4}

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

gravelly, a trace of clay

Figure: 17

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

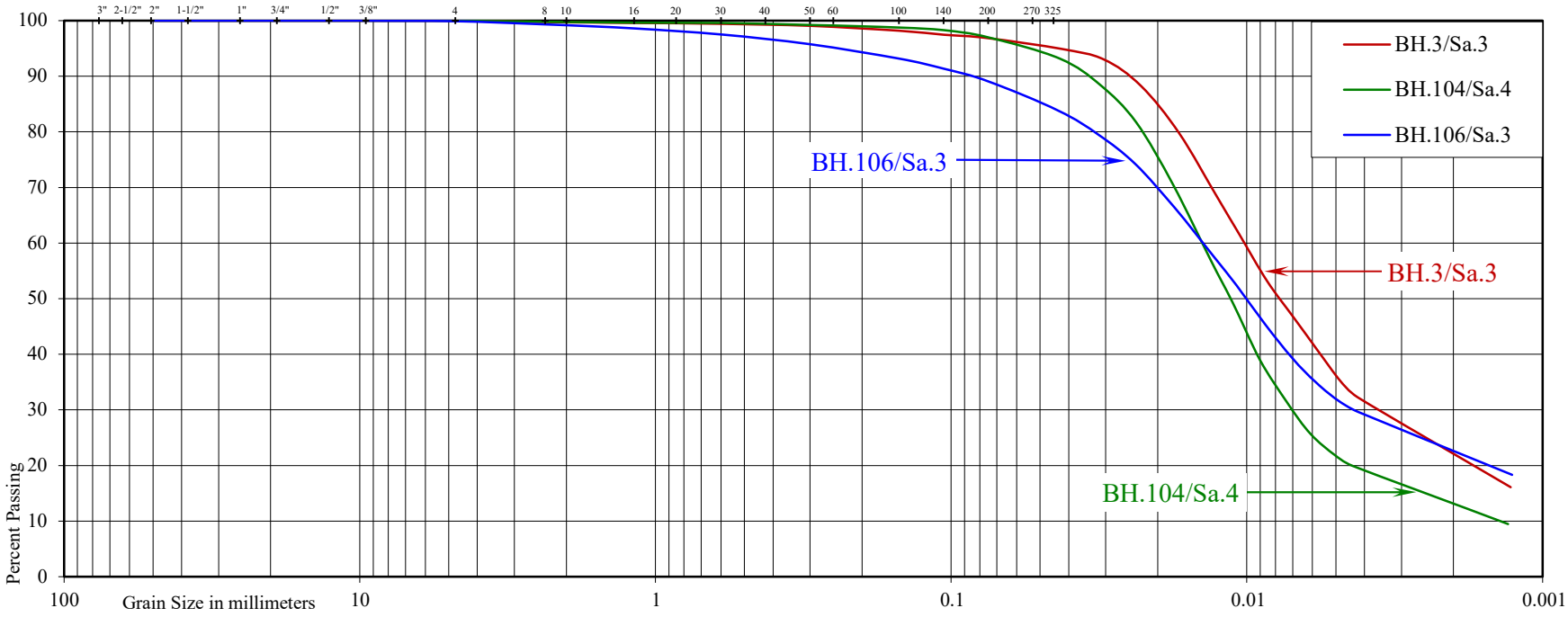
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

Borehole No:	3	104	106
Sample No:	3	4	3
Depth (m):	1.8	2.5	1.7
Elevation (m):	294.0	293.0	291.3

BH./Sa.	3/3	104/4	106/3
Liquid Limit (%) =	26	-	28
Plastic Limit (%) =	18	-	17
Plasticity Index (%) =	8	-	11
Moisture Content (%) =	19	19	22
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-6}	10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY

a trace to some sand

Figure: 18

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

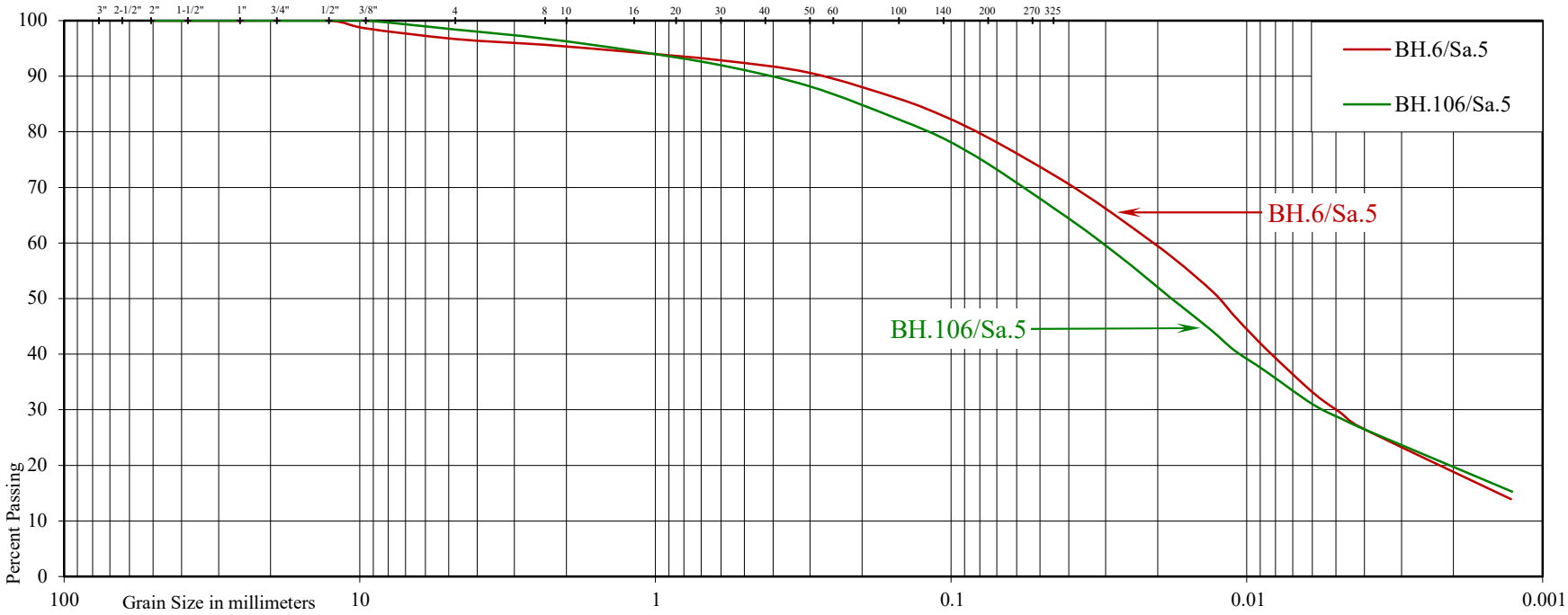
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

Borehole No:	6	106
Sample No:	5	5
Depth (m):	3.2	3.2
Elevation (m):	291.2	289.8

BH./Sa.	6/5	106/5
Liquid Limit (%) =	24	25
Plastic Limit (%) =	17	16
Plasticity Index (%) =	7	9
Moisture Content (%) =	15	13
Estimated Permeability (cm./sec.) =	10^{-7}	10^{-7}

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

some sand to sandy, a trace of gravel

Figure: 19

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

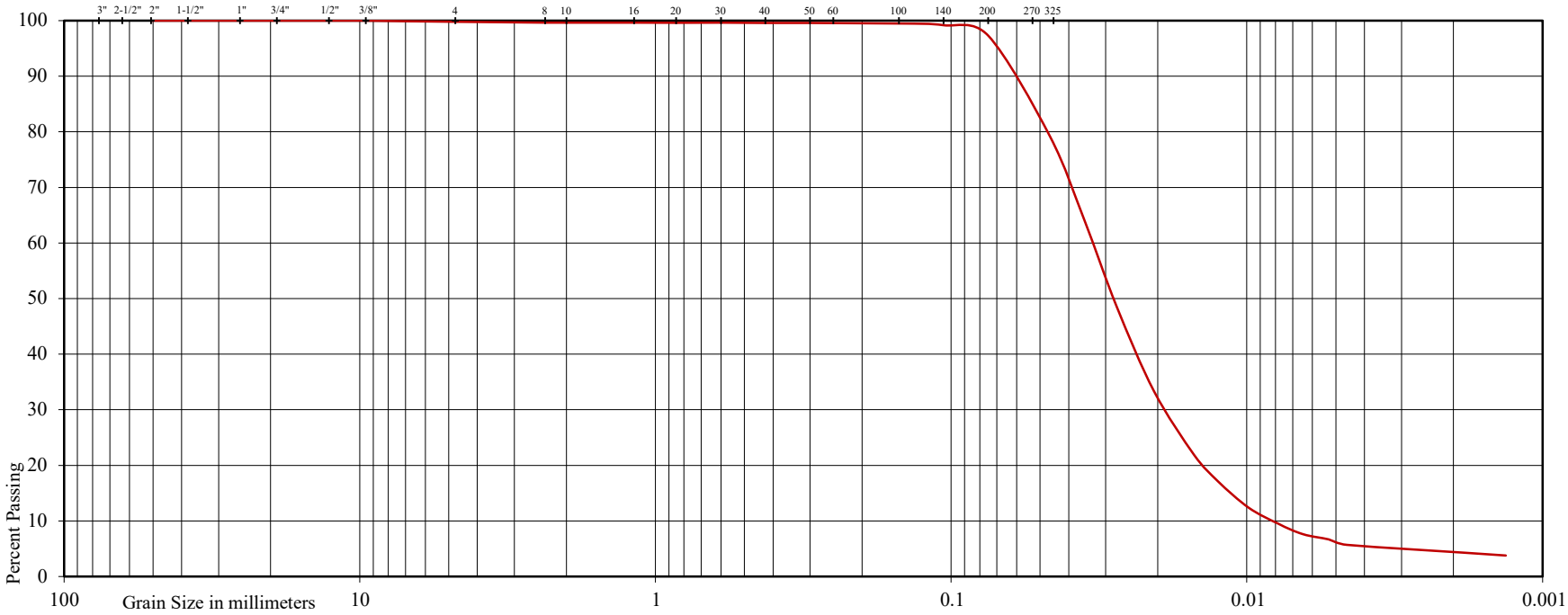
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

BH./Sa. 3/7

Liquid Limit (%) = -

Borehole No: 3

Plastic Limit (%) = -

Sample No: 7

Plasticity Index (%) = -

Depth (m): 6.3

Moisture Content (%) = 18

Elevation (m): 289.5

Estimated Permeability (cm./sec.) = 10^{-5}

Classification of Sample [& Group Symbol]: SILT

traces of fine sand and clay

Figure: 20

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

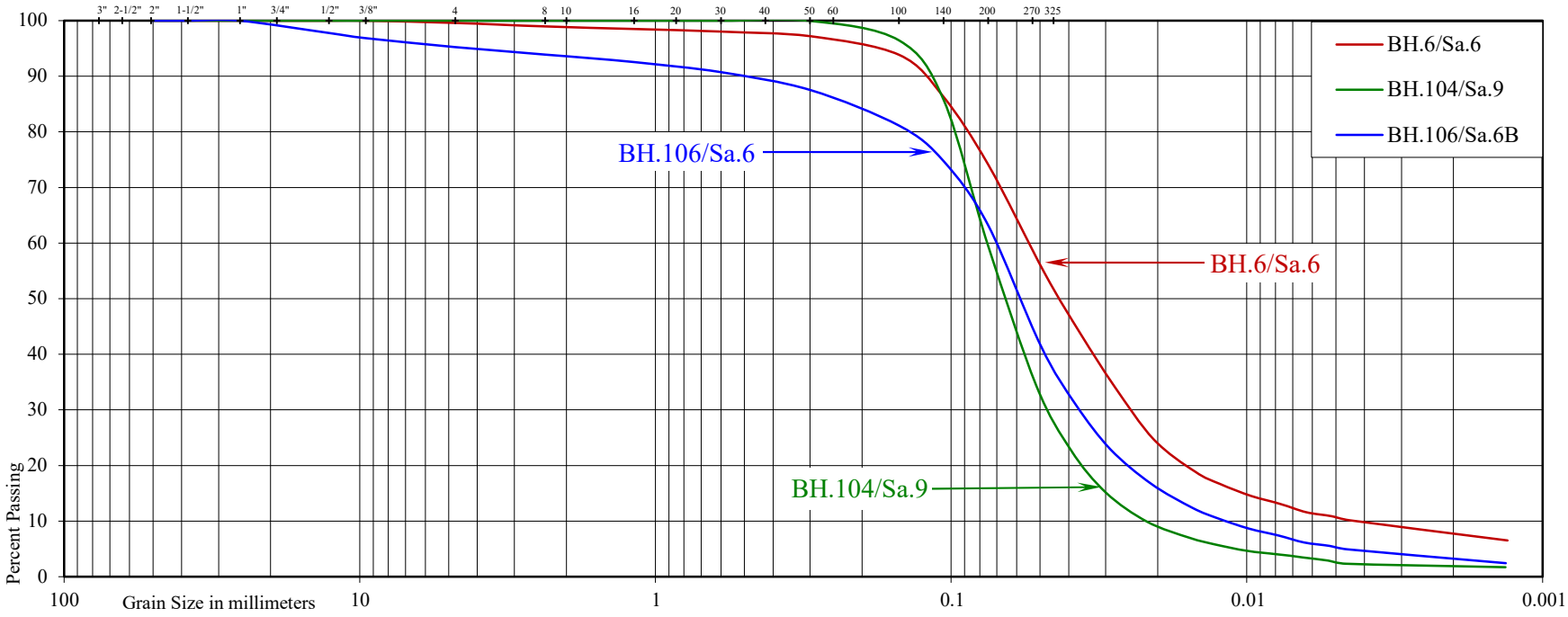
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

Borehole No:	6	104	106
Sample No:	6	9	6B
Depth (m):	4.8	2.5	5.0
Elevation (m):	289.6	293.0	288.0

BH./Sa.	6/6	104/9	106/6B
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	10	19	22
Estimated Permeability (cm./sec.) =	10^{-5}	10^{-4}	10^{-4}

Classification of Sample [& Group Symbol]: SANDY SILT

a trace of clay, occ. a trace of gravel

Figure: 21

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

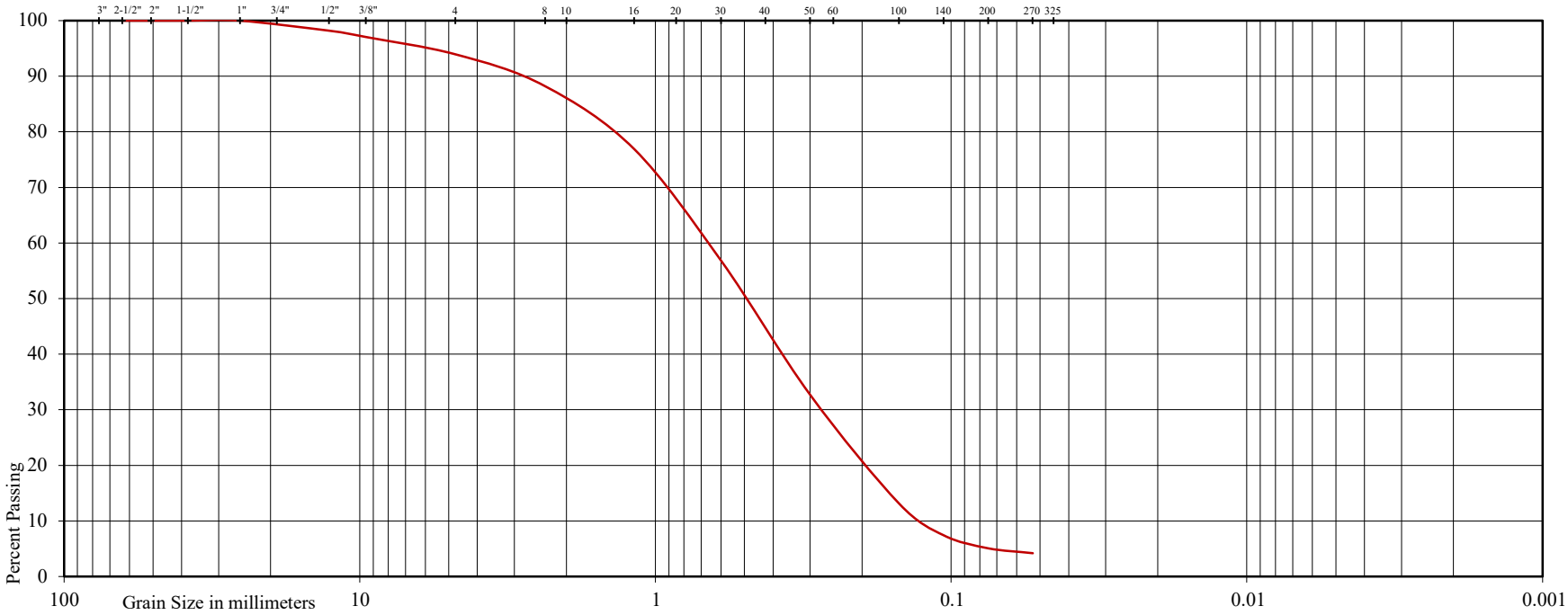
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

BH./Sa. 105/10

Liquid Limit (%) = -

Borehole No: 105

Plastic Limit (%) = -

Sample No: 10

Plasticity Index (%) = -

Depth (m): 10.9

Moisture Content (%) = 18

Elevation (m): 282.5

Estimated Permeability (cm./sec.) = 10^{-2}

Classification of Sample [& Group Symbol]: SAND

fine to medium grained, traces of silt and gravel

Figure: 22

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

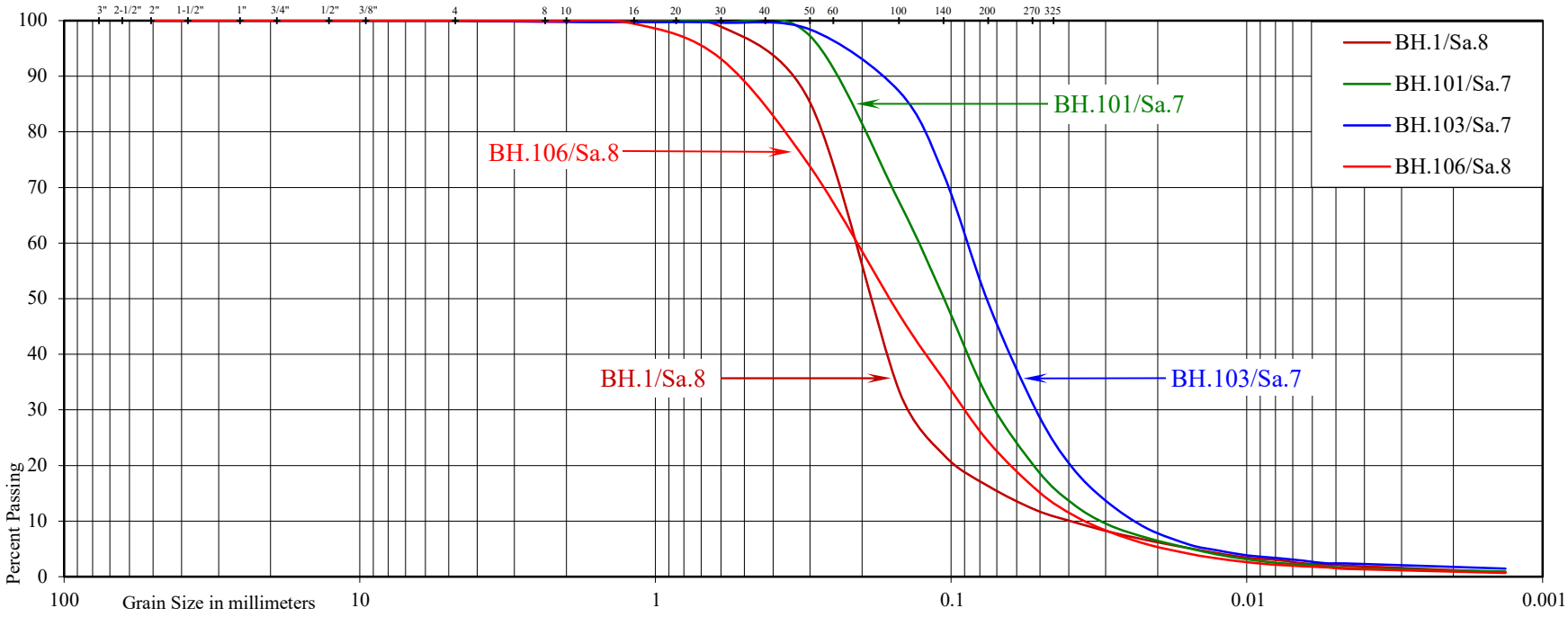
Reference No: 1910-W052

U.S. BUREAU OF SOILS CLASSIFICATION

GRAVEL		SAND				SILT	CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	V. FINE		

UNIFIED SOIL CLASSIFICATION

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	



Project: Proposed Residential Development

Location: 12811 Tenth Line, Town of Whitchurch-Stouffville

Borehole No:	1D	101	103	106
Sample No:	8	7	7	8
Depth (m):	7.9	6.3	6.3	7.8
Elevation (m):	285.7	287.6	285.5	285.2

BH./Sa.	1/8	101/7	103/7	106/8
Liquid Limit (%) =	-	-	-	-
Plastic Limit (%) =	-	-	-	-
Plasticity Index (%) =	-	-	-	-
Moisture Content (%) =	15	19	16	18
Estimated Permeability (cm./sec.) =	10^{-3}	10^{-4}	10^{-4}	10^{-3}

Classification of Sample [& Group Symbol]: SAND

fine to fine to medium grained, some silt to silty

Figure: 23

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	GRAVENHURST	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

APPENDIX 'B'

MECP WATER WELL RECORDS SUMMARY

REFERENCE NO. 1910-W052

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	1912953	Cable Tool	49.1	Water Supply	Domestic	5.8	47.2	49.1	1996-08-15
2	1913749	Cable Tool	25.3	Water Supply	Domestic	7.6	24.4	25.3	1998-07-20
3	4604230	Rotary(Convemt.) (Reverse)	61.3	Test Hole	Not Used	3.7	19.8	23.2	1969-09-10
4	4602706	Rotary(Convemt.) (Reverse)	12.2	Water Supply	Domestic	3.7	10.7	12.2	1962-08-22
5	4604125	Rotary(Convemt.) (Reverse)	65.8	Test Hole	-	-	-	-	1969-07-18
6	6908472	Cable Tool	20.7	Water Supply	Domestic	7.0	18.3	20.7	1966-10-16
7	6912298	Rotary(Convemt.) (Reverse)	21.9	Water Supply	Domestic	14.6	19.8	21.9	1974-07-11
8	6914076	Cable Tool	21.3	Water Supply	Domestic	5.5	20.1	21.0	1977-06-17
9	6915215	Cable Tool	19.8	Water Supply	Domestic	9.1	18.9	19.8	1979-11-20
10	6915456	Cable Tool	18.3	Water Supply	Domestic	7.6	17.4	18.3	1979-08-01
11	6915555	Rotary(Convemt.) (Reverse)	24.4	Water Supply	Domestic	3.7	18.0	19.8	1980-05-27
12	6924863	Cable Tool	19.5	Water Supply	Domestic	10.7	17.7	19.5	1999-04-12
13	6917898	Cable Tool	19.8	Water Supply	Domestic	5.8	18.9	19.8	1985-09-15
14	6919626	Cable Tool	27.7	Water Supply	Domestic	4.6	22.6	24.4	1988-06-09
15	6920552	Cable Tool	17.7	Water Supply	Domestic	7.6	16.8	17.7	1989-08-10
16	6920785	Cable Tool	23.2	Water Supply	Domestic	12.2	22.3	23.2	1989-10-31
17	6921454	Cable Tool	21.9	Water Supply	Domestic	11.3	20.7	21.6	1991-04-30
18	6923729	Cable Tool	18.0	Water Supply	Domestic	-0.9	16.2	18.0	1996-09-25
19	6925977	Cable Tool	26.2	Water Supply	-	7.0	2.4	3.4	2001-08-23
20	6930711	Rotary(Air)	115.0	Water Supply	Domestic	34.2	109.0	115.0	2006-08-21
21	6930712	-	-	Abandoned-Other	-	-	-	-	2006-08-29
22	7109188	Rotary(Air)	27.4	Water Supply	Domestic	11.6	-	-	2007-07-16
23	7194248	Rotary(Convemt.) (Reverse)	6.1	Observation Wells	Monitoring	-	4.6	6.1	2012-12-12
24	7205486	Rotary(Convemt.) (Reverse)	7.6	Test Hole	Monitoring and Test Hole	-	6.1	7.6	2013-01-14
25	7205632	-	-	-	-	-	-	-	2013-06-05
26	7248277	-	-	Abandoned-Other	-	-	-	-	2015-05-23
27	7258396	Boring	7.6	Observation Wells	Monitoring	-	4.6	7.6	2016-01-14
28	7258397	Boring	4.6	Observation Wells	Monitoring	-	3.0	4.6	2016-01-14
29	7258398	Boring	6.1	Observation Wells	Monitoring	-	3.0	6.1	2016-01-14
30	7258401	Boring	6.1	Observation Wells	Monitoring	-	3.0	6.1	2016-01-15
31	7282181	-	-	-	-	-	-	-	2016-07-22
32	7279554	Rotary(Convemt.) (Reverse)	9.1	Other Status	Monitoring and Test Hole	-	6.1	9.1	2016-10-20
33	7279555	Rotary(Convemt.) (Reverse)	9.1	Other Status	Monitoring and Test Hole	-	6.1	9.1	2016-10-21
34	7283606	Rotary(Convemt.) (Reverse)	7.6	Other Status	Test Hole	-	6.1	7.6	2016-06-22
35	7295152	Other Method	6.1	Dewatering	Dewatering	-1.2	4.1	6.1	2017-07-12
36	7295153	Other Method	3.3	Observation Wells	Monitoring	-	2.8	3.3	2017-07-11
37	7295154	Other Method	3.3	Observation Wells	Monitoring	-	2.8	3.3	2017-07-06
38	7295155	Other Method	3.3	Observation Wells	Monitoring	-	2.8	3.3	2017-07-10
39	7295156	Other Method	3.4	-	Monitoring	-	2.9	3.4	2017-07-06

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				
40	7295221	Other Method	7.1	-	Dewatering	2.1	5.1	7.1	2017-07-07
41	7299532	-	-	Abandoned-Other	Monitoring	4.9	-	-	2017-10-10
42	7299529	Other Method	29.3	Observation Wells	Monitoring	6.9	21.3	24.4	2017-11-03
43	7308424	-	-	-	-	-	-	-	2018-01-19
44	7314016	Boring	-	Other Status	Test Hole	-	4.6	6.1	2018-04-30
45	7314017	Boring	-	Other Status	Test Hole	-	3.0	4.6	2018-05-01
46	7314018	Boring	-	Other Status	Test Hole	-	6.1	7.6	2018-05-01
47	7314019	Boring	-	Other Status	Test Hole	-	6.1	7.6	2018-04-30
48	7321547	Boring	-	Observation Wells	Test Hole	-	5.2	8.2	2018-09-24
49	7321548	Boring	-	Observation Wells	Test Hole	-	5.2	8.2	2018-09-24
50	7336393	-	-	-	-	-	-	-	2019-04-22
51	7353458	Rotary(Convemt.) (Reverse)	9.8	Other Status	Monitoring and Test Hole	-	6.7	9.8	2019-12-04
52	7353459	Rotary(Convemt.) (Reverse)	7.6	Other Status	Monitoring and Test Hole	-	4.6	7.6	2019-12-05
53	7353460	Rotary(Convemt.) (Reverse)	9.1	Other Status	Monitoring and Test Hole	-	6.1	9.1	2019-12-05
54	7353461	Rotary(Convemt.) (Reverse)	7.9	Other Status	Monitoring and Test Hole	-	4.9	7.9	2019-12-06
55	7354871	Rotary(Convemt.) (Reverse)	9.1	Observation Wells	Monitoring and Test Hole	-	6.1	9.1	2019-12-11
56	7354872	Rotary(Convemt.) (Reverse)	9.1	Observation Wells	Monitoring and Test Hole	-	6.1	9.1	2019-12-11
57	7354873	Rotary(Convemt.) (Reverse)	9.1	Observation Wells	Monitoring and Test Hole	-	6.1	9.1	2019-12-11
58	7360748	-	-	-	-	-	-	-	2020-03-06
59	7360761	-	-	-	-	-	-	-	2020-03-04
60	7361464	Boring	7.9	Observation Wells	Monitoring	-	4.9	7.9	2020-02-11
61	7361465	Boring	9.1	Observation Wells	Monitoring	-	5.8	8.8	2020-02-11
62	7361466	Boring	8.8	Observation Wells	Monitoring	-	5.8	8.8	2020-02-11
63	7361467	Boring	6.1	Observation Wells	Monitoring	-	3.7	5.2	2020-02-11
64	7374635	-	-	-	-	-	-	-	2020-08-11
65	7374637	-	-	-	-	-	-	-	2020-08-12
66	7380336	-	-	-	-	-	-	-	2020-12-07
67	7391893	Rotary(Convemt.) (Reverse)	6.1	Observation Wells	Monitoring	-	3.0	6.1	2021-05-30
68	7398439	H.S.A.	8.2	Other Status	Monitoring and Test Hole	-	5.2	8.2	2021-08-18
69	7398440	H.S.A.	8.1	Other Status	Monitoring and Test Hole	-	5.0	8.1	2021-06-19
70	7398441	Boring	12.2	Other Status	Monitoring and Test Hole	-	9.1	12.2	2021-08-18
71	7398442	Boring	8.1	Other Status	Monitoring and Test Hole	-	5.0	8.1	2021-08-17
72	7400893	Boring	6.1	Test Hole	Test Hole	-	3.7	6.7	2021-06-09
73	7402887	-	-	-	-	-	-	-	2021-04-17
74	7412138	-	-	-	-	-	-	-	2021-12-16
75	7429150	-	-	-	-	-	-	-	2022-09-06
76	7429151	-	-	-	-	-	-	-	2022-09-06
77	7429152	-	-	-	-	-	-	-	2022-09-06

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				
78	7429153	-	-	-	-	-	-	-	2022-09-07
79	7435307	-	-	-	-	-	-	-	2022-03-16
80	7439519	-	-	-	-	-	-	-	2022-09-30
81	7451897	-	-	-	-	-	-	-	2022-06-24
82	7467973	-	-	-	-	-	-	-	2023-08-10
83	7482923	H.S.A.	7.6	Observation Wells	Monitoring	-	4.6	7.6	2024-05-08
84	7482944	Other Method	146.3	Observation Wells	Monitoring	50.1	122.0	128.1	2024-07-02
85	7483837	H.S.A.	9.1	Observation Wells	Monitoring and Test Hole	-	3.0	6.1	2024-07-15

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	GRAVENHURST	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

APPENDIX 'C-1'

Groundwater Level Monitoring Summary

REFERENCE NO. 1910-W052

BH/MW	Ground Level Elevation (masl)	Units	8-Apr-20	25-May-20	29-Jun-20	28-Aug-20	28-Oct-20	29-Dec-20	26-Feb-21	27-Apr-21	25-Jun-21	27-Aug-21	29-Oct-21	21-Dec-21	3-Mar-22
1D	293.62	mbgs	Dry	5.90	6.33	6.42	6.87	6.91	Dry	6.60	6.88	Dry	Dry	6.57	6.24
		masl	<286.02	287.72	287.29	287.20	286.75	286.71	<286.02	287.02	286.74	<286.02	<286.02	287.05	287.38
1S	293.61	mbgs	Dry	5.87	5.97	5.96	5.97	5.98	5.98	5.98	5.97	5.97	6.00	5.98	5.98
		masl	<287.51	287.74	287.64	287.65	287.64	287.63	287.63	287.63	287.64	287.64	287.61	287.63	287.63
2	291.75	mbgs	Dry	4.43	4.88	4.84	5.39	5.54	5.50	5.05	5.37	5.66	5.61	4.88	4.59
		masl	<285.65	287.32	286.87	286.91	286.36	286.21	286.25	286.70	286.38	286.09	286.14	286.87	287.16
3	295.75	mbgs	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
		masl	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65
4	293.65	mbgs	5.70	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
		masl	287.95	<287.55	<287.55	<287.55	<287.55	<287.55	<287.55	<287.55	<287.55	<287.55	<287.55	<287.55	<287.55
5	295.84	mbgs	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
		masl	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74
6	294.41	mbgs	Dry	6.03	6.00	5.94	5.96	Dry	Dry	Dry	5.97	Dry	6.00	5.97	5.97
		masl	<288.31	288.38	288.41	288.47	288.45	<288.31	<288.31	<288.31	288.44	<288.31	288.41	288.44	288.44
7S	292.49	mbgs	4.44	5.02	5.32	5.43	5.67	5.72	5.71	5.39	5.74	5.96	5.86	5.42	5.00
		masl	288.05	287.47	287.17	287.06	286.82	286.77	286.78	287.10	286.75	286.53	286.63	287.07	287.49
7D	292.53	mbgs	4.37	4.90	5.21	5.29	5.54	5.57	5.58	5.27	5.62	5.86	5.70	5.28	4.90
		masl	288.16	287.63	287.32	287.24	286.99	286.96	286.95	287.26	286.91	286.67	286.83	287.25	287.63
101	293.94	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
		masl													
102	293.18	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
		masl													
103	291.76	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
		masl													
104	295.47	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
		masl													
105	293.39	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
		masl													
106	292.96	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
		masl													

NI - Not Installed
NA - Not Accessible

BH/MW	Ground Level Elevation (masl)	Units	25-Mar-22	27-Apr-22	24-May-22	30-Jun-22	21-Sep-22	18-Dec-22	10-Apr-23	26-May-23	13-Jun-23	19-Jul-23	23-Nov-23	24-Jan-24	12-Mar-24
1D	293.62	mbgs	5.73	5.55	5.93	6.36	7.02	Dry	5.53	5.72	5.94	6.10	6.79	6.48	6.07
		masl	287.89	288.07	287.69	287.26	286.60	<286.02	288.09	287.90	287.68	287.52	286.83	287.14	287.55
1S	293.61	mbgs	5.78	5.54	5.91	5.98	5.96	5.98	5.62	5.69	5.92	5.94	5.95	5.96	5.95
		masl	287.83	288.07	287.70	287.63	287.65	287.63	287.99	287.92	287.69	287.67	287.66	287.65	287.66
2	291.75	mbgs	3.87	3.99	4.43	4.90	5.50	5.77	3.18	4.20	4.42	4.63	5.29	5.06	4.48
		masl	287.88	287.76	287.32	286.85	286.25	285.98	288.57	287.55	287.33	287.12	286.46	286.69	287.27
3	295.75	mbgs	Dry	Dry	Dry	Dry	Dry	6.06	Dry	Dry	Dry	Dry	Dry	Dry	Dry
		masl	<289.65	<289.65	<289.65	<289.65	<289.65	289.69	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65	<289.65
4	293.65	mbgs	Dry	5.88	6.04	Dry	Dry	Dry	5.80	5.99	Dry	Dry	Dry	Dry	Dry
		masl	<287.55	287.77	287.61	<287.55	<287.55	<287.55	287.85	287.66	<287.55	<287.55	<287.55	<287.55	<287.55
5	295.84	mbgs	Dry	Dry	Dry	Dry	Dry	Dry	4.77	5.95	5.94	5.91	5.90	5.90	5.90
		masl	<289.74	<289.74	<289.74	<289.74	<289.74	<289.74	291.07	289.89	289.90	289.93	289.94	289.94	289.94
6	294.41	mbgs	5.98	5.98	5.97	5.99	5.98	5.99	5.97	5.97	5.97	NA	5.96	Dry	5.97
		masl	288.43	288.43	288.44	288.42	288.43	288.42	288.44	288.44	288.44		288.45	<288.31	288.44
7S	292.49	mbgs	4.25	4.73	5.00	5.38	5.78	5.88	4.22	4.80	4.92	5.11	5.51	5.46	4.87
		masl	288.24	287.76	287.49	287.11	286.71	286.61	288.27	287.69	287.57	287.38	286.98	287.03	287.62
7D	292.53	mbgs	4.30	4.60	4.88	5.26	5.65	5.76	4.11	4.67	4.78	4.99	5.38	5.12	4.75
		masl	288.23	287.93	287.65	287.27	286.88	286.77	288.42	287.86	287.75	287.54	287.15	287.41	287.78
101	293.94	mbgs	5.97	5.72	6.10	6.52	7.13	7.43	5.64	5.87	6.09	6.26	6.92	6.63	6.21
		masl	287.97	288.22	287.84	287.42	286.81	286.51	288.30	288.07	287.85	287.68	287.02	287.31	287.73
102	293.18	mbgs	5.23	5.16	5.57	6.03	6.61	6.90	5.06	5.35	5.57	5.75	6.41	6.09	5.66
		masl	287.95	288.02	287.61	287.15	286.57	286.28	288.12	287.83	287.61	287.43	286.77	287.09	287.52
103	291.76	mbgs	3.96	3.98	4.40	4.87	5.45	5.71	3.86	4.35	4.40	4.60	5.24	4.92	4.48
		masl	287.80	287.78	287.36	286.89	286.31	286.05	287.90	287.41	287.36	287.16	286.52	286.84	287.28
104	295.47	mbgs	7.37	7.18	7.53	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged	Damaged
		masl	288.10	288.29	287.94										
105	293.39	mbgs	5.49	5.38	5.76	6.20	6.79	7.08	5.28	5.55	5.75	5.94	6.59	6.31	6.31
		masl	287.90	288.01	287.63	287.19	286.60	286.31	288.11	287.84	287.64	287.45	286.80	287.08	287.08
106	292.96	mbgs	5.17	5.10	5.49	5.94	6.51	6.78	4.97	5.28	5.49	5.88	6.30	6.01	6.01
		masl	287.79	287.86	287.47	287.02	286.45	286.18	287.99	287.68	287.47	287.08	286.66	286.95	286.95

NI - Not Installed
NA - Not Accessible

BH/MW	Ground Level Elevation (masl)	Units	22-May-24	31-Jul-24	25-Sep-24	24-Dec-25	7-Jan-26
1D	293.62	mbgs	5.51	6.13	6.31	Dry	Dry
		masl	288.11	287.49	287.31	<286.02	<286.02
1S	293.61	mbgs	5.49	5.95	5.96	Dry	Dry
		masl	288.12	287.66	287.65	<287.51	<287.51
2	291.75	mbgs	4.05	4.62	4.90	Dry	Dry
		masl	287.70	287.13	286.85	<285.65	<285.65
3	295.75	mbgs	5.80	5.87	Dry	Dry	Dry
		masl	289.95	289.88	<289.65	<289.65	<289.65
4	293.65	mbgs	Dry	Dry	Dry	Dry	Dry
		masl	<287.55	<287.55	<287.55	<287.55	<287.55
5	295.84	mbgs	5.96	5.92	5.92	Dry	Dry
		masl	289.88	289.92	289.92	<289.74	<289.74
6	294.41	mbgs	5.97	5.97	5.96	Dry	Dry
		masl	288.44	288.44	288.45	<288.31	<288.31
7S	292.49	mbgs	4.69	5.16	5.31	5.79	5.70
		masl	287.80	287.33	287.18	286.70	286.79
7D	292.53	mbgs	4.56	5.03	5.18	5.65	5.57
		masl	287.97	287.50	287.35	286.88	286.96
101	293.94	mbgs	5.66	6.26	6.52	7.37	7.36
		masl	288.28	287.68	287.42	286.57	286.58
102	293.18	mbgs	5.16	5.74	6.01	6.85	6.80
		masl	288.02	287.44	287.17	286.33	286.38
103	291.76	mbgs	4.02	4.57	4.85	NA	5.65
		masl	287.74	287.19	286.91		286.11
104	295.47	mbgs	Damaged	Damaged	Damaged	Damaged	Damaged
		masl					
105	293.39	mbgs	5.36	5.94	6.20	7.02	6.98
		masl	288.03	287.45	287.19	286.37	286.41
106	292.96	mbgs	5.11	5.67	5.93	6.72	6.69
		masl	287.85	287.29	287.03	286.24	286.27

NI - Not Installed
NA - Not Accessible

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

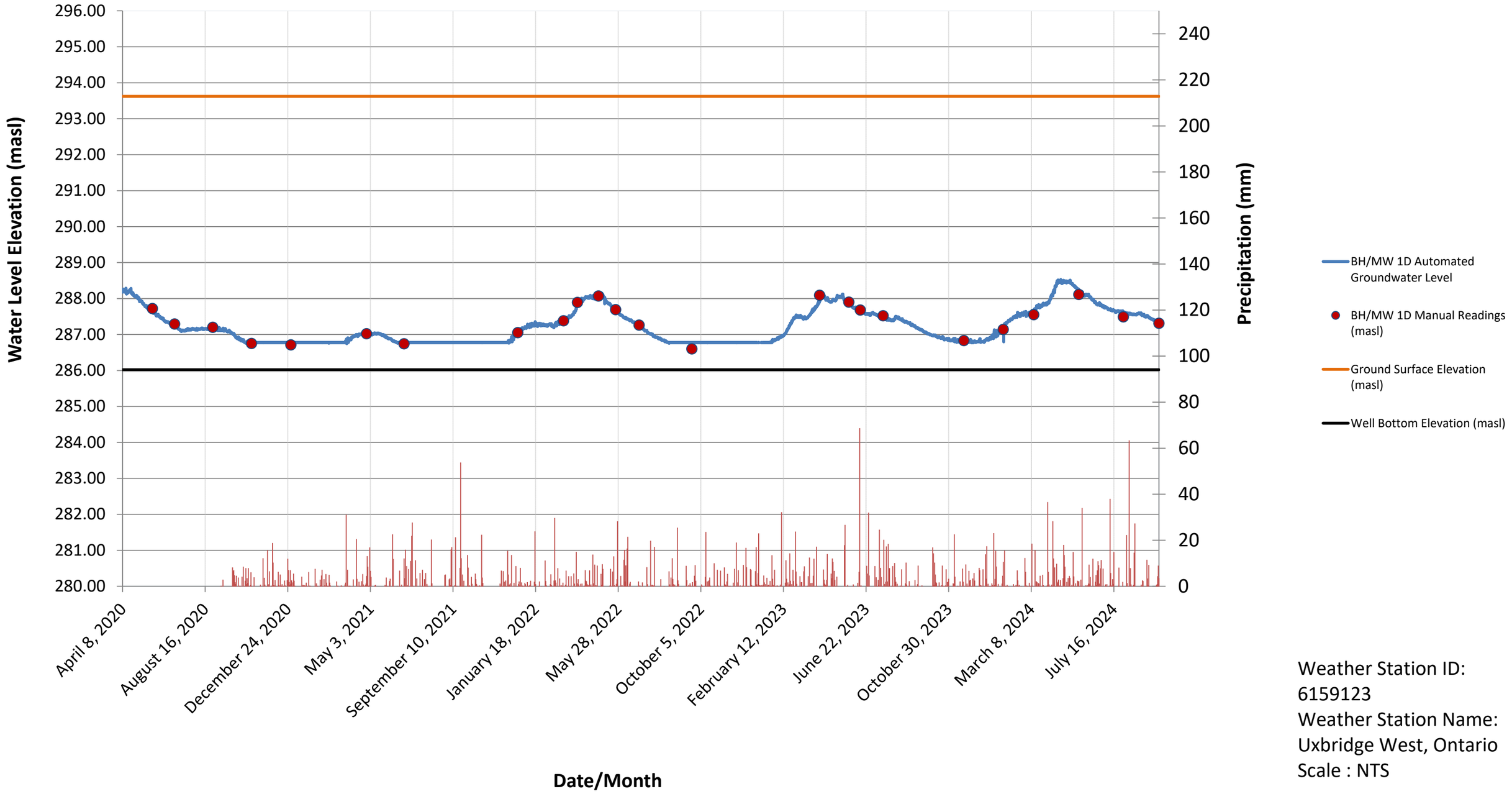
BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	GRAVENHURST	HAMILTON
TEL: (705) 721-7863	TEL: (905) 542-7605	TEL: (905) 440-2040	TEL: (905) 853-0647	TEL: (705) 684-4242	TEL: (905) 777-7956
FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 542-2769

APPENDIX 'C-2'

Hydrographs

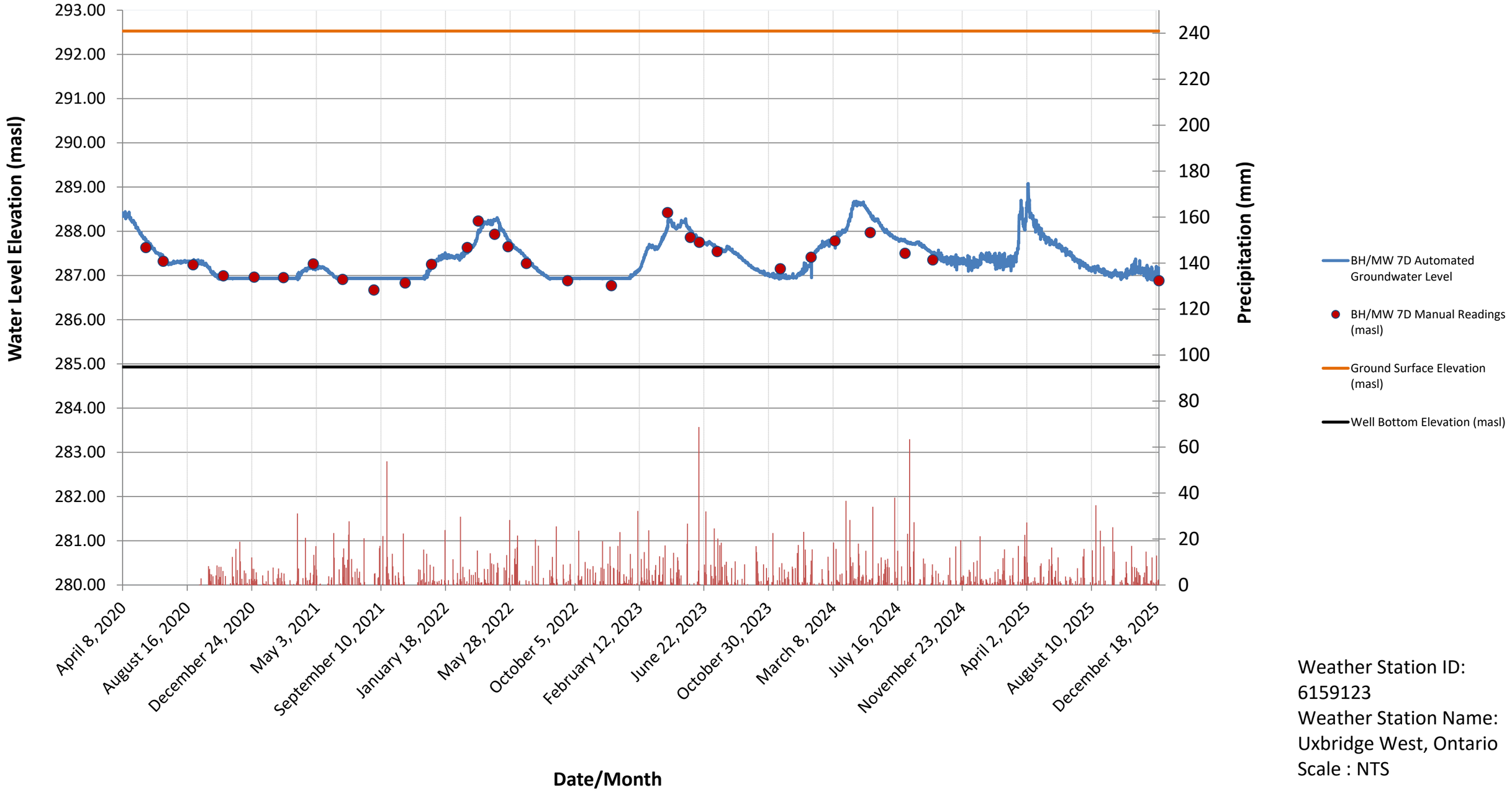
REFERENCE NO. 1910-W052

Hydrograph : BH/MW 1D



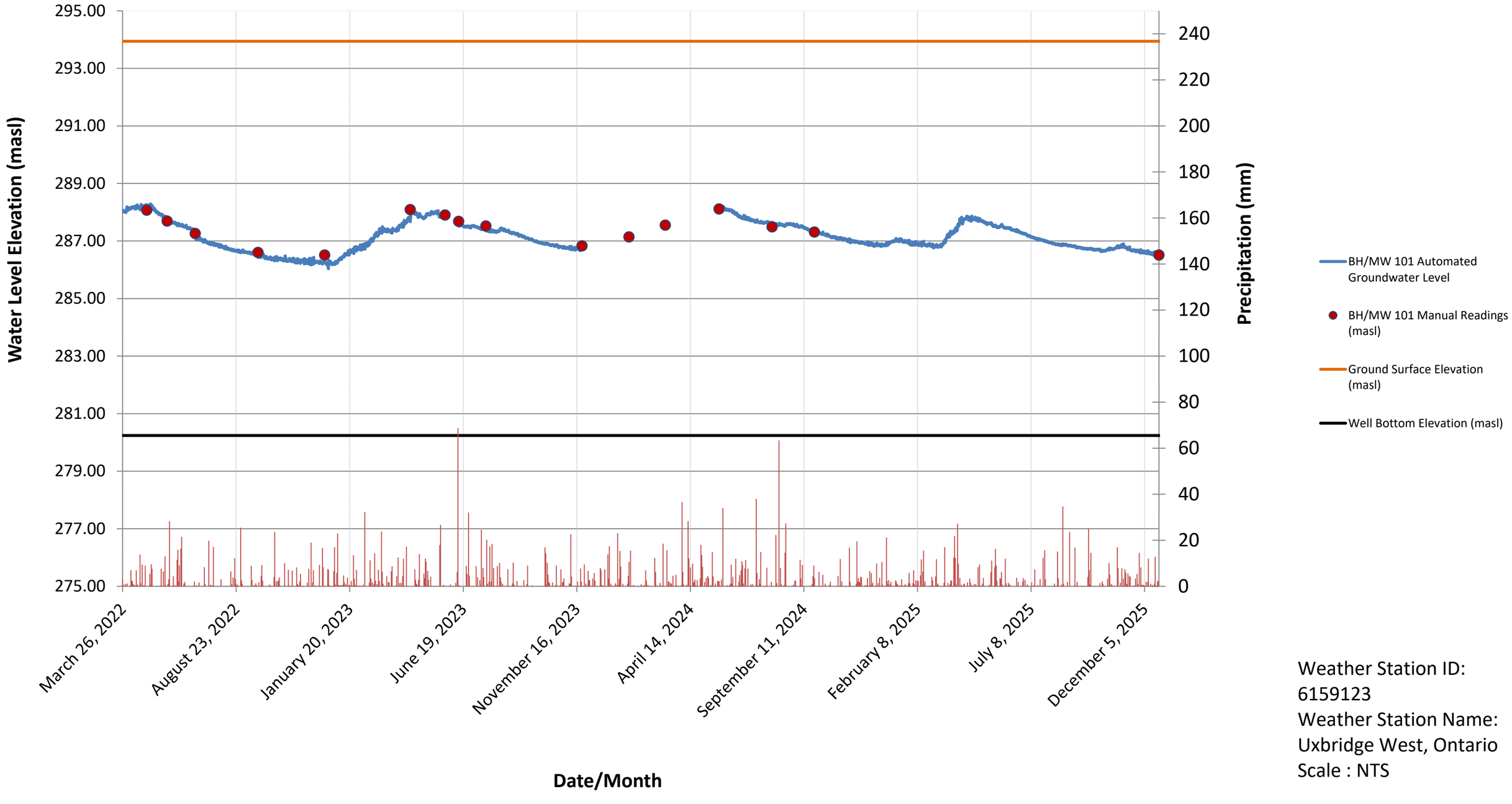
Weather Station ID: 6159123
Weather Station Name: Uxbridge West, Ontario
Scale : NTS

Hydrograph : BH/MW 7D



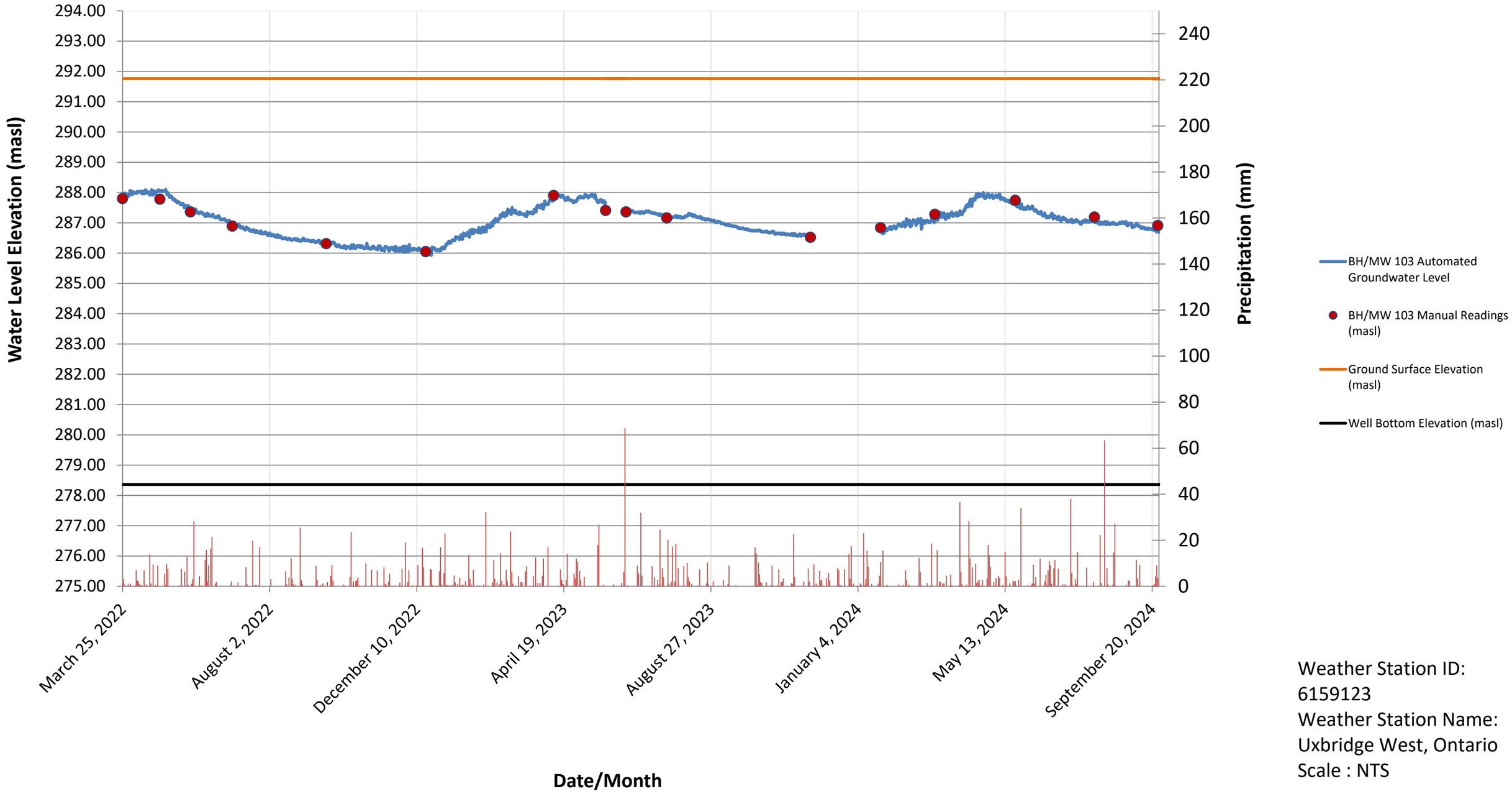
Weather Station ID: 6159123
Weather Station Name: Uxbridge West, Ontario
Scale : NTS

Hydrograph : BH/MW 101



Weather Station ID: 6159123
Weather Station Name: Uxbridge West, Ontario
Scale : NTS

Hydrograph : BH/MW 103



Weather Station ID: 6159123
Weather Station Name: Uxbridge West, Ontario
Scale : NTS

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	GRAVENHURST	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

APPENDIX 'D'

Results of the Single Well Response Test

REFERENCE NO. 1910-W052

Falling Head Test (Slug Test)

Test Date:		30-Jun-22	
Piezometer/Well No.:		**BH/MW 7D**	
Ground level:		292.53	m
Screen top level:		288.03	m
Screen bottom level:		285.03	m
Test El. (at midpoint of screen):		286.53	m
Test depth (at midpoint of screen):		6	m
Screen length	L=	3.0	m
Diameter of undisturbed portion (	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.1892	m
Initial water depth		5.26	m
Aquifer material:		**Sandy Silt Till and Sandy Silt**	

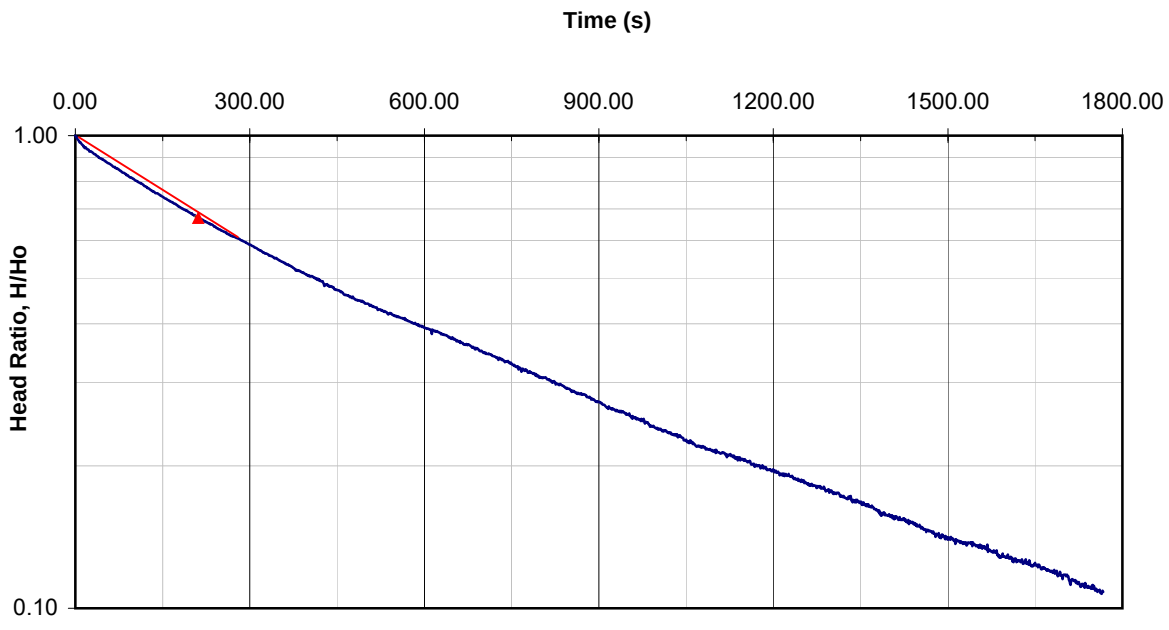
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.701815$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 0.003248072$

K= **1.1E-04** cm/s

1.1E-06 m/s



Falling Head Test (Slug Test)

Test Date:		30-Jun-22	
Piezometer/Well No.:		**BH/MW 101**	
Ground level:		293.94	m
Screen top level:		283.74	m
Screen bottom level:		280.74	m
Test El. (at midpoint of screen):		282.24	m
Test depth (at midpoint of screen):		11.7	m
Screen length	L=	3.0	m
Diameter of undisturbed portion (	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.0123	m
Initial water depth		6.52	m
Aquifer material:		**SAND**	

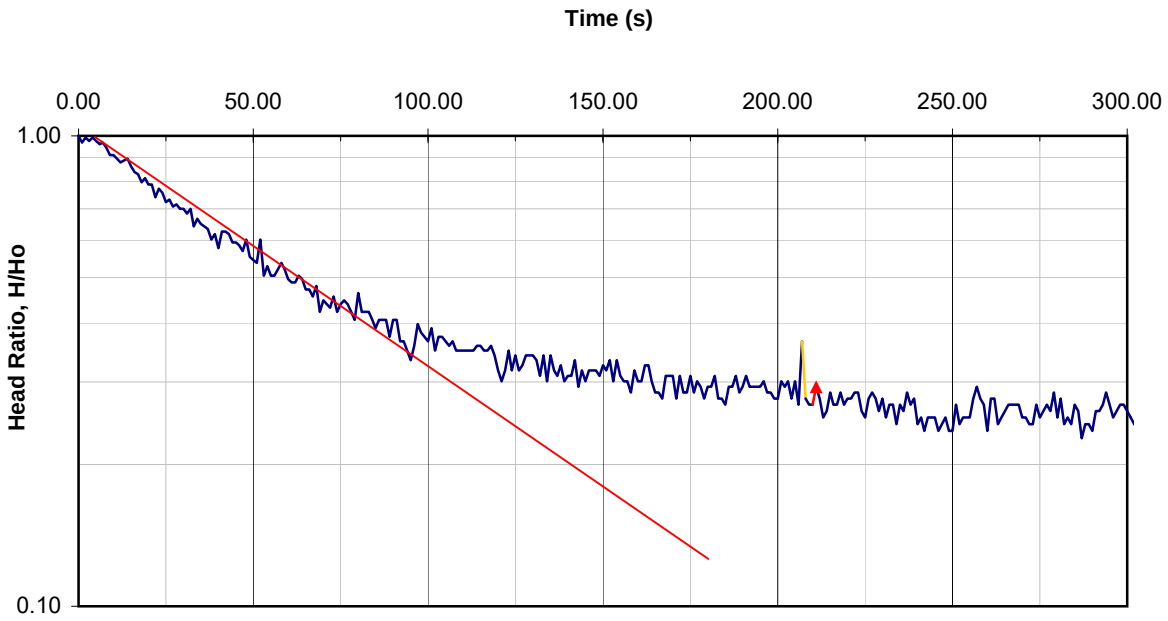
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.701815$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 0.01262316$

K= **4.3E-04** cm/s

4.3E-06 m/s



Falling Head Test (Slug Test)

Test Date:		30-Jun-22	
Piezometer/Well No.:		**BH/MW 102**	
Ground level:		293.18	m
Screen top level:		282.28	m
Screen bottom level:		279.28	m
Test El. (at midpoint of screen):		280.78	m
Test depth (at midpoint of screen):		12.4	m
Screen length	L=	3.0	m
Diameter of undisturbed portion	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.0282	m
Initial water depth		6.03	m
Aquifer material:		**Sand**	

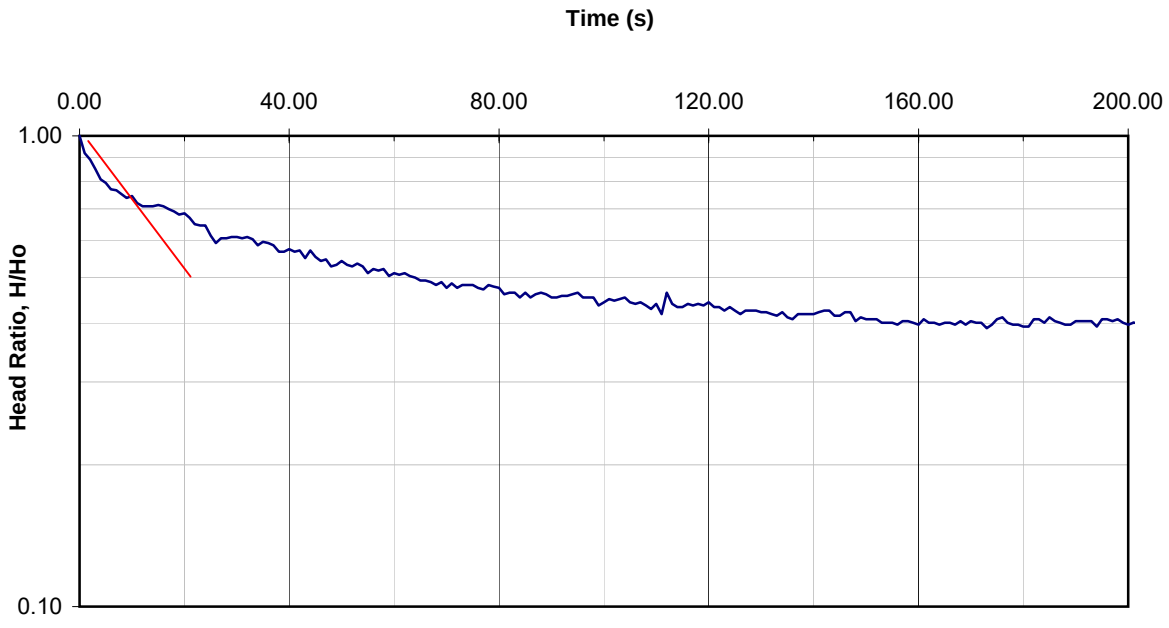
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.701815$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 0.014485449$

K= **5.0E-04** cm/s

5.0E-06 m/s



Falling Head Test (Slug Test)

Test Date:		30-Jun-22	
Piezometer/Well No.:		**BH/MW 103**	
Ground level:		291.76	m
Screen top level:		281.76	m
Screen bottom level:		278.76	m
Test El. (at midpoint of screen):		280.26	m
Test depth (at midpoint of screen):		11.5	m
Screen length	L=	3.0	m
Diameter of undisturbed portion (	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.0135	m
Initial water depth		4.87	m
Aquifer material:		**SAND**	

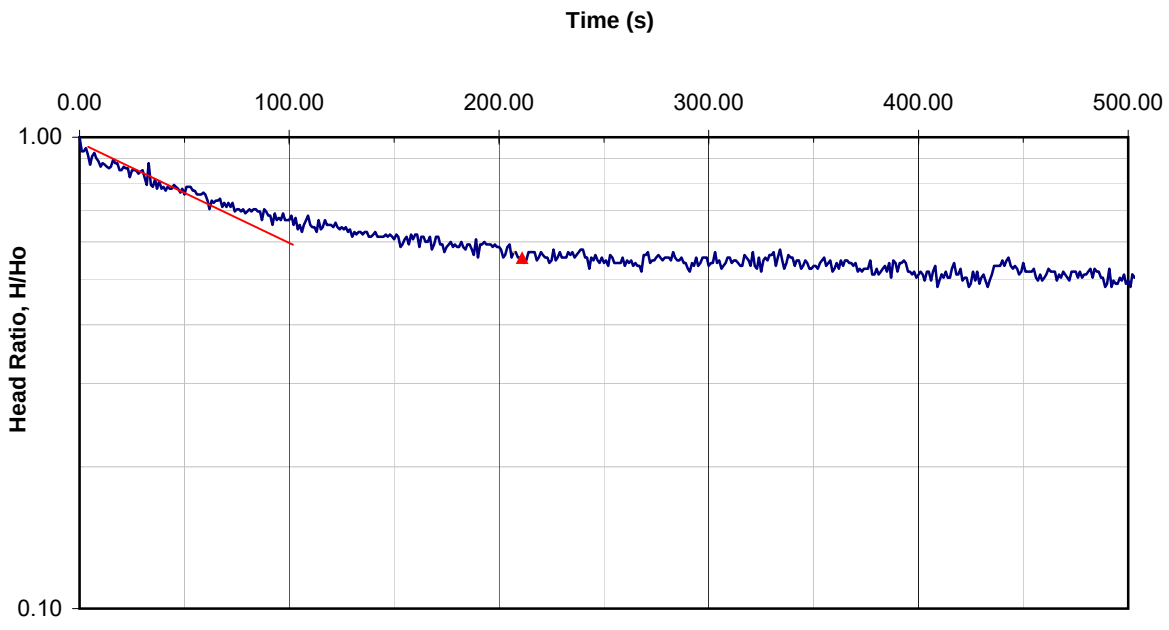
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.701815$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 0.006842765$

K= **2.4E-04** cm/s

2.4E-06 m/s



Falling Head Test (Slug Test)

Test Date:		30-Jun-22	
Piezometer/Well No.:		**BH/MW 105**	
Ground level:		293.39	m
Screen top level:		282.59	m
Screen bottom level:		279.59	m
Test El. (at midpoint of screen):		281.09	m
Test depth (at midpoint of screen):		12.3	m
Screen length	L=	3.0	m
Diameter of undisturbed portion (	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.0186	m
Initial water depth		6.2	m
Aquifer material:		**SAND**	

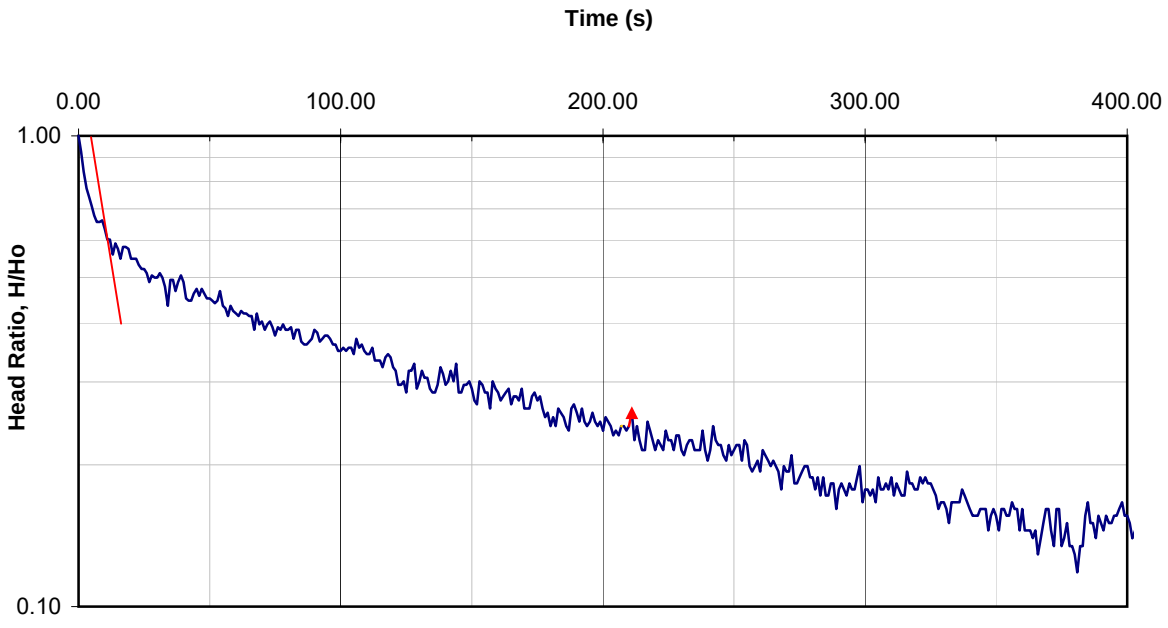
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.701815$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 0.037548366$

K= **1.3E-03** cm/s

1.3E-05 m/s



Falling Head Test (Slug Test)

Test Date:		30-Jun-22	
Piezometer/Well No.:		**BH/MW 106**	
Ground level:		292.96	m
Screen top level:		281.96	m
Screen bottom level:		278.96	m
Test El. (at midpoint of screen):		280.46	m
Test depth (at midpoint of screen):		12.5	m
Screen length	L=	3.0	m
Diameter of undisturbed portion (	2R=	0.22	m
Standpipe diameter	2r=	0.05	m
Initial unbalanced head	Ho=	-0.0113	m
Initial water depth		5.94	m
Aquifer material:		**Sand**	

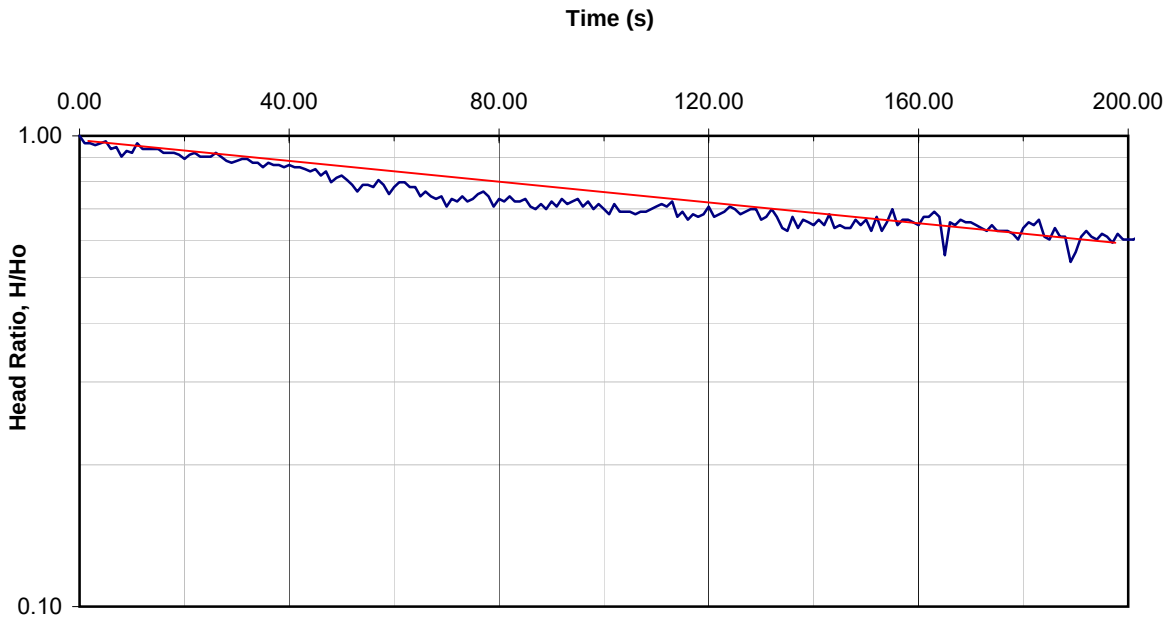
Shape factor $F = \frac{2 \times 3.14 \times L}{\ln(L/R)} = 5.701815$ m

Permeability $K = \frac{3.14 \times r2}{F \times (t2 - t1)} \times \ln(H1/H2)$ (Bouwer and Rice Method)

$\frac{\ln(H1/H2)}{(t2 - t1)} = 0.003192189$

K= **1.1E-04** cm/s

1.1E-06 m/s



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	GRAVENHURST	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

APPENDIX 'E'

Groundwater Quality Test Results

REFERENCE NO. 1910-W052

FINAL REPORT

CA40227-JUN22 R1

1910-W052, 12779 and 12811 Tenth line, Whitchurch - Stouffville

Prepared for

Soil Engineers Ltd.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Soil Engineers Ltd.
Address	90 West Beaver Creek Rd Richmond Hill, ON M1S 3A7. Canada
Contact	Harpreet Singh
Telephone	416-7548515 ext 1606
Facsimile	416-754-8516
Email	harpreet.singh@soilengineersltd.com;angella.graham@soileng
Project	1910-W052, 12779 and 12811 Tenth line, Whitchurch - Stouffvi
Order Number	
Samples	Ground Water (2)

LABORATORY DETAILS

Project Specialist	Jill Campbell, B.Sc.,GISAS
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	2165
Facsimile	705-652-6365
Email	jill.campbell@sgs.com
SGS Reference	CA40227-JUN22
Received	06/30/2022
Approved	07/11/2022
Report Number	CA40227-JUN22 R1
Date Reported	07/11/2022

COMMENTS

RL - SGS Reporting Limit

Nonylphenol Ethoxylates is the sum of nonylphenol monoethoxylate and nonylphenol diethoxylate.

Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 032720

SIGNATORIES

Jill Campbell, B.Sc.,GISAS

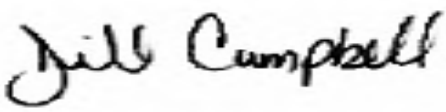


TABLE OF CONTENTS

Client: Soil Engineers Ltd.

Project: 1910-W052, 12779 and 12811 Tenth line, Whitchurch - Stouffville

Project Manager: Harpreet Singh

Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

				Sample Number	8	9
				Sample Name	BH/MW 2	BH/MW 2 Dissolved Metals
				Sample Matrix	Ground Water	Ground Water
				Sample Date	30/06/2022	30/06/2022
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
General Chemistry						
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	< 4 ↑	---
Total Suspended Solids	mg/L	2	350	15	9	---
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	< 0.5	---
Metals and Inorganics						
Sulphate	mg/L	0.2	1500		14	---
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01	---
Fluoride	mg/L	0.06	10		< 0.06	---
Aluminum (total)	mg/L	0.001	50		4.70	0.003
Antimony (total)	mg/L	0.0009	5		< 0.0009	< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0022	< 0.0002
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000059	< 0.000003
Chromium (total)	mg/L	0.00008	2	0.08	0.00656	0.00080
Cobalt (total)	mg/L	0.000004	5		0.00377	0.000027
Copper (total)	mg/L	0.0002	3	0.05	0.0099	0.0010
Lead (total)	mg/L	0.00009	1	0.12	0.00496	< 0.00009
Manganese (total)	mg/L	0.00001	5	0.15	0.302	0.00011
Molybdenum (total)	mg/L	0.00004	5		0.00025	0.00082
Nickel (total)	mg/L	0.0001	2	0.08	0.0069	< 0.0001
Phosphorus (total)	mg/L	0.003	10	0.4	0.363	< 0.003
Selenium (total)	mg/L	0.00004	1	0.02	0.00008	0.00049
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005	< 0.00005

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779 and 12811 Tenth line, Whitchurch - Stouffville
Project Manager: Harpreet Singh
Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

				Sample Number	8	9
				Sample Name	BH/MW 2	BH/MW 2 Dissolved Metals
				Sample Matrix	Ground Water	Ground Water
				Sample Date	30/06/2022	30/06/2022
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Metals and Inorganics (continued)						
Tin (total)	mg/L	0.00006	5		0.00049	0.00007
Titanium (total)	mg/L	0.00005	5		0.167	0.00024
Zinc (total)	mg/L	0.002	2	0.04	0.020	< 0.002
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	---
Other (ORP)						
pH	No unit	0.05	10.5	9	7.67	---
Mercury (total)	mg/L	0.00001	0.01	0.0004	0.00004	---

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779 and 12811 Tenth line, Whitchurch - Stouffville
Project Manager: Harpreet Singh
Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

				Sample Number	8	9
				Sample Name	BH/MW 2	BH/MW 2 Dissolved Metals
				Sample Matrix	Ground Water	Ground Water
				Sample Date	30/06/2022	30/06/2022
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
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	0.003	---
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	---
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005	---
Trichloroethylene	mg/L	0.0005	0.4	0.008	< 0.0005	---
Methyl ethyl ketone	mg/L	0.02	8		< 0.02	---
Styrene	mg/L	0.0005	0.2		< 0.0005	---

Client: Soil Engineers Ltd.

Project: 1910-W052, 12779 and 12811 Tenth line, Whitchurch - Stouffville

Project Manager: Harpreet Singh

Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

				Sample Number	8	9
				Sample Name	BH/MW 2	BH/MW 2 Dissolved Metals
				Sample Matrix	Ground Water	Ground Water
				Sample Date	30/06/2022	30/06/2022
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
VOCs - BTEX						
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 / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23 L1	SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23 L2
BH/MW 2					
Manganese	SM 3030/EPA 200.8	mg/L	0.302		0.15

QC SUMMARY

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-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
Sulphate	DIO0105-JUL22	mg/L	0.2	<0.2	1	20	95	90	110	92	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENVIEWL-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)	BOD0061-JUN22	mg/L	2	< 2	2	30	103	70	130	114	70	130

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-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)	SKA0033-JUL22	mg/L	0.01	<0.01	ND	10	98	90	110	102	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	EWL0039-JUL22	mg/L	0.06	<0.06	ND	10	102	90	110	96	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)	EHG0002-JUL22	mg/L	0.00001	< 0.00001	ND	20	111	80	120	93	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)	EMS0016-JUL22	mg/L	0.00005	<0.00005	ND	20	95	90	110	85	70	130
Aluminum (total)	EMS0016-JUL22	mg/L	0.001	<0.001	7	20	95	90	110	121	70	130
Arsenic (total)	EMS0016-JUL22	mg/L	0.0002	<0.0002	5	20	96	90	110	103	70	130
Cadmium (total)	EMS0016-JUL22	mg/L	0.000003	<0.000003	9	20	98	90	110	103	70	130
Cobalt (total)	EMS0016-JUL22	mg/L	0.000004	<0.000004	7	20	98	90	110	116	70	130
Chromium (total)	EMS0016-JUL22	mg/L	0.00008	<0.00008	13	20	98	90	110	113	70	130
Copper (total)	EMS0016-JUL22	mg/L	0.0002	<0.0002	1	20	94	90	110	91	70	130
Manganese (total)	EMS0016-JUL22	mg/L	0.00001	<0.00001	3	20	99	90	110	102	70	130
Molybdenum (total)	EMS0016-JUL22	mg/L	0.00004	<0.00004	4	20	99	90	110	97	70	130
Nickel (total)	EMS0016-JUL22	mg/L	0.0001	<0.0001	3	20	97	90	110	85	70	130
Lead (total)	EMS0016-JUL22	mg/L	0.00009	<0.00001	0	20	100	90	110	92	70	130
Phosphorus (total)	EMS0016-JUL22	mg/L	0.003	<0.003	2	20	98	90	110	NV	70	130
Antimony (total)	EMS0016-JUL22	mg/L	0.0009	<0.0009	7	20	98	90	110	98	70	130
Selenium (total)	EMS0016-JUL22	mg/L	0.00004	<0.00004	4	20	98	90	110	114	70	130
Tin (total)	EMS0016-JUL22	mg/L	0.00006	<0.00006	ND	20	96	90	110	NV	70	130
Titanium (total)	EMS0016-JUL22	mg/L	0.00005	<0.00005	ND	20	105	90	110	NV	70	130
Zinc (total)	EMS0016-JUL22	mg/L	0.002	<0.002	5	20	96	90	110	78	70	130

QC SUMMARY

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	GCM0031-JUL22	mg/L	0.01	<0.01			86	55	120			
Nonylphenol Ethoxylates	GCM0031-JUL22	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0031-JUL22	mg/L	0.01	<0.01			83	55	120			
Nonylphenol	GCM0031-JUL22	mg/L	0.001	<0.001			76	55	120			

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-IENVIGC-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)	GCM0086-JUL22	mg/L	2	<2	NSS	20	109	75	125			

QC SUMMARY

Oil & Grease-AV/MS

Method: MOE E3401/SM 5520F | Internal ref.: ME-CA-IENVIGC-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)	GCM0086-JUL22	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0086-JUL22	mg/L	4	< 4	NSS	20	NA	70	130			

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-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	EWL0029-JUL22	No unit	0.05	NA	0		100			NA		

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-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	SKA0026-JUL22	mg/L	0.002	<0.002	ND	10	89	80	120	91	75	125

QC SUMMARY

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	GCM0053-JUL22	mg/L	0.0001	<0.0001	NSS	30	80	60	140	NSS	60	140

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	GCM0116-JUL22	mg/L	0.002	< 0.002	NSS	30	100	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0116-JUL22	mg/L	0.002	< 0.002	NSS	30	106	50	140	NSS	50	140

QC SUMMARY

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	EWL0056-JUL22	mg/L	2	< 2	2	10	101	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	SKA0034-JUL22	as N mg/L	0.5	<0.5	1	10	100	90	110	103	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	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	103	60	130	104	50	140
1,2-Dichlorobenzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	101	60	130	105	50	140
1,4-Dichlorobenzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	101	60	130	104	50	140
Benzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	107	60	130	110	50	140
Chloroform	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	103	60	130	108	50	140
cis-1,2-Dichloroethene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	107	60	130	108	50	140
Ethylbenzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	104	60	130	108	50	140
m-p-xylene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	108	50	140
Methyl ethyl ketone	GCM0006-JUL22	mg/L	0.02	<0.02	ND	30	101	50	140	102	50	140
Methylene Chloride	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	114	60	130	118	50	140
o-xylene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	102	60	130	107	50	140
Styrene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	104	60	130	108	50	140
Tetrachloroethylene (perchloroethylene)	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	107	50	140
Toluene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	108	50	140
trans-1,3-Dichloropropene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	106	50	140
Trichloroethylene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	107	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

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: 032720

Page _____ of _____

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

Laboratory Information Section - Lab use only

Received By: Nicole Brigant
Received Date: June 30 / 22 (mm/dd/yy)
Received Time: 14 : 30 (hr : min)
Received By (signature): Na
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Ice
Temperature Upon Receipt (°C) 9 . 9 . 9
LAB LIMS #: CA40227-JUN22

REPORT INFORMATION	INVOICE INFORMATION
Company: Soil Engineers Ltd	☑ (same as Report Information)
Contact: Harpreet Singh	Company:
Address: 90 West Beaver Creek Rd Richmond Hill	Contact:
Phone: 416-841-6413	Address:
Fax: harpreet.singh@soilengineers ltd.ca	Phone:
Email:	Email:

Quotation #: _____ P.O. #: _____
Project #: 1910-W052 Site Location/ID: 12779 and 12811 Tenth Line Whitchurch - Stouffville

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: York

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: Metals Dissolved	Other	Other	Other	Other: Sewer Use: Storm & Sanitary York ✓ Specify pkg:	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	BH/MW 2	June 30	11:00	16	GW	N																			
2	BH/MW 2	June 30	11:00	1	GW	Y													✓							
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): Harpreet Sykh Signature: Harpreet Sykh Date: June 30/ 2022 (mm/dd/yy) Pink Copy - Client

Relinquished by (NAME): Harpreet Sykh Signature: Harpreet Sykh Date: June 30/ 2022 (mm/dd/yy) Yellow & White Copy - SGS

FINAL REPORT

CA40228-JUN22 R1

1910-WO52, 12779 and 12811 Tenth line, Whitchurch - Stouffville

Prepared for

Soil Engineers Ltd.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Soil Engineers Ltd.
Address	90 West Beaver Creek Rd Richmond Hill, ON M1S 3A7. Canada
Contact	Harpreet Singh
Telephone	416-7548515 ext 1606
Facsimile	416-754-8516
Email	harpreet.singh@soilengineersltd.com;angella.graham@soileng
Project	1910-WO52, 12779 and 12811 Tenth line, Whitchurch - Stouff\
Order Number	
Samples	Ground Water (2)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA40228-JUN22
Received	06/30/2022
Approved	07/11/2022
Report Number	CA40228-JUN22 R1
Date Reported	07/11/2022

COMMENTS

RL - SGS Reporting Limit

Nonylphenol Ethoxylates is the sum of nonylphenol monoethoxylate and nonylphenol diethoxylate.

Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 023141

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: Soil Engineers Ltd.

Project: 1910-WO52, 12779 and 12811 Tenth line, Whitchurch - Stouffville

Project Manager: Harpreet Singh

Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

Parameter	Units	RL	L1	L2	Sample Number: 8 Sample Name: BH/MW 102 Sample Matrix: Ground Water Sample Date: 30/06/2022 Result	Sample Number: 9 Sample Name: BH/MW 102 Dissolved Metals Sample Matrix: Ground Water Sample Date: 30/06/2022 Result
General Chemistry						
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	< 4 ↑	---
Total Suspended Solids	mg/L	2	350	15	32	---
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	< 0.5	---
Metals and Inorganics						
Sulphate	mg/L	0.2	1500		36	---
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01	---
Fluoride	mg/L	0.06	10		0.44	---
Aluminum (total)	mg/L	0.001	50		0.416	< 0.001
Antimony (total)	mg/L	0.0009	5		< 0.0009	< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0006	0.0005
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000014	0.000005
Chromium (total)	mg/L	0.00008	2	0.08	0.00069	0.00026
Cobalt (total)	mg/L	0.000004	5		0.000172	0.000022
Copper (total)	mg/L	0.0002	3	0.05	0.0012	0.0018
Lead (total)	mg/L	0.00009	1	0.12	0.00043	< 0.00009
Manganese (total)	mg/L	0.00001	5	0.15	0.0172	0.00007
Molybdenum (total)	mg/L	0.00004	5		0.00205	0.00343
Nickel (total)	mg/L	0.0001	2	0.08	0.0009	0.0004
Phosphorus (total)	mg/L	0.003	10	0.4	0.094	0.049
Selenium (total)	mg/L	0.00004	1	0.02	0.00047	0.00052
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005	< 0.00005

Client: Soil Engineers Ltd.
Project: 1910-WO52, 12779 and 12811 Tenth line, Whitchurch - Stouffville
Project Manager: Harpreet Singh
Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

				Sample Number	8	9
				Sample Name	BH/MW 102	BH/MW 102 Dissolved Metals
				Sample Matrix	Ground Water	Ground Water
				Sample Date	30/06/2022	30/06/2022
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
Metals and Inorganics (continued)						
Tin (total)	mg/L	0.00006	5		0.00341	0.00100
Titanium (total)	mg/L	0.00005	5		0.0168	< 0.00005
Zinc (total)	mg/L	0.002	2	0.04	0.004	< 0.002
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	---
Other (ORP)						
pH	No unit	0.05	10.5	9	7.93	---
Mercury (total)	mg/L	0.00001	0.01	0.0004	< 0.00001	---

Client: Soil Engineers Ltd.
Project: 1910-WO52, 12779 and 12811 Tenth line, Whitchurch - Stouffville
Project Manager: Harpreet Singh
Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

				Sample Number	8	9
				Sample Name	BH/MW 102	BH/MW 102 Dissolved Metals
				Sample Matrix	Ground Water	Ground Water
				Sample Date	30/06/2022	30/06/2022
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
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	0.0022	---
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	---
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005	---
Trichloroethylene	mg/L	0.0005	0.4	0.008	< 0.0005	---
Methyl ethyl ketone	mg/L	0.02	8		< 0.02	---
Styrene	mg/L	0.0005	0.2		< 0.0005	---

Client: Soil Engineers Ltd.

Project: 1910-WO52, 12779 and 12811 Tenth line, Whitchurch - Stouffville

Project Manager: Harpreet Singh

Samplers: Harpreet Singh

MATRIX: WATER

L1 = SANSEW / WATER / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23

L2 = SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23

				Sample Number	8	9
				Sample Name	BH/MW 102	BH/MW 102 Dissolved Metals
				Sample Matrix	Ground Water	Ground Water
				Sample Date	30/06/2022	30/06/2022
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**
VOCs - BTEX						
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 / - - York - Discharge of Sewage ~ Sanitary Water - BL_2014_23 L1	SANSEW / WATER / - - York - Discharge of Sewage ~ Storm Water - BL_2014_23 L2
BH/MW 102					
Chloroform	EPA 5030B/8260C	mg/L	0.0022		0.002
Total Suspended Solids	SM 2540D	mg/L	32		15

QC SUMMARY

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-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
Sulphate	DIO0088-JUL22	mg/L	0.2	<0.2	0	20	99	90	110	NV	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-[ENVIEWL-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)	BOD0061-JUN22	mg/L	2	< 2	2	30	103	70	130	114	70	130

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-[ENVISFA-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)	SKA0033-JUL22	mg/L	0.01	<0.01	ND	10	98	90	110	102	75	125

QC SUMMARY

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-[ENV]EWL-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	EWL0039-JUL22	mg/L	0.06	<0.06	ND	10	102	90	110	96	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B I Internal ref.: ME-CA-[ENV]SPE-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)	EHG0002-JUL22	mg/L	0.00001	< 0.00001	ND	20	111	80	120	93	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)	EMS0016-JUL22	mg/L	0.00005	<0.00005	ND	20	95	90	110	85	70	130
Aluminum (total)	EMS0016-JUL22	mg/L	0.001	<0.001	7	20	95	90	110	121	70	130
Arsenic (total)	EMS0016-JUL22	mg/L	0.0002	<0.0002	5	20	96	90	110	103	70	130
Cadmium (total)	EMS0016-JUL22	mg/L	0.000003	<0.000003	9	20	98	90	110	103	70	130
Cobalt (total)	EMS0016-JUL22	mg/L	0.000004	<0.000004	7	20	98	90	110	116	70	130
Chromium (total)	EMS0016-JUL22	mg/L	0.00008	<0.00008	13	20	98	90	110	113	70	130
Copper (total)	EMS0016-JUL22	mg/L	0.0002	<0.0002	1	20	94	90	110	91	70	130
Manganese (total)	EMS0016-JUL22	mg/L	0.00001	<0.00001	3	20	99	90	110	102	70	130
Molybdenum (total)	EMS0016-JUL22	mg/L	0.00004	<0.00004	4	20	99	90	110	97	70	130
Nickel (total)	EMS0016-JUL22	mg/L	0.0001	<0.0001	3	20	97	90	110	85	70	130
Lead (total)	EMS0016-JUL22	mg/L	0.00009	<0.00001	0	20	100	90	110	92	70	130
Phosphorus (total)	EMS0016-JUL22	mg/L	0.003	<0.003	2	20	98	90	110	NV	70	130
Antimony (total)	EMS0016-JUL22	mg/L	0.0009	<0.0009	7	20	98	90	110	98	70	130
Selenium (total)	EMS0016-JUL22	mg/L	0.00004	<0.00004	4	20	98	90	110	114	70	130
Tin (total)	EMS0016-JUL22	mg/L	0.00006	<0.00006	ND	20	96	90	110	NV	70	130
Titanium (total)	EMS0016-JUL22	mg/L	0.00005	<0.00005	ND	20	105	90	110	NV	70	130
Zinc (total)	EMS0016-JUL22	mg/L	0.002	<0.002	5	20	96	90	110	78	70	130

QC SUMMARY

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	GCM0031-JUL22	mg/L	0.01	<0.01			86	55	120			
Nonylphenol Ethoxylates	GCM0031-JUL22	mg/L	0.01	< 0.01								
Nonylphenol monoethoxylate	GCM0031-JUL22	mg/L	0.01	<0.01			83	55	120			
Nonylphenol	GCM0031-JUL22	mg/L	0.001	<0.001			76	55	120			

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-IENVIGC-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)	GCM0086-JUL22	mg/L	2	<2	NSS	20	109	75	125			

QC SUMMARY

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)	GCM0086-JUL22	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0086-JUL22	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	EWL0029-JUL22	No unit	0.05	NA	0		100			NA		

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	SKA0026-JUL22	mg/L	0.002	<0.002	ND	10	89	80	120	91	75	125

QC SUMMARY

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-IENVIGC-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	GCM0053-JUL22	mg/L	0.0001	<0.0001	NSS	30	80	60	140	NSS	60	140

Semi-Volatile Organics

Method: EPA 3510C/8270D | Internal ref.: ME-CA-IENVIGC-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	GCM0116-JUL22	mg/L	0.002	< 0.002	NSS	30	100	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0116-JUL22	mg/L	0.002	< 0.002	NSS	30	106	50	140	NSS	50	140

QC SUMMARY

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	EWL0056-JUL22	mg/L	2	< 2	2	10	101	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	SKA0052-JUL22	as N mg/L	0.5	<0.5	ND	10	97	90	110	102	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	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	103	60	130	104	50	140
1,2-Dichlorobenzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	101	60	130	105	50	140
1,4-Dichlorobenzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	101	60	130	104	50	140
Benzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	107	60	130	110	50	140
Chloroform	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	103	60	130	108	50	140
cis-1,2-Dichloroethene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	107	60	130	108	50	140
Ethylbenzene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	104	60	130	108	50	140
m-p-xylene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	108	50	140
Methyl ethyl ketone	GCM0006-JUL22	mg/L	0.02	<0.02	ND	30	101	50	140	102	50	140
Methylene Chloride	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	114	60	130	118	50	140
o-xylene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	102	60	130	107	50	140
Styrene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	104	60	130	108	50	140
Tetrachloroethylene (perchloroethylene)	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	107	50	140
Toluene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	108	50	140
trans-1,3-Dichloropropene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	106	50	140
Trichloroethylene	GCM0006-JUL22	mg/L	0.0005	<0.0005	ND	30	105	60	130	107	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

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

SGS Environment, Health & Safety - 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

No: 023141 Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Nicole Brigant
Received Date: June 30 / 22 (mm/dd/yy)
Received Time: 14 : 30 (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) 9 . 9 . 9
LAB LIMS #: CA40228-Jun22

REPORT INFORMATION

Company: Soil Engineers Ltd
Contact: Harpreet Singh
Address: 90 West Beaver Creek Rd, Richmond Hill
Phone: 416-841-6413
Fax: harpreet.singh@soilengineers ltd.ca
Email:

INVOICE INFORMATION

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

Quotation #:
P.O. #:
Project #: 1910-W052
Site Location/ID: 12779 and 12811 Tenth Line

TURNAROUND TIME (TAT) REQUIRED Whitchurch-Stouffville

☑ 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: York

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,)	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 (please specify)				SPLP: Specify tests	TCLP: Specify tests	COMMENTS:
																		Metals Dissolved			Sewer Use: Storm & Sanitary York	Water Characterization Pkg ☐ (Specify pkg: General Extended)	☐ Metals ☐ VOC ☐ 1,4-Dioxane ☐ OCP ☐ ABN	☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.	
1	BH/MW 102	June 30	10:00	16	GW	N															✓			
2	BH/MW 102	June 30	10:00	1	GW	Y												✓						
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

Observations/Comments/Special Instructions

Sampled By (NAME): Harpreet Singh Harpreet Singh
Signature: Harpreet Singh
Date: June 30 / 2022 (mm/dd/yy)

Relinquished by (NAME): Harpreet Singh
Signature: Harpreet Singh
Date: June 30 / 2022 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.5
Date of Issue: 11 June 2021

FINAL REPORT

CA40016-JAN26 R1

1910-W052, 12779812811 Tenth Line, Stouffville

Prepared for

Soil Engineers Ltd.

FINAL REPORT

First Page

CLIENT DETAILS

Client	Soil Engineers Ltd.
Address	90 West Beaver Creek Rd Richmond Hill, ON M1S 3A7. Canada
Contact	Yogiraj Rana
Telephone	705-341-1987
Facsimile	416-754-8516
Email	yogiraj.rana@soilengineersltd.com
Works #	
Project	1910-W052, 12779812811 Tenth Line, Stouffville
Reference	
Batch	
Samples	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	CA40016-JAN26
Received	2026-01-07
Approved	01/15/2026
Report Number	CA40016-JAN26 R1
Date Reported	01/15/2026

COMMENTS

RL - SGS Reporting Limit

Nonylphenol Ethoxylates is the sum of nonylphenol monoethoxylate and nonylphenol diethoxylate.

Temperature of Sample upon Receipt: 9 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:046408

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779812811 Tenth Line, Stouffville
Project Manager: Yogiraj Rana
Samplers: Naeim Rafati

MATRIX: WATER

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	9
Sample Name	MW-101
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

General Chemistry

Parameter	Units	RL	L1	Result
Alkalinity	mg/L as CaCO3	2		333
Bicarbonate	mg/L as CaCO3	2		333
Carbonate	mg/L as CaCO3	2		< 2
OH	mg/L as CaCO3	2		< 2
Colour	TCU	3		< 3
Conductivity	uS/cm	2		684
Turbidity	NTU	0.10		34
Ammonia+Ammonium (N)	as N mg/L	0.1		< 0.1
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03		< 0.03
Total Organic Carbon	mg/L	1		1
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 ↑
Total Suspended Solids	mg/L	2		338
Total Kjeldahl Nitrogen	as N mg/L	0.5		< 0.5

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779812811 Tenth Line, Stouffville
Project Manager: Yogiraj Rana
Samplers: Naeim Rafati

MATRIX: WATER

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	9
Sample Name	MW-101
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

Metals and Inorganics

Parameter	Units	RL	L1	Result
Bromide	mg/L	0.3		< 0.3
Nitrite (as N)	as N mg/L	0.03		< 0.03
Nitrate (as N)	as N mg/L	0.06		0.51
Sulphate	mg/L	2		20
Cyanide (total)	mg/L	0.01		< 0.01
Fluoride	mg/L	0.06		< 0.06
Aluminum (total)	mg/L	0.001		1.32
Aluminum (0.2µm)	mg/L	0.001	0.015	0.002
Antimony (total)	mg/L	0.0009	0.02	< 0.0009
Arsenic (total)	mg/L	0.0002	0.1	0.0006
Boron (total)	mg/L	0.002	0.2	0.014
Barium (total)	mg/L	0.00008		0.106
Beryllium (total)	mg/L	0.000007	0.011	0.000148
Cadmium (total)	mg/L	0.000003	0.0002	0.000042
Chromium (total)	mg/L	0.00008		0.00106
Calcium (total)	mg/L	0.01		94.8
Cobalt (total)	mg/L	0.000004	0.0009	0.000351
Copper (total)	mg/L	0.001	0.005	0.002
Lead (total)	mg/L	0.00009	0.001	0.00274
Iron (total)	mg/L	0.007	0.3	1.03
Potassium (total)	mg/L	0.009		1.09
Magnesium (total)	mg/L	0.001		16.3

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779812811 Tenth Line, Stouffville
Project Manager: Yogiraj Rana
Samplers: Naeim Rafati

MATRIX: WATER

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	9
Sample Name	MW-101
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

Metals and Inorganics (continued)

Parameter	Units	RL	L1	Result
Manganese (total)	mg/L	0.00001		0.0330
Molybdenum (total)	mg/L	0.0004	0.04	0.0008
Nickel (total)	mg/L	0.0001	0.025	0.0023
Sodium (total)	mg/L	0.01		17.7
Silicon (total)	mg/L	0.02		9.93
Phosphorus (total)	mg/L	0.003	0.01	0.050
Selenium (total)	mg/L	0.00004	0.1	0.00023
Silver (total)	mg/L	0.00005	0.0001	< 0.00005
Strontium (total)	mg/L	0.00008		0.447
Thallium (total)	mg/L	0.000005	0.0003	0.000031
Tin (total)	mg/L	0.00006		0.00040
Titanium (total)	mg/L	0.0001		0.0333
Uranium (total)	mg/L	0.000002	0.005	0.00221
Vanadium (total)	mg/L	0.00001	0.006	0.00116
Zinc (total)	mg/L	0.002	0.02	0.018
Hardness	mg/L as CaCO3	0.05		304
Cation sum	meq/L	-9999		7.08
Anion Sum	meq/L	-9999		7.63
Anion-Cation Balance	% difference	-9999		-3.74
Ion Ratio	none	-9999		0.93
Total Dissolved Solids (calculated)	mg/L	-9999		370
Conductivity (calculated)	uS/cm	-9999		736

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779812811 Tenth Line, Stouffville
Project Manager: Yogiraj Rana
Samplers: Naeim Rafati

MATRIX: WATER

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	9
Sample Name	MW-101
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

Parameter	Units	RL	L1	Result
Metals and Inorganics (continued)				
Langeliers Index 4° C	@ 4° C	-9999		0.2
Saturation pH 4°C	pHs @ 4°C	-9999		7.46
Nonylphenol and Ethoxylates				
Nonylphenol	mg/L	0.001	0.00004	< 0.001
Nonylphenol Ethoxylates	mg/L	0.01		< 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		< 4
Oil & Grease (mineral/synthetic)	mg/L	4		< 4
Other (ORP)				
pH	No unit	0.05	8.5	7.66
Chloride	mg/L	1		20
Mercury (total)	mg/L	0.00001	0.0002	0.00001
Mercury (dissolved)	mg/L	0.00001	0.0002	0.00001

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779812811 Tenth Line, Stouffville
Project Manager: Yogiraj Rana
Samplers: Naeim Rafati

MATRIX: WATER

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	9
Sample Name	MW-101
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

Parameter	Units	RL	L1	Result
PCBs				
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.000001	< 0.0001
Phenols				
4AAP-Phenolics	mg/L	0.001	0.001	0.002
SVOCs				
di-n-Butyl Phthalate	mg/L	0.002	0.004	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.0006	< 0.002
VOCs				
Chloroform	mg/L	0.0005		< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.0025	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.004	< 0.0005
cis-1,2-Dichloroethylene	mg/L	0.0005	0.2	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005		< 0.0005
Methylene Chloride	mg/L	0.0005	0.1	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	0.07	< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	0.05	< 0.0005
Trichloroethylene	mg/L	0.0005	0.02	< 0.0005
Methyl ethyl ketone	mg/L	0.02		< 0.02
Styrene	mg/L	0.0005	0.004	< 0.0005

Client: Soil Engineers Ltd.
Project: 1910-W052, 12779812811 Tenth Line, Stouffville
Project Manager: Yogiraj Rana
Samplers: Naeim Rafati

MATRIX: WATER

L1 = PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	9
Sample Name	MW-101
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

Parameter	Units	RL	L1	Result
VOCs - BTEX				
Benzene	mg/L	0.0005	0.1	< 0.0005
Ethylbenzene	mg/L	0.0005	0.008	< 0.0005
Toluene	mg/L	0.0005	0.0008	< 0.0005
Xylene (total)	mg/L	0.0005		< 0.0005
m-p-xylene	mg/L	0.0005	0.002	< 0.0005
o-xylene	mg/L	0.0005	0.04	< 0.0005

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	PWQO / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
MW-101				
Nonylphenol	ASTM D7065-06	mg/L	< 0.001	0.00004
Bis(2-ethylhexyl)phthalate	EPA 3510C/8270D	mg/L	< 0.002	0.0006
Polychlorinated Biphenyls	MOE E3400/EPA 8082A	mg/L	< 0.0001	0.000001
Iron	SM 3030/EPA 200.8	mg/L	1.03	0.3
Lead	SM 3030/EPA 200.8	mg/L	0.00274	0.001
Phosphorus	SM 3030/EPA 200.8	mg/L	0.050	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

QC SUMMARY

Alkalinity

Method: SM 2320 I 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
Alkalinity	EWL0109-JAN26	mg/L as CaCO3	2	< 2	4	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 I Internal ref.: ME-CA-[ENV]SFA-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
Ammonia+Ammonium (N)	SKA0060-JAN26	as N mg/L	0.1	<0.1	4	10	99	90	110	96	75	125

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-[ENVIEWL-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
Chloride	DIO8005-JAN26	mg/L	1	<1	2	20	94	70	130	94	70	130
Nitrite (as N)	DIO8005-JAN26	mg/L	0.03	< 0.03	1	20	100	80	120	102	75	125
Sulphate	DIO8005-JAN26	mg/L	2	<2	2	20	106	80	120	101	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-[ENVIIC-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
Bromide	DIO0245-JAN26	mg/L	0.3	<0.3	ND	20	103	90	110	100	75	125

QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 I 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)	BOD0010-JAN26	mg/L	2	< 2	10	30	98	70	130	105	70	130

Carbon by SFA

Method: SM 5310 I Internal ref.: ME-CA-IENVISFA-LAK-AN-009

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 Organic Carbon	SKA0055-JAN26	mg/L	1	<1	1	20	100	90	110	96	75	125

QC SUMMARY

Carbonate/Bicarbonate

Method: SM 2320 | 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
Carbonate	EWL0109-JAN26	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0109-JAN26	mg/L as CaCO3	2	< 2	4	10	NA	90	110	NA		
OH	EWL0109-JAN26	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		

Colour

Method: SM 2120 | Internal ref.: ME-CA-[ENV]EWL-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
Colour	EWL0151-JAN26	TCU	3	< 3	ND	10	110	80	120	NA		

QC SUMMARY

Conductivity

Method: SM 2510 I Internal ref.: ME-CA-IENVIEWL-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
Conductivity	EWL0109-JAN26	uS/cm	2	3	1	10	99	90	110	NA		

Cyanide by SFA

Method: SM 4500 I 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)	SKA0056-JAN26	mg/L	0.01	<0.01	ND	10	95	90	110	91	75	125

Fluoride by Specific Ion Electrode

Method: SM 4500 I Internal ref.: ME-CA-IENVIEWL-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	EWL0123-JAN26	mg/L	0.06	<0.06	ND	10	95	90	110	104	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/SM 3112B | 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)	EHG0018-JAN26	mg/L	0.00001	< 0.00001	ND	20	110	80	120	109	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)	EMS0093-JAN26	mg/L	0.00005	<0.00005	ND	20	104	90	110	NV	70	130
Aluminum (total)	EMS0093-JAN26	mg/L	0.001	<0.001	7	20	100	90	110	130	70	130
Arsenic (total)	EMS0093-JAN26	mg/L	0.0002	<0.0002	ND	20	106	90	110	102	70	130
Barium (total)	EMS0093-JAN26	mg/L	0.00008	<0.00008	3	20	102	90	110	99	70	130
Beryllium (total)	EMS0093-JAN26	mg/L	0.000007	<0.000007	ND	20	103	90	110	99	70	130
Boron (total)	EMS0093-JAN26	mg/L	0.002	<0.002	9	20	100	90	110	89	70	130
Calcium (total)	EMS0093-JAN26	mg/L	0.01	<0.01	5	20	101	90	110	98	70	130
Cadmium (total)	EMS0093-JAN26	mg/L	0.000003	<0.000003	0	20	103	90	110	99	70	130
Cobalt (total)	EMS0093-JAN26	mg/L	0.000004	<0.000004	ND	20	103	90	110	99	70	130
Chromium (total)	EMS0093-JAN26	mg/L	0.00008	<0.00008	10	20	104	90	110	103	70	130
Copper (total)	EMS0093-JAN26	mg/L	0.001	<0.001	5	20	105	90	110	102	70	130
Iron (total)	EMS0093-JAN26	mg/L	0.007	<0.007	ND	20	99	90	110	100	70	130
Potassium (total)	EMS0093-JAN26	mg/L	0.009	<0.009	4	20	97	90	110	102	70	130
Magnesium (total)	EMS0093-JAN26	mg/L	0.001	<0.001	6	20	100	90	110	98	70	130
Manganese (total)	EMS0093-JAN26	mg/L	0.00001	<0.00001	8	20	102	90	110	100	70	130
Molybdenum (total)	EMS0093-JAN26	mg/L	0.0004	<0.0004	10	20	103	90	110	102	70	130
Sodium (total)	EMS0093-JAN26	mg/L	0.01	<0.01	5	20	101	90	110	99	70	130
Nickel (total)	EMS0093-JAN26	mg/L	0.0001	<0.0001	6	20	102	90	110	98	70	130
Lead (total)	EMS0093-JAN26	mg/L	0.00009	<0.00009	4	20	102	90	110	101	70	130
Phosphorus (total)	EMS0093-JAN26	mg/L	0.003	<0.003	ND	20	98	90	110	NV	70	130

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

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
Antimony (total)	EMS0093-JAN26	mg/L	0.0009	<0.0005	ND	20	99	90	110	109	70	130
Selenium (total)	EMS0093-JAN26	mg/L	0.00004	<0.00004	11	20	101	90	110	98	70	130
Silicon (total)	EMS0093-JAN26	mg/L	0.02	<0.02	11	20	98	90	110	NV	70	130
Tin (total)	EMS0093-JAN26	mg/L	0.00006	<0.00006	ND	20	98	90	110	NV	70	130
Strontium (total)	EMS0093-JAN26	mg/L	0.00008	<0.00008	0	20	104	90	110	99	70	130
Titanium (total)	EMS0093-JAN26	mg/L	0.0001	<0.0001	ND	20	94	90	110	NV	70	130
Thallium (total)	EMS0093-JAN26	mg/L	0.000005	<0.000005	1	20	101	90	110	98	70	130
Uranium (total)	EMS0093-JAN26	mg/L	0.000002	<0.000002	ND	20	103	90	110	100	70	130
Vanadium (total)	EMS0093-JAN26	mg/L	0.00001	<0.00001	14	20	102	90	110	100	70	130
Zinc (total)	EMS0093-JAN26	mg/L	0.002	<0.002	3	20	101	90	110	105	70	130
Aluminum (0.2µm)	EMS0105-JAN26	mg/L	0.001	<0.001	3	20	103	90	110	104	70	130

QC SUMMARY

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	GCM0077-JAN26	mg/L	0.01	<0.01			90	55	120			
Nonylphenol monoethoxylate	GCM0077-JAN26	mg/L	0.01	<0.01			87	55	120			
Nonylphenol	GCM0077-JAN26	mg/L	0.001	<0.001			83	55	120			

Oil & Grease

Method: MOE E3401 | Internal ref.: ME-CA-IENVIGC-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)	GCM0081-JAN26	mg/L	2	<2	NSS	20	103	75	125			

QC SUMMARY

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)	GCM0081-JAN26	mg/L	4	< 4	NSS	20	NA	70	130			
Oil & Grease (mineral/synthetic)	GCM0081-JAN26	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	EWL0109-JAN26	No unit	0.05	NA	0		100			NA		

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	SKA0053-JAN26	mg/L	0.001	<0.001	ND	10	99	80	120	109	75	125

QC SUMMARY

Polychlorinated Biphenyls

Method: MOE E3400/EPA 8082A | Internal ref.: ME-CA-IENVIGC-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	GCM0080-JAN26	mg/L	0.0001	<0.0001	NSS	30	106	60	140	NSS	60	140

Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-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 Reactive Phosphorous (o-phosphate as P)	SKA0059-JAN26	mg/L	0.03	<0.03	ND	10	97	90	110	105	75	125

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	GCM0078-JAN26	mg/L	0.002	< 0.002	NSS	30	107	50	140	NSS	50	140
di-n-Butyl Phthalate	GCM0078-JAN26	mg/L	0.002	< 0.002	NSS	30	103	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	EWL0156-JAN26	mg/L	2	< 2	4	10	101	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	SKA0091-JAN26	as N mg/L	0.5	<0.5	2	10	98	90	110	101	75	125

QC SUMMARY

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-[ENV]EWL-LAK-AN-003

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
Turbidity	EWL0101-JAN26	NTU	0.10	< 0.10	0	10	103	90	110	NA		

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	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	102	60	130	104	50	140
1,2-Dichlorobenzene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	103	60	130	104	50	140
1,4-Dichlorobenzene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	105	60	130	102	50	140
Benzene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	105	60	130	102	50	140
Chloroform	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	102	60	130	103	50	140
cis-1,2-Dichloroethylene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	102	60	130	102	50	140
Ethylbenzene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	106	60	130	104	50	140
m-p-xylene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	107	60	130	105	50	140
Methyl ethyl ketone	GCM0089-JAN26	mg/L	0.02	<0.02	ND	30	103	50	140	111	50	140
Methylene Chloride	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	90	60	130	91	50	140
o-xylene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	106	60	130	104	50	140
Styrene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	106	60	130	109	50	140
Tetrachloroethylene (perchloroethylene)	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	105	60	130	103	50	140
Toluene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	104	60	130	103	50	140
trans-1,3-Dichloropropene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	104	60	130	97	50	140
Trichloroethylene	GCM0089-JAN26	mg/L	0.0005	<0.0005	ND	30	99	60	130	102	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.

Test method information available upon request.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

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

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 046408 Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Katie Larocque
Received Date: 01 / 07 / 26 (mm/dd/yy)
Received Time: 14 : 00 (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) 9.9.9
CA 40016 JAN 26
LAB LIMS #:

REPORT INFORMATION

Company: Soil Engineers Ltd
Contact: Yogiraj Rana
Address: 90 West Beaver Creek Richmond Hill
Phone: 4167548515
Fax:
Email: Yogiraj.rana@soilengineersltd.com

INVOICE INFORMATION

☐ (same as Report Information)
Company:
Contact:
Address:
Phone:
Email:

Quotation #:
Project #: 1910-W052
P.O. #:
Site Location/ID: 12779 & 12811 Tenth Line Stouffville

TURNAROUND TIME (TAT) REQUIRED

☐ Client Regular TAT ☑ 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:
☐ Table 2 ☐ Ind/Com ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ Medium/Fine
☐ 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: Region of York

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:	Other:	Other: Gen Chem Package Compared to PWQO	Other:	Other: Sewer Use: Specify pkg: Region of York Storm and Sanitary	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	MW-101	1.7.26	10:30	24	GW	N														✓		✓	✓			
2																										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

Observations/Comments/Special Instructions

Sampled By (NAME): Naeim Rafati Signature: Naeim Rafati Date: 1 / 7 / 2026 (mm/dd/yy)
Relinquished by (NAME): Naeim Rafati Signature: Naeim Rafati Date: 1 / 7 / 2026 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.8
Date of Issue: 06 SEP 2024

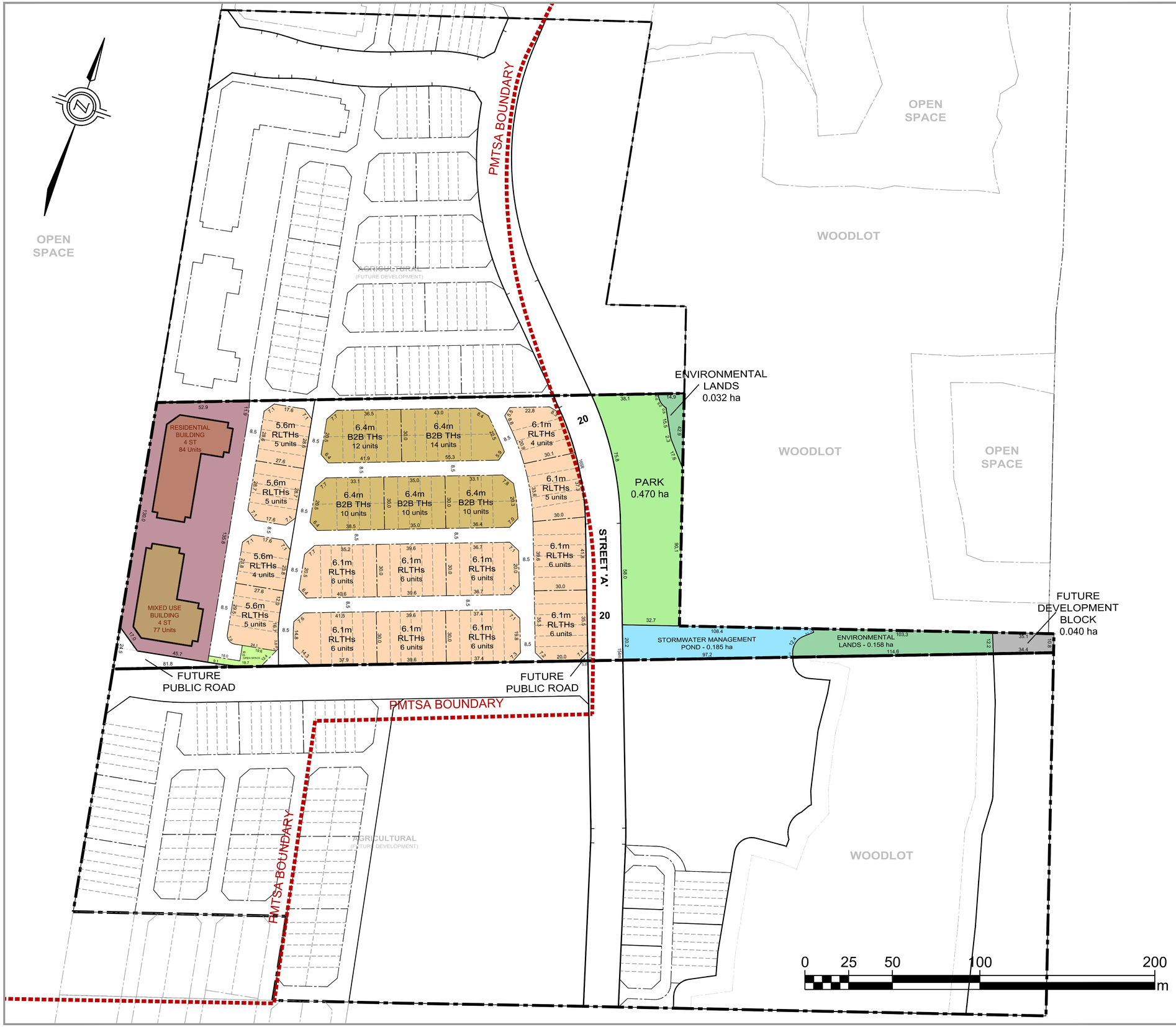
Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
90 WEST BEAVER CREEK ROAD, SUITE 100, RICHMOND HILL, ONTARIO L4B 1E7 · TEL: (416) 754-8515 · FAX: (905) 881-8335

BARRIE	MISSISSAUGA	OSHAWA	NEWMARKET	GRAVENHURST	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

APPENDIX 'F'

Reviewed Plans and Dewatering Estimates

REFERENCE NO. 1910-W052



Key Plan — Subject Property

NORTHCAPE STOUFFVILLE - Conceptual Demonstration Plan

ESTIMATED UNIT COUNT	22103 - 143cp	March 9, 2026
5.6m Rear Lane Towns	6%	19
6.1m Rear Lane Towns	19%	57
6.4m Back-to-Back Towns	19%	56
Mixed Use Residential	55%	161
Total	**100%**	**293 units**

- Back-to-Back Townhouses
- Rear Lane Townhouses
- Mixed Use Residential
- Environmental Lands
- Park
- Open Space
- Stormwater Management Pond
- Future Development Block
- PMTSA Boundary (3.89 ha within PMTSA Boundary)

BOUSFIELDS INC.

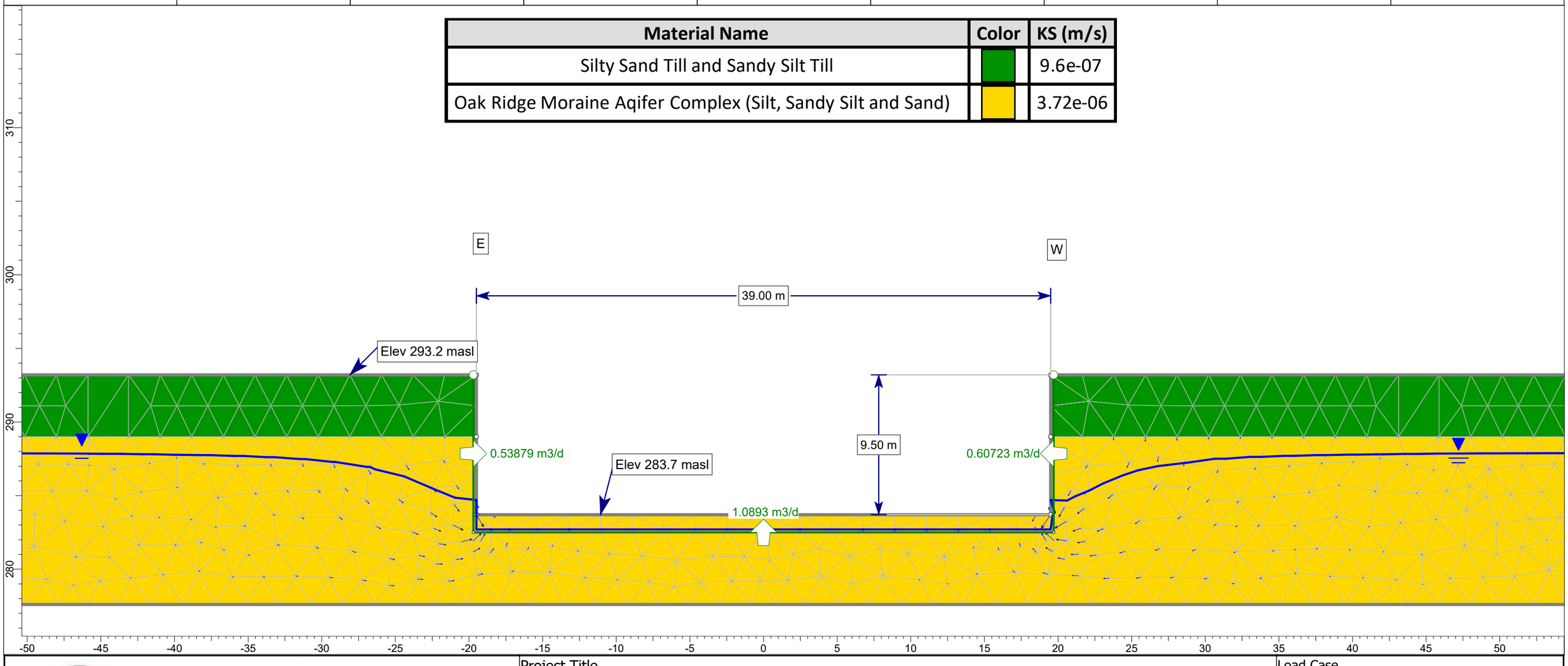
3 Church Street, Suite 200, Toronto, Ontario M5E 1M2
P (416) 947-9744 | F (416) 947-0781 | E bousfields@bousfields.ca

Groundwater Control Needs
Summary of Assumptions and Proposed Excavation Details

Proposed Excavation Location	Proposed Mixed Use with 2 Level Underground Parking
Shoring System	Permeable
Excavation Dimensions (m)	130 m X 39 m

Ground Surface Elevation (masl)	Lowest Finished Floor Elevation (masl)	Base of Excavation (masl)	Base of Footings (masl)	Base of Elevator Pit (masl)	Groundwater Table (masl)	Groundwater Flow Rate (L/Day)	Storm Event Flow Rate (L/Day)	Total Construction Dewatering Flow Rate (L/Day)
293.2	285.2	283.7	283.7	283.7	287.9	670,600.0 (with S.F. 2)	157,100.0 (2 year 3 hr)	827,700.0

Material Name	Color	KS (m/s)
Silty Sand Till and Sandy Silt Till		9.6e-07
Oak Ridge Moraine Aqifer Complex (Silt, Sandy Silt and Sand)		3.72e-06



Soil Engineers Ltd.

Project Title	Hydrogeological Assessment		Load Case: Short-Term Dewatering
Location	12811 Tenth Line, Stouffville		
Drawn By: YR	Checked By: NA	Scale: 1:257	
Date: 2026-04-06, 3:52:09 PM		Reference No.: 1910-W052	Drawing No.: 1

DEWATERING CALCULATION FOR UNDERGROUND SERVICES INSTALLATION

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_0 (m)/2

Radius of Influence Formula (Sichardt Equation):

$$R_0 = 3000 * D * K^{0.5}$$

Where:

R_0 = Radius of Influence (m), beyond which there is negligible drawdown
D = Distance from the initial static water level to the dewatering target
K = Hydraulic conductivity (m/s)

Parameter	Units	BH/MW 104	BH/MW 106	BH/MW 5	BH/MW 6
Total Anticipated Short-Term Dewatering Flow including Storm Event and Groundwater Seepage with Safety Factor:	L/day	**81,500.0**	**65,700.0**	**87,700.0**	**77,500.0**
Anticipated Storm Flow:					
Anticipated Storm Flow (2Year-3Hr event)	L/day	3,100.0	3,100.0	3,100.0	3,100.0
Storm Event (2Year-3Hr event)	m	0.03098	0.03098	0.03098	0.03098
Groundwater Seepage Estimate:					
Q s.f. 2.0	L/day	78,400.0	62,600.0	84,600.0	74,400.0
Q	L/day	39,200.0	31,300.0	42,300.0	37,200.0
Q	m^3/day	39.1	31.2	42.2	37.2
K	m/day	0.3214	0.3214	0.3214	0.3214
H	m	4.1	3.1	4.5	3.9
h	m	2.0	2.0	2.0	2.0
R_0	m	12.2	6.2	14.5	10.8
Trench width (b)	m	2.0	2.0	2.0	2.0
r_s	m	1.0	1.0	1.0	1.0
x (a)	m	50.0	50.0	50.0	50.0
L	m	6.1	3.1	7.2	5.4
	a/b	25.0	25.0	25.0	25.0
Conceptual Zone of Influence:					
R_0	m	12.2	6.2	14.5	10.8
D	m	2.1	1.1	2.5	1.9
K	m/s	3.72E-06	3.72E-06	3.72E-06	3.72E-06
Empirical constant (conservative)		3000	3000	3000	3000
Assumptions:					
Assumed Grading Elevation	masl	292.9	291.9	293.6	292.6
Highest Interpreted Groundwater Elevation	masl	290.0	288.0	291.1	289.5
Proposed Invert Elevation for the Excavation	masl	288.9	287.9	289.6	288.6
Trench Width	m	2.0	2.0	2.0	2.0
Trench Length	m	50.0	50.0	50.0	50.0
Area	m^2	100.0	100.0	100.0	100.0
Perimeter	m	104.0	104.0	104.0	104.0

DEWATERING CALCULATION FOR PROPOSED TOWNHOUSE DEVELOPMENT

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

Radius of Influence Formula (Sichardt Equation):

$$R_0 = 3000 * D * K^{0.5}$$

Where:

R_0 = Radius of Influence (m), beyond which there is negligible drawdown
D = Distance from the initial static water level to the dewatering target
K = Hydraulic conductivity (m/s)

Parameter	Units	BH/MW 5 RLTH (6.1 m)
Total Anticipated Short-Term Dewatering Flow including Storm Event and Groundwater Seepage with Safety Factor:	L/day	**32,100.0**
Anticipated Storm Flow:		
Anticipated Storm Flow (2Year-3Hr event)	L/day	19,900.0
Storm Event (2Year-3Hr event)	m	0.03098
Groundwater Seepage Estimate:		
Q s.f. 2.0	L/day	12,200.0
Q	L/day	6,100.0
Q	m^3/day	6.0
K	m/day	0.0829
H	m	2.7
h	m	1.5
R_0	m	3.4
Trench width (b)	m	21.0
r_s	m	10.5
x (a)	m	30.5
L	m	1.7
	a/b	1.5
Conceptual Zone of Influence:		
R_0	m	3.4
D	m	1.2
K	m/s	9.60E-07
Empirical constant (conservative)		3000
Assumptions:		
Assumed Grading Elevation	masl	293.8
Highest Interpreted Groundwater Elevation	masl	291.0
Proposed Invert Elevation for the Excavation	masl	290.8
Trench Width	m	21.0
Trench Length	m	30.5
Area	m^2	641.0
Perimeter	m	103.0

LONG-TERM FOUNDATION DRAINAGE FLOW RATES FOR PROPOSED TOWNHOUSE DEVELOPMENT

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

Radius of Influence Formula (Sichardt Equation):

$$R_0 = 3000 * D * K^{0.5}$$

Where:

R_0 = Radius of Influence (m), beyond which there is negligible drawdown
D = Distance from the initial static water level to the dewatering target
K = Hydraulic conductivity (m/s)

Parameter	Units	BH/MW 5 RLTH (6.1 m)
Total Anticipated Short-Term Dewatering Flow including Storm Event and Groundwater Seepage with Safety Factor:	L/day	**14,200.0**
Anticipated Storm Flow:		
Anticipated Infiltration Flow (2Year-3Hr event)	L/day	3,200.0
Storm Event (2Year-3Hr event)	m	0.03098
Groundwater Seepage Estimate:		
Q s.f. 2.0	L/day	11,000.0
Q	L/day	5,500.0
Q	m^3/day	5.4
K	m/day	0.0829
H	m	1.7
h	m	1.5
R_0	m	0.5
Trench width (b)	m	21.0
r_s	m	10.5
x (a)	m	30.5
L	m	0.2
	a/b	1.5
Conceptual Zone of Influence:		
R_0	m	0.5
D	m	0.2
K	m/s	9.60E-07
Empirical constant (conservative)		3000
Assumptions:		
Assumed Grading Elevation	masl	293.8
Highest Interpreted Groundwater Elevation	masl	291.0
Proposed Invert Elevation for the Excavation	masl	290.8
Trench Width	m	21.0
Trench Length	m	30.5
Area	m^2	641.0
Perimeter	m	103.0

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	GRAVENHURST	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

APPENDIX 'G'

Pre- and Post Development Water Balance Assessment

REFERENCE NO. 1910-W052

Pre- and Post-Development Water Balance

12779 & 12811 Tenth Line, Whitchurch Stouffville

Water Balance Components (Using TRSPA Tool)

Component	Initial Value mm/yr	Modified Value mm/yr	Modified Value m/yr
Precipitation	867	867	0.867
Runoff	155	123	0.123
Recharge	316	253	0.253
Evapotranspiration	614	491	0.491

Subject Site Subsurface Conditions

Surface Soil — Topsoil, Earth fill and Glacial Till

Subject Site Breakdown Area (m^2)

A: Pre-Development	
Existing Impervious Area	0.00
Existing Pervious Area (Green Area)	50,660.00
Total	50,660.00
B: Post-Development	
Proposed Impervious Area (Parks-Hard Landscape)	705.00
Proposed Impervious Area (Rear Lot Townhouses-RLTH)	13,882.00
Proposed Impervious Area (Back to Back Townhouse- B2B)	5,706.00
Proposed Impervious Area (Mixed Use Residential Area)	7,104.00
Proposed Impervious Area (8.5 m Lane Way)	8,495.00
Proposed Impervious Area (20 m ROW)	2,154.00
Proposed Impervious Area (SWM Block)	925.00
Proposed Pervious Area (Parks)	3,995.00
Proposed Pervious Area (Rear Lot Townhouses-RLTH)	1,542.00
Proposed Pervious Area (Back to Back Townhouse- B2B)	634.00
Proposed Pervious Area (Mixed Use Residential Area)	547.00
Proposed Pervious Area (20 m ROW)	1,466.00
Proposed Pervious Area (SWM Block)	925.00
Proposed Pervious Area (Open Space/ Environmental Area/Future Development	2,580.00
Total	50,660.00

Source: https://trca.ca/conservation/drinking-water-source-protection/trspa-water-balance-tool/

Impervious Factors

ET-Impervious (10%)	0.1
Runoff-Impervious (90%)	0.9

Subject Site Pre- and Post-Development Water Balance Estimates

Pre-Development Water Balance

Breakdown	Area (m^2)	Precipitation (m^3/yr)	Evapotranspiration (m^3/yr)	Infiltration (m^3/yr)	Runoff (m^3/yr)
Existing Impervious Area	0.00	0.00	0.00	0.00	0.00
Existing Pervious Area (Green Area)	50,660.00	43,922.22	24,874.06	12,816.98	6,231.18
Total	**50,660.00**	**43,922.22**	**24,874.06**	**12,816.98**	**6,231.18**

Post-Development Water Balance

Breakdown	Area (m^2)	Precipitation (m^3/yr)	Evapotranspiration (m^3/yr)	Infiltration (m^3/yr)	Runoff (m^3/yr)
Proposed Impervious Area (Parks-Hard Landscape)	705.00	611.24	61.13	0.00	550.11
Proposed Impervious Area (Rear Lot Townhouses-RLTH)	13,882.00	12,035.69	1,203.57	0.00	10,832.12
Proposed Impervious Area (Back to Back Townhouse- B2B)	5,706.00	4,947.10	494.71	0.00	4,452.39
Proposed Impervious Area (Mixed Use Residential Area)	7,104.00	6,159.17	615.92	0.00	5,543.25
Proposed Impervious Area (8.5 m Lane Way)	8,495.00	7,365.17	736.52	0.00	6,628.65
Proposed Impervious Area (20 m ROW)	2,154.00	1,867.52	186.75	0.00	1,680.77
Proposed Impervious Area (SWM Block)	925.00	801.98	80.20	0.00	721.78
Proposed Pervious Area (Parks)	3,995.00	3,463.67	1,961.54	1,010.74	491.38
Proposed Pervious Area (Rear Lot Townhouses-RLTH)	1,542.00	1,336.91	757.12	390.12	189.67
Proposed Pervious Area (Back to Back Townhouse- B2B)	634.00	549.68	311.30	160.40	77.98
Proposed Pervious Area (Mixed Use Residential Area)	547.00	474.25	268.58	138.39	67.28
Proposed Pervious Area (20 m ROW)	1,466.00	1,271.02	719.80	370.90	180.32
Proposed Pervious Area (SWM Block)	925.00	801.97	454.17	234.02	113.78
Proposed Pervious Area (Open Space/ Environmental Area/Future Development	2,580.00	2,236.86	1,266.78	652.74	317.34
0	**50,660.00**	**43,922.22**	**9,118.09**	**2,957.31**	**31,846.82**

Subject Site Pre- and Post-Development Water Balance Gain/Loss

Gain/Loss (m^3/yr)	Precipitation (m^3/yr)	Evapotranspiration (m^3/yr)	Infiltration (m^3/yr)	Runoff (m^3/yr)
Pre-Development	43,922.22	24,874.06	12,816.98	6,231.18
Post-Development	43,922.22	9,118.09	2,957.31	31,846.82
Gain/Loss (-)		-15,755.97	-9,859.67	25,615.64
Gain/Loss (%)	-	63 ↓	77 ↓	411 ↑

Subject Site Pre- and Post-Development Water Balance Components Gain/Loss

Gain/Loss (mm/yr)	Precipitation (mm/yr)	Evapotranspiration (mm/yr)	Infiltration (mm/yr)	Runoff (mm/yr)
Pre-Development	867.00	491.00	253.00	123.00
Post-Development	867.00	179.98	58.38	628.64
Gain/Loss (-)	-	-311.02	-194.62	505.64
Gain/Loss (%)	-	63 ↓	77 ↓	411 ↑