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A REPORT TO
ACORN NE STOUFFVILLE INC.

HYDROGEOLOGICAL ASSESSMENT
PROPOSED RESIDNETIAL DEVELOPMENT

12875 TENTH LINE
TOWN OF WITCHURCH-STOUFFVILLE

REFERENCE NO. 1903-W092

April 24, 2026

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Issues and Revisions Registry

Modification	Date	Description of the issues and/or revision
1st Draft Limited Hydrogeological Assessment Letter Report	June 14, 2023	For Review
1st Draft Report	April 17, 2026	For Review
2nd Draft Report	April 23, 2026	For review
Final Report	April 24, 2026	For Submission

1.0 EXECUTIVE SUMMARY

Soil Engineers Ltd. (SEL) was retained by Acorn NE Stouffville Inc. to conduct an Updated Hydrogeological Assessment for the proposed residential development. The subject site, known as the Acorn North Parcel, is located at 12875 Tenth Line in the Town of Whitchurch-Stouffville (Subject Site).

Based on the Conceptual Site Plan prepared by Bousfields Inc., dated January 26, 2026, it is understood that the Subject Site is proposed to be developed as a residential subdivision. The development will include mixed-use and residential buildings fronting Tenth Line with up to two levels of underground parking. In addition, stacked townhouses, back-to-back townhouses, and rear-lot townhouses are proposed. The remaining portions of the site are designated for reserved environmental lands and a park block located along the eastern limit of the property.

The current investigation revealed that:

- The investigation has revealed that beneath a topsoil veneer and a layer of earth fill at most borehole locations, the Subject Site is generally underlain by strata of sandy silt till and silty sand till to the termination depth of investigation. These till deposits are interstratified with or overlie deposits of silty clay, silty clay till, silt, sandy silt, and sand.
- A review of the recorded groundwater table indicates that the highest and lowest groundwater tables were recorded at 291.97 metres above sea level (masl) and 286.90 masl in BH/MWs 102 and 303, respectively.
- The estimated hydraulic conductivity of 2.85×10^{-8} m/sec for the sandy silt till was utilized for the current assessment.
- The groundwater quality assessment results indicate exceedances of Total Kjeldahl Nitrogen (TKN) and total manganese when compared to the York Region Storm Sewer Use By-law (2021-102). However, it meets the York Region Sanitary Sewer Use By-Law. As such, if the collected groundwater is proposed to be discharged to the York Region storm sewer system, pre-treatment would be required to ensure compliance with the by-law limits. This would apply to any short-term construction dewatering activities prior to discharge to the Region of York storm sewer system.
- The groundwater quality result indicated exceedances in total cobalt, total phosphorus, and total zinc when the water quality samples were compared against PWQO parameters. Additionally, Nonylphenol, Polychlorinated Biphenyls (PCBs) – Total and Bis(2-ethylhexyl)phthalate are reported at the detection limits. This indicates that any short-term construction dewatering discharge would require pre-treatment to lower the elevated parameters before being released into the nearby natural system.

- The estimated maximum short-term construction dewatering flow rate from the groundwater source, with a safety factor of 1.5 and a 2-year storm event for construction of the proposed installation of the underground services, can range from 3,100.0 L/day to 6,700.0 L/day, considering an open and active excavation trench with dimensions of 2 m width and 50 m length. As such, filing an Environmental Activity and Secor Registry (EASR) with the Ministry of the Environment and Parks (MECP) is not required for the excavation and construction of the proposed underground services if it is completed over phases. Furthermore, the estimated flow rates consider the seasonally high shallow groundwater table. As such, if excavation and construction are completed during dry seasons of a year, the lower construction dewatering flow rates are expected. Additionally, obtaining a discharge agreement from the Region of York is required if short-term dewatering effluent is proposed to be conveyed to the region's sewer system.
- Based on the reviewed plans and assumptions made in the current report, groundwater seepage is not anticipated for the construction of the proposed townhouse blocks. However, a potential 2-year storm event with a duration of 3 hr is expected to range from the 17,000.00 to 24,900.0 L/day. As such, filing an EASR with the MECP is not required for the excavation and construction of the proposed townhouse blocks. However, obtaining a discharge agreement from the Region of York is required if short-term dewatering effluent is proposed to be conveyed to the region's sewer system.
- Detail designs are not available for construction of the apartment buildings facing 10th Line for review at the time of preparation of the current report. As such, potential short-term dewatering assessment should be completed once details become available for review.
- Based on the review of the provided plan and assumptions made to estimate the short-term dewatering flow rates for the proposed townhouse blocks, the proposed basements and underside of the footings will be constructed between 0.6 and 2.0 m above the highest recorded shallow groundwater table within the glacial till. As such, Long-term foundation drainage is not anticipated for the proposed townhouse blocks.
- The geotechnical assessment report dated March 2026 recommends that if the foundation of the proposed midrise building with 2 level underground parking extends below water table, then the proposed structure should be water proofed. As such, no long-term foundation drainage control is required for the proposed mid-rise development. Once the building design becomes available additional borehole monitoring wells should be installed to assess and verify the ground condition within the footprint of the future development.
- The maximum anticipated conceptual Zone of Influence (ZOI) for dewatering extends up to 1.6 meters from the dewatering area for the installation of underground services within the Subject Site.

- A review of the records indicates that there are no structures located within the preliminary ZOI. Therefore, risk for the ground settlement is not anticipated for the proposed construction of the underground services. Additionally, the short-term dewatering is not anticipated for the proposed Townhouse development. Therefore, risk for the ground settlement is not anticipated for the construction of the proposed town house blocks. At the time of preparation of this report, the detailed design for the proposed mid-rise buildings, including the two-level underground parking, was not available for review. Accordingly, recommendations related to ground settlement for the proposed mid-rise development should be reassessed once the detailed design information becomes available.
- Based on the review, no natural features are located within the conceptual zone of influence; therefore, no impacts are anticipated. However, this assessment and associated recommendations should be reviewed and confirmed once the detailed design for the Subject Site becomes available.
- A review of the MECP well records indicates that there are no records for water supply wells that are registered within the conceptual ZOI for dewatering. Considering the current available data, significant impacts to water supply wells are not anticipated for the proposed Subject Site. However, completion of a private water supply well is recommended in advance of, during and post-construction. The private water supply well monitoring should be completed a couple of months ahead of construction.
- A review of the findings indicates that a total decrease of 14,759.39 m^3/year and 8,041.14 m^3/year for ET and infiltration, respectively, and an increase of 22,800.51 m^3/year for runoff are expected for the post-development Site.

2.0 INTRODUCTION

2.1 Site Location and Project Description

Soil Engineers Ltd. (SEL) was retained by Acorn NE Stouffville Inc. to conduct an Updated Hydrogeological Assessment for the proposed residential development at a property with municipal address of 12875 Tenth Line, in Twon od Whitchurch-Stouffville (The Subject Site). The Subject Site, known as the Acorn North Parcel. The location of the subject site is presented on **Drawing 1**.

At the time of investigation, in 2019 and following groundwater monitoring program, extended to January 2026, the Subject Site was a farm field, with a barn building located adjacent to Tenth Line and a residence situated in the southern portion of the Subject Site, accessed by a driveway from Tenth Line.

Based on the Conceptual Site Plan prepared by Bousfields Inc., dated January 26, 2026, it is understood that the Subject Site is proposed to be developed as a residential subdivision. The development will include a residential apartment building as well as a mixed-use residential building fronting Tenth Line with up to two levels of underground parking. In addition, stacked townhouses, back-to-back townhouses, and rear-lot townhouses are proposed. The remaining portions of the Subject Site are designated for reserved environmental lands and a park block located along the eastern limit.

The current report is mainly prepared for the stacked townhouses, back-to-back townhouses, and rear-lot townhouses with underground services. Details regarding the mixed-use multistorey residential buildings proposed along Tenth Line are currently unavailable and are therefore not included in this report. Furthermore, based on SEL records, the 10 previously installed monitoring wells in the Subject Site were decommissioned during 2023 as per the client's request.

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 control are assessed, and hydrogeological impacts of the proposed development to the nearby groundwater receptors, including water supply wells, natural heritage features, and structures, are assessed (if applicable). This report provides comments on the potential impacts of the proposed development and the nearby structures. Furthermore, potential needs for long-term foundation drainage control were assessed. Comments and recommendations are provided on any needs for posting Environmental Activity and Sector Registry (EASR) and filling Permit to Take Water (PTTW) with the Ministry of the Environment, Conservation and Parks (MECP).

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

2.3 Scope of Work

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

- *Background Review:* Available background geological and hydrogeological information for the Subject Site, including topographic mapping, surface geological, natural heritage features databases, Toronto and Region Conservation Authority (TRCA) regulated area plans, and MECP water well records were reviewed.
- *Fieldwork:* Fieldwork includes inspecting the subject site and surrounding properties concerning the natural features, groundwater receptors, and structures, as well as installing and development of seven (7) Monitoring wells in 2019, three (3) monitoring wells in 2020 and four (4) monitoring wells in 2025. Groundwater levels within the installed monitoring wells were monitored over up to Twenty-five (25) site visits in the available monitoring wells. Furthermore, in-situ hydraulic conductivity testing (Single Well Response Tests/slug tests) was completed in the available monitoring wells. Additionally, two (2) sets of untreated groundwater samples were collected and submitted to a CALA-accredited laboratory to characterize groundwater quality in comparison with the Region of York Storm and Sanitary Sewer Use By-Law standards and Provincial Water Quality Objectives (PWQO) standards. This was conducted to assess disposal and management options for any anticipated short-term construction dewatering or long-term foundation drainage control, if applicable.
- *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 (if available), short-term dewatering flow rate including groundwater seepage, and anticipated water that should be collected over potential storm events was calculated. Potential need for a mitigation plan was discussed 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, if applicable.
- *Permit Requirements:* Considering the estimated short-term construction dewatering long-term foundation drainage flow rates, recommendations were provided on any need for posting on the EASR, or filling PTTW with the MECP, if required.

3.0 APPLICABLE REGULATIONS AND OFFICIAL PLANS

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

3.1 Toronto Regional Conservation Authority (TRCA) Policies and Regulation (O. Reg. 41/24)

Under Section 28 of the Conservation Authorities Act, local conservation authorities are mandated to protect the health and integrity of the regional greenspace system and to maintain or improve the hydrological and ecological functions performed by valley and stream corridors. The TRCA, through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (O. Reg.) 41/24, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposals or Site alteration work to shorelines and watercourses within the regulated areas.

TRCA Regulated Area online mapping was reviewed on March 23, 2026. It is our understanding that eastern portion of the Subject Site, identified as Environmental lands and park area, are located within a TRCA Regulated Area, specifically at the tributary of Reesor creek. As such, it is anticipated that obtaining a permit from the TRCA under O. Reg. 41/42 (or the applicable updated Conservation Authorities Act regulations) may be required if the proposed development encroach into the regulated area of the Subject Site.

3.2 Clean Water Act

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

Based on the regional-scale source water protection mapping (Source Water Protection Information Atlas) provided by the MECP on April 8, 2026, the Subject Site is not located within an Issue Contributing Area (ICA), Intake Protection Zone and Event Based Area. Record review indicates that the Subject Site is located within Wellhead Protection Area C (WHPA-C) with a vulnerability score of 8, as well as WHPA-Q1 and WHPA-Q2 areas associated with a moderate stress level. It is also partially located within a Significant Groundwater Recharge Area (SGRA), and a Highly Vulnerable Aquifer (HVA) with a vulnerability score of 6. Since the Subject Site is located within the WHPA Q1 and Q2 the Pre- and Post Development Water Balance Assessment is provided in the **Section 9.0** of the current report.

4.0 METHODOLOGY

4.1 Borehole Advancement and Monitoring Well Installation

Fourteen (14) monitoring wells were installed over three (3) investigation phases within the Subject Site for hydrogeological assessment. The boreholes and monitoring wells are numbered in the 100-, 200- and 300-series to differentiate them from the original geotechnical investigation completed in 2018 with the finding presented in the report titled: "*A Geotechnical Investigation for Proposed Development, 12875 Tenth Line, Town of Whitchurch-Stouffville*", SEL Reference number 1804-S036 dated May 2018.

- ***Series 1-2018 (i.e. BH 1-12)*** – Total of twelve (12) geotechnical Boreholes were drilled as part of geotechnical investigation in 2018.
- ***Series 100 -2019 (i.e BH/MW 101-106)*** **-** Six (6) boreholes (Boreholes 101 to 106, inclusive), extending to a depth of 8.1 below the prevailing ground surface (mbgs), were completed on April 18 and 22, 2019, to facilitate the installation of monitoring wells. Theses series of monitoring wells were decommissioned on November 06, 2023.
- ***Series 200 -2020 (i.e. BH/MW 201-204)*** **-** Three (3) boreholes (Boreholes 201 to 203, inclusive), extending to depths of 7.8 and 8.1 mbgs, were completed on March 4, 2020, to facilitate the installation of monitoring wells. Theses series of monitoring wells were decommissioned on November 06, 2023.
- ***Series 300 -2025 (i.e. BH/MW 301-304)*** - Four (4) boreholes (Boreholes 301 to 304, inclusive), extending to depths of 7.6 to 8.1 mbgs, were completed on December 8, 2025, to facilitate the installation of monitoring wells.

The borehole and monitoring well locations are shown on **Drawing 2**, enclosed.

Borehole drilling and monitoring well construction were completed by a licensed water well contractor in each investigation phase, under the full-time supervision of SEL's geotechnical supervisor who logged the soil strata encountered during borehole advancement and collected representative soil samples for textural classification. The boreholes were drilled using a track-mounted drill rig equipped with continuous-flight, solid-stem augers. Detailed descriptions of the encountered subsoil and groundwater conditions, as well as a grain size distribution graph, are provided by SEL and presented on the borehole and monitoring well logs, in the enclosed **Appendix A-1 and A-2**.

The monitoring wells were constructed using 50-mm diameter Trilock pipes and 3.0 m or 1.5 m long 10-slot well screens, which were installed in each of the selected geotechnical boreholes. All monitoring wells were equipped with monument steel protective casings. The boreholes were checked for the presence of groundwater and the occurrence of cave-in upon completion of drilling.

The UTM coordinates and ground surface elevations at the monitoring wells' locations, as well as the monitoring well construction details, are presented in **Table 4-1**. The ground surface elevations and horizontal coordinates at the monitoring well locations were determined at the time of the investigation, using a Trimble TSC 3SP 60 handheld Global Navigation Satellite System.

Table 4-1 Monitoring Well Installation Details

Monitoring Well ID	Installation Date	UTM Coordinates (m)		Ground El. (masl)	Screen Interval (mbgs)	Soil in the Screen Interval	Casing Dia. (mm)	Protective Casing Type
		Easting	Northing					
BH/MW 101	April 22,2019	641558	4872389	298.20	4.3-7.3	Sandy Silt Till, Silt and Silty Fine Sand,	50	Monument
BH/MW 102	April 22, 2019	641654.4	4872424	299.05	4.6-7.6	Sandy Silt Till, Fine Sand and Silty Fine Sand	50	Monument
BH/MW 103D[1]	April 22, 2019	641766.8	4872435	292.17	4.6-7.6	Silty Sand Till/ Sandy Silt Till and Silt	50	Monument
BH/MW 103S[2]	April 22, 2019	641767.1	4872435	292.07	3.1-4.6	Silty Sand Till/ Sandy Silt Till	50	Monument
BH/MW 104	April 18, 2019	641722.2	4872279	296.35	4.6-7.6	Silty Sand Till, Silty Clay, Sand and Sandy Silt Till	50	Monument
BH/MW 105	April 18, 2019	641854	4872277	297.12	4.6-7.6	Silty Sand Till and Sandy Silt	50	Monument
BH/MW 106	April 18, 2019	641592.3	4872204	295.48	4.6-7.6	Sandy Silt Till and Silty Fine Sand	50	Monument
BH/MW 201	March 4, 2020	641745.8	4872348.8	292.41	4.6-7.6	Sandy Silt Till, Silty clay and Sand	50	Monument
BH/MW 202	March 4, 2020	641678	4872330	291.73	4.6-7.6	Sandy Silt Till	50	Monument
BH/MW 203	March 4, 2020	641603	4872307.9	293.08	4.6-7.6	Sandy Silt Till and Silt	50	Monument
BH/MW 301	December 8, 2025	641669.6	4872415.4	297.00	6.1 to 7.6	Sandy Silt till	50	Monument
BH/MW 302	December 8, 2025	641683.0	4872343.0	291.70	4.6 to 7.6	Sandy Silt Till	50	Monument
BH/MW 303	December 8, 2025	641653.1	4872232.6	294.30	4.6 to 7.6	Sandy Silt Till and Silt	50	Monument
BH/MW 304	December 8, 2025	641766.5	4872289.1	295.60	4.6 to 7.6	Sand and Sandy Silt Till	50	Monument

Notes:
mbgs metres below ground surface
masl metres above sea level
[1] S: Shallow Nested Monitoring Well
[2] D: Deep Nested Monitoring Well

4.2 MECP Water Well Records Review

MECP Water Well Records (WWRs) were reviewed for the registered wells located within a 500 m radius of the Subject Site. The water well records indicate that Seventy-Eight (78) wells are located within the 500 m zone of influence of the Study Area relative to the Subject Site. The findings of the MECP well records are summarized in **Section 5.6** of the current report.

4.3 Groundwater Monitoring

The groundwater levels in the monitoring wells were measured manually on twenty-five (25) occasions during the study period, on the following dates: April 30, May 23, June 17, and July 16 of 2019; April 7, May 25, June 29, July 20, August 28, September 25, October 28, November 27, and December 29 of 2020; December 8, 2021; September 29, October 27, November 28, and December 19 of 2022; March 22, April 28, May 26, June 9 of 2023; December 19 of 2025; and January 7 and January 21 of 2026. These measurements were taken to record the fluctuation of the stabilized groundwater table beneath the Subject Site with the results presented in **Section 7.1**.

4.4 In-Situ Hydraulic Conductivity Test

Completion of hydraulic conductivity testing was not in the scope of work for previous investigations, and the monitoring wells were decommissioned in advance of the recent investigation at the Subject Site. As such, in-situ hydraulic conductivity testing was conducted in one (1) monitoring well with sufficient groundwater. SEL has conducted an in-situ hydraulic conductivity test (falling head) at one (1) BH/MW location. The in-situ hydraulic conductivity test (falling head and rising head) provides an estimated hydraulic conductivity (K) for the subsoil strata at the depth of the well screen. The monitoring well was developed in advance of the test. Well development involves the purging and removal of groundwater from the monitoring well to remove remnants of clay, silt, and other debris introduced into the monitoring well during construction, and to induce the flow of formation groundwater through the well screen, thereby improving the transmissivity of the subsoil strata formation at the well screen depth.

The in-situ falling head hydraulic conductivity test involves the placement of a slug of known volume into the monitoring well, below the water table, to displace the groundwater level upward. The in-situ rising head hydraulic conductivity test involves removing a volume of water from the monitoring well to displace the groundwater level downward. The rate at which the water level recovers to static conditions (rising head/falling head) is tracked manually using a water level tape and a data logger. A slug test in a monitoring well with a partially submerged screen may exhibit a double straight-line effect due to filter pack drainage. Therefore, the data that represents the filter pack around the screen is eliminated during the interpretation of the slug test. The rate at which the water table recovers to static conditions is used to estimate the K value for the water-bearing strata formation at the well screen depth using the Bouwer and Rice method (1976). The findings of the hydraulic conductivity testing are presented in **Section 7.2.1** of the current report.

4.5 Groundwater Quality Assessment

Groundwater quality assessment was completed by SEL on January 7, 2026. One (1) set of groundwater samples was collected from one (1) selected monitoring well (BH/MW 302) to characterize its quality for evaluation against the Region of York Sanitary and Storm Sewer Use By-Law (2021-102) parameters. This

is performed to assess whether any anticipated dewatering effluent can be disposed of into the Region of York Storm or Sanitary Sewer system during construction. Based on the results, recommendations for any pre-treatment for any dewatering effluent can be developed, if required. Additionally, one (1) set of groundwater quality sample was collected from the same monitoring well (BH/MW 302) to characterize its quality for evaluation against the Provincial Water Quality Objectives (PWQO). This is performed to assess whether any anticipated dewatering effluent can be disposed of into the nearby natural system

The sample analysis was performed by SGS Canada Inc., and the results of the analysis are discussed in **Section 7.3** of the current report.

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

The maps, data, and documents provided by the MECP, Ontario Geological Survey (OGS), Ministry of Natural Resources (MNR), Oak Ridges Moraine Groundwater Program (ORMGP), and TRCA were reviewed. Additionally, an issued geotechnical report was reviewed at the time of preparation of the current hydrogeological assessment report, with the findings summarized in S**ections 5** and **6**.

5.0 REGIONAL AND LOCAL SITE SETTING

5.1 Regional Geology

The current understanding of the surface geological setting of the Subject Site is based on scientific work conducted by the OGS (OGS, 2003). Majority of the Subject Site is located within an area mapped as Halton Till deposits (5d), comprising of clay to silt-textured till derived from the glaciolacustrine deposits or shale. Furthermore, central and northeast portions of the Subject Site is mapped with Glacial Lake Deposit (8a), comprising of clay, silt. **Drawing 3** illustrates the mapped surficial geology for the Subject Site and the surrounding area.

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

- *Undifferentiated Sediments:* Undifferentiated sediments present on the ground surface, with an approximate thickness of between 0.4 m and 2.6 m.
- *Halton Till (Upper Till):* The Halton Till is mainly comprised of sandy silt to clayey silt till interbedded with silt, clay, and some discontinuous sand and gravel lenses. It was deposited approximately 12,500 years ago. Based on cross-section, the Halton Till or equivalent can be contacted beneath the undifferentiated sediments with an approximate thickness ranging between 8.2 m and 9.2 m.
- *Oak Ridges Moraine:* The Oak Ridges Aquifer Complex (ORAC) is a regionally significant aquifer in southern Ontario. The majority of the aquifer's recharge occurs at the crest of the moraine north of the Subject Site. It is primarily composed of interbedded fine sand and silt deposits with localized coarse sand and gravel deposits. The ORAC is approximately 90 m thick beneath the crest of the moraine but thins out rapidly towards the margins. The approximate thickness of the ORAC could reach between 26.1 m and 29.9 m beneath the Subject Site.
- *Newmarket Till:* The Newmarket Till is a regionally extensive till formation that acts as an aquitard separating the Oak Ridges Aquifer Complex (ORAC) from the underlying Thorncliffe Formation. Based on the ORMGP cross-section, Upper New Market Till, is mapped beneath the ORAC, with the approximate thickness ranging from 0.4 to 2.3 m. The Inter-Newmarket Sediment is mapped beneath the Upper New Market Till. The approximate thickness of the Inter-Newmarket Sediment ranges from 4.3 m to 7.3 m from southwest to northeast of the Subject Site. Lower Newmarket Till is mapped beneath the Inter-Newmarket Sediment. The approximate thickness of the Lower Newmarket Till ranges from 21.8 to 27.8 m from southwest to northeast of the Subject Site.

- *Thorncliffe Formation:* The Thorncliffe Formation consists of glaciofluvial and glaciolacustrine sand and silt deposited approximately 30,000 to 50,000 years ago. The Thorncliffe Formation shows a considerable variation in grain size and thickness, both locally and regionally. It acts as a regional aquifer. Based on the ORMGP cross-section, the approximate thickness of the Thorncliffe at the Subject Site is 26.5 to 32.2 m from southwest to northeast of the Study Area.
- *Sunnybrook Drift:* The Sunnybrook Drift consists of silt to silty clay materials deposited 45,000 years ago and acts as a regional aquitard. The thickness of the Sunnybrook Drift is generally less than 10 m to 20 m. The approximate thickness of the Sunnybrook drift at the Subject Site ranges from 26.6 to 26.9 m from southwest to northeast of the Study Area.
- *Scarborough Formation:* The Scarborough Formation is composed of clay, silt, and sand sediments in a deltaic sequence. It acts as an aquifer of regional extent. This unit is mostly found within bedrock valleys and thins laterally away from the valleys. Based on the ORMGP cross-section, the thickness of the Scarborough Formation approximately ranges from 0.7 to 4.4 m from southwest to northeast of the Subject Site.

The underlying bedrock at The Study Area is the Blue Mountain Formation, which consists of shale along with minor limestone (OGS, 2007). A review of the ORMGP cross-section indicates that the bedrock could be contacted approximately 115.0 to 142.6 mbgs beneath the Subject Site.

5.2 Regional Physiography

The Subject Site is located within a regional physiography of Southern Ontario known as the South Slope. The South Slope within the vicinity of the Subject Site comprises a drumlinized Till Plains (Chapman and Putnam, 1984). **Drawing 4** shows the location of the Subject Site within the regional physiography map.

5.3 Regional Topography and Drainage

A review of the regional topography map presented on **Drawing 5** indicates that the topography of the Subject Site slopes gently to the east and southeast towards Reesor Creek. The ground surface elevation ranges approximately between 291.7 meters above sea level (masl) and 299.1 masl, based on the ground surface elevations measured at the borehole and monitoring well locations.

5.4 Watershed Setting

The Subject Site is located within the Duffins Creek Watershed which falls within the Toronto and Region Conservation Authority (TRCA) jurisdiction.

5.5 Local Surface Water and Natural Heritage Features

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

Based on the record review, the Subject Site is situated within the Oak Ridges Moraine (Settlement Area) planned area. Bodies of water are mapped approximately 26 m east of the east boundary of the Subject Site and approximately 146 m west of the west boundary of the Subject Site.

A watercourse, Reesor creek, and associated wooded areas are mapped to the east and southeast of the Subject Site. The record review indicates the presence of an unevaluated wetland feature (not evaluated as per the Ontario Wetland Evaluation System - OWES) located within the central and eastern portions of the Subject Site.

5.6 Ground Water Resources (MECP 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 Seventy-eight (78) well records are located within the Study Area. A summary of data obtained from the records review is presented in **Table 5-1**.

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

Table 5-1 MECP Well Record Summary

Water Use (Final Status)	
Final Status	**Number of Records**
Water Supply	22
Unknown	21
Observation Wells	16
Other Status	14
Test Hole	3
Abandoned-Other	2

The above summary indicates that there are twenty-two (22) records of water supply wells located within the 500 m from the Subject Site. However, there is no record of water supply well within the Subject Site.

5.7 Active Permit to Take Water Application Record Review

The MECP website was reviewed for active Permit to Take Water (PTTW) records within a 1.0 km radius of the subject site on March 24, 2026. The record review indicates there is one (1) active PTTW within this search radius.

Table 5-2 Summary of the nearby Active PTTW

Permit Holder	Permit Number	Purpose	Source Type	Maximum Taking	Distance from Site
The Regional Municipality of York	6555-CANK9P	Water Supply (Municipal)	Ground Water	2,946,240 L/day	0.90 km

6.0 SOIL LITHOLOGY AND SUBSURFACE INVESTIGATION

The investigation has revealed that beneath a topsoil veneer and a layer of earth fill at most borehole locations, the Subject Site is generally underlain by strata of sandy silt till and silty sand till. These till deposits are interstratified with or overlie deposits of silty clay, silty clay till, silt, sandy silt, and sand. Moist to wet silt, sandy silt, and sand deposits were also encountered at various depths, particularly in the lower stratigraphy of several boreholes (such as BHs 1, 3, 5, 9, and BH/MW 303). Information regarding the borehole logs is presented in **Appendix A-1 and A-2**. The approximate locations of the boreholes are shown on **Drawing 2**. Additionally, a key plan and geological cross-sections are presented on **Drawings 8-1**, **8-2A** and **8-2B,** respectively.

Based on a review of the geotechnical investigation report prepared by SEL as well as findings of the additional monitoring wells installed for hydrogeological assessment, the stratigraphy beneath the investigated areas of the Subject Site generally consists of the following:

6.1 Topsoil

The revealed topsoil veneer ranges from 13 to 40 cm in thickness. Thicker topsoil layers may occur in places, especially in low-lying areas that have been filled during previous farming activities.

6.2 Earth Fill

The investigation revealed that a layer of earth fill was encountered at most borehole locations beneath a surficial topsoil veneer. The thickness of the earth fill generally ranges from approximately 0.7 m to 1.4 m, extending up to 2.2 mbgs at BH 7. The earth fill was noted to consist of sand and silt, with clay, gravel, and a mixture of topsoil and rootlet inclusions.

6.3 Sandy Silt Till and Silty Sand Till

A stratum of sandy silt till and silty sand till was encountered below the topsoil veneer or earth fill unit across the Subject Site in most of the boreholes. The silty sand till and sandy silt till deposit consists of a randomized mixture of particle sizes ranging from clay to gravel, with sand and silt being the dominant fractions. Hard resistance to auguring was encountered in places, showing occasional cobbles and boulders in the till stratum. The compactness of the tills varies from very loose to very dense, being generally dense. The very loose and loose tills are generally restricted to the surficial weathered zone near the ground surface. The natural water content values of the till samples indicating moist to very moist, generally moist

The estimated permeability for the silty sand till unit, encountered at a depth of 4.8 mbgs within BH 10, is approximately 10^{-5} cm/sec. Grain size analysis was performed on one (1) subsoil sample, and the graduation curve is plotted in **Figure 15 (Appendix A-2)**.

The estimated permeability for the sandy silt till unit, encountered at a depth of 3.3 mbgs in BH/MWs 103 and 106, is approximately 10^{-6} cm/sec. Grain size analysis was performed on two (2) subsoil samples, and the graduation curve is plotted in **Figure 15 (Appendix A-2)**.

6.4 Silty Clay/Silty Clay Till

The silty clay till deposit, similar in structure and composition to the sandy silt till, was encountered beneath the earth fill in BHs 4, and 11, and BH/MWs 105, and 203. It consists of a random mixture of soils with particle sizes ranging from clay to gravel, where the clay and silt fractions exert the dominant influence on its soil properties. Additionally, a laminated silty clay deposit containing occasional sand and silt seams and layers was contacted below the sandy silt till or silty clay till at depths ranging from 3.3 to 4.6 meters in BHs 4, 5, 6, and BH/MWs 104 and 201.

The silty clay till deposit is firm to very stiff, being generally stiff in consistency. The underlying silty clay is stiff to hard, being generally very stiff. The natural water content for the clay and the clay till indicate that both the silty clay and silty clay till deposits are generally in moist conditions.

6.5 Silt/Sandy Silt

The silt and sandy silt deposits were encountered at various depths in BHs 1, 2, 3, 7, 9, 11, and BH/MWs 101, 102, 103D, 203, 301 and 303. It is fine grained with some clay and occasional clay and sand seams and layers. The compactness of the silts is loose to very dense, being generally dense. The loose silt was encountered within the surficial weathered zone near the ground surface. The natural water content values of the silt samples showing that the silts are in moist to wet, generally very moist conditions.

The estimated permeability for the silt, encountered at a depth of 4.8 and 2.5 mbgs within BHs 1 and 7, is approximately 10^{-6} and 10^{-7}cm/sec respectively. Grain size analysis was performed on two (2) subsoil sample, and the graduation curve is plotted in **Figure 16 (Appendix A-2)**.

6.6 Sand

A sand deposit was encountered beneath the earth fill at BHs 8 and 12. Additionally, this sand deposit was contacted in the lower stratigraphy at depths below 1.3, 4.3, 6.0, and 7.6 mbgs in BHs 1, 3, 5, 9, and BH/MWs 102, 104, 201, 202, 302, and 303. Additionally, stratum of silty fine sand was contacted approximately 1.6 mbgs in BH/MW 106. Sample examinations show that the sand varies from fine-grained to well-graded, and ranges from containing some silt to being silty. The compactness of the sand deposit varies from compact to very dense, being generally dense in consistency. The natural water content indicating damp to wet conditions, but it is generally moist. The estimated permeability for the sand and silty fine sand, encountered at a depth of 6.3 mbgs within BH/MWs 102 and 106, is approximately 10^{-4} and

10^{-3} cm/sec respectively. Grain size analysis was performed on two (2) subsoil sample, and the graduation curve is plotted in **Figures 17** and **18 (Appendix A-2)**.

7.0 LOCAL HYDROGEOLOGICAL STUDY

7.1 Monitoring Well Development and Groundwater Level Monitoring

The groundwater levels in the monitoring wells were measured manually on twenty-five (25) occasions during the study period, on the following dates: April 30, May 23, June 17, and July 16 of 2019; April 7, May 25, June 29, July 20, August 28, September 25, October 28, November 27, and December 29 of 2020; December 8, 2021; September 29, October 27, November 28, and December 19 of 2022; March 22, April 28, May 26, June 9 of 2023; December 19 of 2025; and January 7 and January 21 of 2026. These measurements were taken to record the fluctuation of the stabilized shallow groundwater table beneath the Subject Site. Details of the groundwater monitoring program is presented in **Appendix C-1**.

A review of the recorded groundwater table indicates that the highest and lowest groundwater tables were recorded at 291.97 masl and 286.90 masl in BH/MWs 102 and 303, respectively.

SEL installed one (1) nested pair of shallow and deep groundwater monitoring wells at the Subject Site (BH/MWs 103S and D). Based on the soil stratigraphy encountered at the monitoring well screen intervals, the observed groundwater conditions are likely influenced by the presence of a low-permeability shallow till unit partially surrounding the shallow nested monitoring well screen.

A review of groundwater elevations measured in the nested monitoring wells (103S – shallow and 103D – deep) indicates that groundwater levels generally fluctuate within a relatively narrow elevation range throughout the monitoring period. Observed groundwater elevations in the shallow well (103S) range from approximately 289.00 m asl to 291.68 masl, while groundwater elevations in the deep well (103D) range from approximately 288.09 m asl to 291.82 masl.

Comparison of groundwater level measurements indicates that, during most monitoring events, groundwater elevations in the deep monitoring well are slightly higher than those in the shallow monitoring well, indicating a predominantly upward vertical hydraulic gradient during the spring 2019, early spring, summer and fall of 2020, late fall of 2021, fall of 2022 and spring 2023. The higher recorded groundwater table in the deep nested monitoring well is mainly due to a layer of silt within the screen interval. However, several monitoring events show higher groundwater elevations in the shallow monitoring well relative to the deep nested monitoring well, indicating localized periods of downward vertical hydraulic gradient during late spring and fall of 2020, late fall of 2022 (December 2022).

Two (2) selected monitoring wells BH/MW 103D and 105 were equipped with digital transducer to record groundwater fluctuation over two monitoring programs. The interpreted hydrographs are presented in **Appendix C-2**.

Long-Term Groundwater Monitoring in BH/MW 103D: The first monitoring program was conducted in BH/MW 103D between June 6, 2020 and December 8, 2021. A review of the findings indicates that shallow

groundwater table was increased during late fall 2020, spring of 2021 and late fall of 2021. The highest and lowest shallow groundwater tables were recorded at 292.2 masl and 288.94 masl on March 11, 2021 and November 24, 2020, respectively. The second monitoring program in BH/MW 103D started on September 19, 2022 and extended on April 28, 2023. A review of the findings indicates that shallow groundwater table increased during late December 2022 extending spring of 2022 and approximately remained in the range of 292.5 to 291.5 masl for the remainder of the monitoring program. The highest and lowest shallow groundwater tables were recorded at 292.17 masl and 289.25 masl on February 15, 2023 and November 29, 2022, respectively. The interpreted hydrograph indicates that shallow groundwater table increases after precipitation with delay.

Long-Term Groundwater Monitoring in BH/MW 105: The first monitoring program completed in BH/MW 105 between April 8, 2020 and December 8, 2021. A review of the findings indicates that shallow groundwater table was increased during spring of 2021 for very short period of the time and monitoring well remained dry for the remainder of the monitoring program. The highest shallow groundwater table was recorded at 290.71 masl on March 13, 2021. The second monitoring program in BH/MW 105 conducted between September 19, 2022 and June 8, 2023. A review of the findings indicates that shallow groundwater table was increased in January, February and March 2023 after the precipitation event for very short period of time and monitoring well remained dry for the remainder of the monitoring program. The highest shallow groundwater table was recorded at 291.89 masl on March 13, 2021. The interpreted hydrograph indicates that shallow groundwater table increases after precipitation with delay.

A summary of the groundwater level observations and their corresponding elevations are provided in **Appendix C-1**.

A review of the shallow groundwater table recorded during monitoring program between 2019 and 2026 in the monitoring wells installed within the glacial till (Halton Till or equivalent) indicates that the shallow groundwater table is under impression of precipitation and it responds with delay due to the relatively low permeability of the glacial till. The shallow groundwater table decreases during dry seasons and increases again during wet seasons and snow melting. The fluctuation rate varies based on the sand seems appearance in the glacial till that facilitates shallow groundwater flow.

7.2 Shallow Groundwater Flow Pattern

Groundwater level elevations measured on March 22, 2023, were considered to interpret the shallow groundwater flow pattern beneath the Subject Site. This interpretation suggests that it flows mainly in a southerly direction. The interpreted shallow groundwater flow pattern beneath the Subject Site is illustrated on **Drawing 9**. As presented in the drawing, groundwater table was recorded within the vicinity of BH/MW 103D, where the ground surface was observed wet and saturated during the monitoring event.

7.3 Hydraulic Conductivity Testing

7.3.1 Single Well Response Test

Completion of hydraulic conductivity testing was not in the scope of work for previous investigations, and the monitoring wells were decommissioned in advance of the recent investigation at the Subject Site. As such, in-situ hydraulic conductivity testing was conducted in one (1) monitoring well with sufficient groundwater. BH/MW 302 underwent a single well response testing (SWRT) to assess the hydraulic conductivity (K) for saturated shallow aquifer or water-bearing units at the depths of the well screens. Each monitoring well was equipped with a digital transducer to record the fluctuation made to complete the SWRT. The results of the SWRT tests are presented in **Appendix D**, with a summary of the findings provided in **Table 7-1**.

Table 7-1 A Summary of Falling Head Hydraulic Conductivity Testing

Well ID	Ground El. (masl)	Monitoring Well Depth (mbgs)	Screen Interval (mbgs)	Screened Soil Strata	Hydraulic Conductivity (K in m/sec)	Test Method
BH/MW 302	291.70	7.70	4.6 to 7.	Sandy Silt Till	2.85×10^{-8}	Falling Head

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

7.3.2 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, d_{10}, in the soil media. This empirical relation predicts a power-law relation with K, as follow:

$$K = Ad_{10}^2$$

where;

d_{10}: 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 d_{10} 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 7-3**,

below.

Table 7-2 A Summary of Hydraulic Conductivity Using Hazen Equation

Monitoring Well/Sample ID	Soil Sample Depth (mbgs)	Soil Sample Elevation (masl)	Soil Strata	Hydraulic Conductivity (m/s)
BH 10/6	4.8	289.9	Silty Sand Till	6.1×10^{-7}
BH 102/7	6.3	292.75	Fine Sand	3.0×10^{-5}
BH 103/5	3.3	288.87	Sandy Silt Till	1.4×10^{-8}
BH 106/5	3.3	292.18	Sandy Silt Till	1.4×10^{-8}
BH 106/7	6.3	289.18	Silty Fine Sand	7.2×10^{-7}

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

7.4 Groundwater Quality

One (1) set of groundwater samples was collected for analysis from the monitoring well BH/MW 302 on January 7, 2026, by SEL. The samples were submitted for analysis and evaluation against the York Region Sanitary and Storm Sewer Use By-Law (2021-102) parameters. Upon sampling, all of the bottles were placed in a cooler for shipment to the analytical laboratory. Sample analysis was performed by SGS Canada Inc., which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Results of the analysis are provided in **Appendix D**, with a discussion of the findings provided below. The chain of custody number for the submitted samples that underwent analysis is 046409.

Table 7-3 Groundwater Quality Exceedance Results (Unfiltered Sample) – York Region Storm

Exceeded Parameter	Groundwater Quality Results (Unfiltered Sample) (mg/L)	York Region Storm Sewer Use By-Law	Detection Limit (mg/L)
Manganese (total)	0.620	0.15	0.00001
Total Kjeldahl Nitrogen (TKN)	1.4	1	0.5

The results indicate exceedances of Total Kjeldahl Nitrogen (TKN) and total manganese when the water quality samples were compared to the York Region Storm Sewer Use By-Law (2021-102) limits. However, a review of the analytical results indicates that groundwater quality meets the York Region Sanitary Sewer Use By-Law.

If the collected groundwater is proposed to be discharged to the York Region storm sewer system, pre-treatment would be required to ensure compliance with the by-law limits. This would apply to any short-term construction dewatering activities or long-term foundation drainage prior to discharge to the Region of York storm sewer system.

Additionally, one (1) set of groundwater samples was collected for analysis compared to PWQO from the monitoring well BH/MW 302 on January 7, 2026, by SEL. Upon sampling, all of the bottles were placed

in a cooler for shipment to the analytical laboratory. Sample analysis was performed by SGS Canada Inc., which is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Results of the analysis are provided in **Appendix D**, with a discussion of the findings provided below. The chain of custody number for the submitted samples that underwent analysis is 046409.

Table 7-4 Groundwater Quality Exceedance Results (Unfiltered Sample) – PWQO

Exceeded Parameter	Groundwater Quality Results (Unfiltered Sample) (mg/L)	Provincial Water Quality Objective (PWQO)	Detection Limit (mg/L)
Cobalt (total)	0.00135	0.0009	0.000004
Phosphorus (total)	0.032	0.01	0.003
Zinc (total)	0.023	0.02	0.002
Nonylphenol	< 0.001	0.00004	0.001
Bis(2-ethylhexyl) phthalate	< 0.002	0.0006	0.002
Polychlorinated Biphenyls	< 0.0001	0.000001	0.0001

The results indicated that exceedances were reported in total cobalt, total phosphorus, and total zinc when the water quality samples were compared against PWQO parameters. Additionally, Nonylphenol, Polychlorinated Biphenyls (PCBs) – Total and Bis(2-ethylhexyl)phthalate are reported at the detection limits. This indicates that any short-term construction dewatering discharge or long-term foundation drainage would require pre-treatment to lower the elevated parameters before being released into the nearby natural system.

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.

8.0 DISCHARGE WATER CONTROL

8.1 A Review of Proposed Development Plans

Based on the Conceptual Site Plan prepared by Bousfields Inc., dated January 26, 2026, it is understood that the Subject Site is proposed to be developed as a residential subdivision. The development will include a residential apartment building as well as a mixed-use residential building fronting Tenth Line with up to two levels of underground parking. In addition, stacked townhouses, back-to-back townhouses, and rear-lot townhouses are proposed. The remaining portions of the Subject Site are designated for reserved environmental lands and a park block located along the eastern limit. The reviewed plans are presented in **Appendix F**.

Additionally preliminary grading plan prepared by SCS Consulting Group dated April 2026 was reviewed.

The detail designs are not available for the review at the time of the preparation of this report. Therefore, the preliminary dewatering assessment is provided for each component, and once the detail design becomes available for review, the following assessment should be revised. Additionally, the short-term dewatering and long-term foundation drainage assessment for the proposed residential apartment building as well as a mixed-use residential building fronting Tenth Line with 2-level underground parking is not included in the current assessment as designs were not available for review at the time of the preparation of the current report.

8.2 A Review of The Geotech Report

A review of the Geotechnical Investigation report prepared by SEL, dated March 2026 indicates that:

- Due to the unknown history and the presence of topsoil inclusions in the earth fill, it is not suitable for supporting any structure sensitive to movement in its present state. In using the fill for structural backfill, pavement subgrade or slab-on-grade construction, it must be subexcavated, sorted free of concentrated topsoil inclusions or deleterious materials, and properly recompacted in layers.
- 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.
- The Conceptual Demonstration Plan indicates that the development will consist of multi-storey mixed-use residential buildings fronting Tenth Line and townhouse blocks behind the buildings on the west side of Street ‘A’. It is understood that the mixed-use buildings may have up to 2 levels of underground parking structure. According to the Town of Whitchurch-Stouffville’s design requirement, the underside of footing is required to be founded a minimum 0.6 m above the seasonal high groundwater level, otherwise, the underground structure must be waterproofed to eliminate

the need for long-term dewatering. Alternatively, a cut-off wall surrounding the underground structure can also be considered, subject to approval from the Town.

Townhouse Blocks

- 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 existing earth fill and weathered soil.

Mixed-Use and Residential Buildings

- 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 either be provided with a cut-off wall surrounding the structure or the structure must be water-proofed and designed to resist the hydrostatic uplift pressure by a raft foundation.
- One must be aware that the recommended bearing pressures are given as a guide for assessment. A comprehensive geotechnical investigation must be completed for each future building within the property at the detailed design stage. Once detailed design of the underground structures is available, it should be reviewed by the project geotechnical engineer to verify the design bearing pressures at the respective underside of footing elevations.

8.3 Dewatering Calculation Methodology

Short-Term Dewatering Calculation: The pumping rate calculation for the construction of the proposed underground servicing trench excavation and the basements was performed based on the assumption that each excavation acts as a trench, considering the dimensions of the proposed excavation boxes. The calculation was based on the equations provided by Powers et al. (2007). For 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 or single wells and are based on unconfined aquifer conditions (Powers et. al., 2007):

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

Where:

Q	=	Anticipated pumping Rate (m^3/day)
K	=	Hydraulic Conductivity (m/day)
H	=	Distance from the static water level to the bottom of the saturated aquifer (m)
h	=	Depth of water in the well while pumping (m)
R_o	=	Distance from a point of greatest drawdown to a point where there is zero drawdown (radius of influence) (m)
r_s	=	Distance to the points from the centre of the trench, assumed to be half of the trench width (m) for Trench base calculation and the Equivalent radius of excavation (m) for Single well.
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 1.5 to account for uncertainties and natural variability in the range of hydraulic conductivity.

8.3.1 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)

8.3.2 Stormwater Flow Estimates

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.

8.4 Preliminary Short-term Dewatering Flow Estimate

8.4.1 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 March 22, 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 2.85 x 10^{-8} m/sec estimated using in-situ hydraulic conductivity testing was considered for Sandy Silt Till.
- 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 trench to facilitate excavation and construction in dry and stable subsoil conditions.
- The depth of the excavation for the underground services was assumed 4 m below proposed centerline grading of the nearby road. 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/MWs 101, 102, 201 and 106. However, groundwater seepage is expected in the vicinity of BH/MWs 202, 203 and 104. **Table 8-3** presents the details considered

for the current assessment.

Table 8-1 Summary of the preliminary Short-Term Dewatering – Proposed Underground Services

	BH/MW 101	BH/MW 102	BH/MW 201	BH/MW 202	BH/MW 203	BH/MW 104	BH/MW 303
Proposed Grading El. (masl)	297.70	296.23	294.98	294.88	294.35	293.94	293.67
Assumed Invert El. (masl)	293.70	292.23	290.98	290.88	290.35	289.94	289.67
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	2.0 x 50
The highest Recorded Groundwater Level (masl)	291.35	291.96	288.90	290.62	291.00	290.29	289.50
Anticipated Groundwater Seepage (L/day)	NE	NE	NE	2,300.0	2,400.0	2,200.0	NE
Anticipated Groundwater Seepage with S. F. 1.5 (L/day)	NE	NE	NE	3,450.0	3,600.0	3,300.0	NE
Anticipated Storm Water (L/day)	3,100.0	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)	3,100.0	3,100.0	3,100.0	6,550.0	6,700.0	6,400.0	3,100.0
Anticipated Conceptual ZOI for Dewatering (m)	NE	NE	NE	0.4	0.8	0.2	NE
Maximum Anticipated Drawdown (m)	NE	NE	NE	0.74	1.65	0.35	NE

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

The summary of construction dewatering flow rates for the underground services is presented in **Appendix F** (**Pages 1**).

The maximum anticipated dewatering flow rate, including groundwater seepage with a safety factor of 1.5 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, can reaches up to 6,550.0 L/day. Furthermore, as presented in **Table 8-1** construction of the services will be mainly 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 shallow groundwater flow pattern interpreted using

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).

8.4.2 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 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 (underside of the footings) 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 8-2**.
- 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.

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 town house Blocks. However, the storm flow rates during construction are calculated and are provided in **Table 8-2**.

Table 8-2 - Summary of the preliminary Short-Term Dewatering – Proposed Townhouse Blocks

	BH/MW 102 Stacked TH	BH/MW 202 RLTH	BH/MW 202 B2B TH	BH/MW 104 RLTH	BH/MW 303 B2B TH	BH 12 B2B TH
Proposed Grading El. (masl)	296.39	294.99	294.99	293.94	293.56	294.78
Assumed Base of Excavation for Construction of Basement (masl)	293.39	291.99	291.99	290.94	290.56	291.78
Assumed Excavation Length (m)	19.26	16.50	18.00	16.50	18.00	18.00
Assumed Excavation Width (m)	34.04	34.31	40.21	48.31	44.32	44.61
The highest Recorded Groundwater Level (masl)	291.96	290.50	290.00	290.29	289.50	290.50
Anticipated Groundwater Seepage (L/day)	NE	NE	NE	NE	NE	NE
Anticipated Storm Water (L/day)	20,400.0	17,600.0	22,500.0	24,700.0	24,800.0	24,900.0
Total Anticipated Short-Term Dewatering Flow Rate (L/day)	20,400.0	17,600.0	22,500.0	24,700.0	24,800.0	24,900.0
Anticipated Conceptual ZOI for Dewatering (m)	NE	NE	NE	NE	NE	NE
Maximum Anticipated Drawdown (m)	NE	NE	NE	NE	NE	NE

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

The groundwater seepage is not anticipated for the proposed townhouse blocks. However, a potential 2-year storm event with a duration of 3 hr is expected to range from the 17,000.00 to 24,900.0 L/day.

Additionally, a potential 100-year storm event with a duration of 12 hours is expected to range from 58,500.0 L/day to 82,900.0 L/day, considering the active excavation area dimensions outlined in the table above.

8.4.3 Proposed Mid-Rise Development

Based on the review of the Conceptual Site Plan prepared by Bousfields Inc., dated January 26, 2026, it is understood that the Subject Site is proposed to be developed as a residential subdivision. The development will include a residential apartment building as well as a mixed-use residential building fronting Tenth Line with up to two levels of underground parking. However, during the time of the investigation, the detailed design for the proposed building with the 2-level underground parking was not available. Therefore, once the detailed design for the underground structure becomes available for review a detailed dewatering calculation should be assessed and also the additional deep monitoring wells may be required to conduct this study.

8.5 Preliminary Long-term Foundation Drainage Flow Estimate

8.5.1 Proposed Townhouse Development

As noted in Section 7.1 SEL installed one (1) nested pair of shallow and deep groundwater monitoring wells in the glacial till unit at the Subject Site (BH/MWs 103S and D). Based on the soil stratigraphy encountered at the monitoring well screen intervals, the observed groundwater conditions are likely influenced by the presence of a low-permeability shallow till unit partially surrounding the shallow nested monitoring well screen. The interpreted hydrograph indicates that shallow groundwater table increases after precipitation with delay. The recorded shallow groundwater levels within the screen monitoring wells present the groundwater level in the glacial till that is mainly under impression of the precipitation.

Based on the review of the provided plan and assumptions made to estimate the short-term dewatering flow rates for the proposed townhouse blocks, the proposed basements and underside of the footings will be constructed between 0.6 and 2.0 m above the highest recorded shallow groundwater table within the glacial till. Therefore, no long-term foundation drainage is anticipated for the proposed townhouse blocks. Additionally, the geotechnical assessment report date March 2026 indicates that a minimum of 0.6 m separation between the underside of the footing and the seasonal groundwater level should be maintained. As such, since the basements are likely to be remain above the shallow groundwater level, the long-term foundation drainage is not anticipated for the proposed townhouse blocks.

8.5.2 Proposed Mid-Rise Development

Based on the review of the geotechnical assessment report dated March 2026, it recommended that if the foundation of the proposed midrise building with 2 level underground parking extends is below water table, then the proposed structure should be water proofed. As such, for no long-term dewatering is expected for the proposed mid-rise development. Once the building design becomes available additional borehole monitoring wells should be installed to assess and verify the groundwater conditions within the footprint of the future development.

8.6 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 8-3** presents summary of the anticipated short-term dewatering flow rates for construction of the underground services and townhouse blocks and recommendations for obtaining potential permits.

Table 8-3 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	To be assessed once the detailed design becomes available.	To be assessed once the detailed design becomes available.
Underground Services	3,100.0 to 6,700.00	EASR Not Required if excavation and installation of the underground services are completed over phases. 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.
Town House Development	Not expected	Not expected

8.7 Potential Dewatering Impacts and Mitigation Plan-Preliminary

8.7.1 Short-Term Discharge Water Quality

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

A review of the groundwater quality results indicates that the concentrations of Total Kjeldahl Nitrogen (TKN) and total manganese surpass the by-law criteria for discharge to the York Region storm sewer system. However, it meets the York Region Sanitary Sewer Use By-Law. As such, if the collected groundwater is proposed to be discharged to the York Region storm sewer system, pretreatment would be required to ensure compliance with the by-law limits. This would apply to any short-term construction dewatering activities prior to discharge to the Region of York storm sewer system.

The result indicated that exceedances were reported in total cobalt, total phosphorus, and total zinc when the water quality samples were compared against PWQO parameters. Additionally, Nonylphenol, Polychlorinated Biphenyls (PCBs) – Total and Bis(2-ethylhexyl)phthalate are reported at the detection limits. This indicates that any short-term construction dewatering discharge would require pre-treatment to lower the elevated parameters before being released into the nearby natural system.

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.

8.7.2 Ground Settlement

The maximum anticipated preliminary conceptual Zone of Influence (ZOI) for dewatering extends up to 1.6 meters from the dewatering area for the installation of underground services within the Subject Site.

A review of the records indicates that there are no structures located within the preliminary ZOI. Therefore, risk for the ground settlement is not anticipated for the proposed construction of the underground services. Additionally, the short-term dewatering is not anticipated for the proposed Townhouse development. Therefore, risk for the ground settlement is not anticipated for the construction of the proposed town house blocks. At the time of preparation of this report, the detailed design for the proposed mid-rise buildings, including the two-level underground parking, was not available for review. Accordingly, recommendations related to ground settlement for the proposed mid-rise development should be reassessed once the detailed design information becomes available.

8.7.3 Surface Water, Wetlands and Areas of Natural Significance

Based on the review, no natural features are located within the conceptual zone of influence; therefore, no impacts are anticipated. However, this assessment and associated recommendations should be reviewed and confirmed once the detailed design for the Subject Site becomes available.

8.7.4 Water Supply Wells and Zone of Influence

A review of the MECP well records indicates that there are no records for water supply wells that are registered within the conceptual ZOI for dewatering. Considering the current available data, significant impacts to water supply wells are not anticipated for the proposed Subject Site. However, completion of a private water supply well is recommended in advance of, during and post-construction. The private water supply well monitoring should be completed a couple of months ahead of construction.

9.0 PRE AND POST DEVELOPMENT WATER BALANCE ASSESSMENT

9.1 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**.

9.2 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 9-1 Summary of Water Balance Component

Precipitation (mm/year)	Evapotranspiration (mm/year)	Infiltration (mm/year)	Runoff (mm/year)
867	485	217	165

9.3 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 485 mm/yr, runoff is 165 mm/yr and infiltration (groundwater recharge) is 217 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.

9.4 Site Water Balance Component

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

9.4.1 Pre-Development Water Balance

At the time of investigation, in 2019 and following groundwater monitoring program, extended to January 2026, the Subject Site was a farm field, with a barn building located adjacent to Tenth Line and a residence situated in the southern portion of the Subject Site, accessed by a driveway from Tenth Line. 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 56,670.00 m^2 out of which pervious area is 55,070.00 m^2 and impervious area including existing building and paved area is 1,600.00 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) and existing building and paved area 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 9-2**.

Table 9-2 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)
Existing Impervious Area (Building and Paved Areas)	1,600.00	1,387.20	138.72	0.00	1,248.48
Existing Pervious Area (Green Area)	55,070.00	47,745.69	26,708.95	11,950.19	9,086.55
Total	56,670.00	49,132.89	26,847.67	11,950.19	10,335.03

9.4.2 Post-Development Water Balance

The total Subject Site area for the post-development is 56,670.00 $m^{2,}$ out of which the total impervious area and pervious areas of 38,655.94 m^2 and 18,014.06 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 9-3** 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 9-3 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)	814.50	706.17	70.62	0.00	635.55
Proposed Impervious Area (Stacked Townhouses-SKTH)	1,152.00	998.78	99.87	0.00	898.91
Proposed Impervious Area (Rear Lot Townhouses-RLTH)	8,226.00	7,131.94	713.19	0.00	6,418.75
Proposed Impervious Area (Back to Back Townhouse- B2B)	5,553.00	4,814.45	481.45	0.00	4,333.00
Proposed Impervious Area (Mixed Use Residential Area)	11,402.84	9,886.26	988.63	0.00	8,897.63
Proposed Impervious Area (8.5 m Lane Way)	6,700.00	5,808.90	580.89	0.00	5,228.01
Proposed Impervious Area (20 m ROW)	4,807.60	4,168.19	416.82	0.00	3,751.37
Proposed Pervious Area (Parks)	4,615.50	4,001.64	2,238.52	1,001.56	761.56
Proposed Pervious Area (Stacked Townhouses-SKTH)	128.00	110.98	62.08	27.78	21.12
Proposed Pervious Area (Rear Lot Townhouses-RLTH)	914.00	792.44	443.29	198.34	150.81
Proposed Pervious Area (Back to Back Townhouse- B2B)	617.00	534.94	299.24	133.89	101.81
Proposed Pervious Area (Mixed Use Residential Area)	877.16	760.50	425.43	190.34	144.73
Proposed Pervious Area (20 m ROW)	3,292.40	2,854.51	1,596.81	714.45	543.25
Proposed Pervious Area (Open Space/ Environmental Area/Future Development	7,570.00	6,563.19	3,671.45	1,642.69	1,249.05
Total	**56,670.00**	**49,132.89**	**12,088.28**	**3,909.05**	**33,135.54**

9.5 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 9-4 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	49,132.89	26,847.67	11,950.19	10,335.03
Post-Development	49,132.89	12,088.28	3,909.05	33,135.54
Loss (-) and Gain (+)		-14,759.39	-8,041.14	22,800.51

A review of the findings indicates that a total decrease of 14,759.39 m^3/year and 8,041.14 m^3/year for ET and infiltration, respectively, and an increase of 22,800.51 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 9-5**.

Table 9-5 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	473.76	210.87	182.37
Post-Development	867.00	213.31	68.98	584.71
Loss (-) and Gain (+)	-	-260.45	-141.89	402.34

A review of **Table 9-5** indicates that a total loss of 260.45 % and 141.89 % in ET and infiltration, and a total gain of 402.34 % is anticipated in runoff for the post-development Subject Site, respectively.

10.0 CONCLUSIONS AND RECOMMENDATIONS

- Majority of the Subject Site is located within an area mapped as Halton Till deposits (5d), comprising of clay to silt-textured till derived from the glaciolacustrine deposits or shale. Furthermore, central and northeast portions of the Subject Site is mapped with Glacial Lake Deposit (8a), comprising of clay, silt.
- The Subject Site is situated within the Oak Ridges Moraine Settlement Area and the Duffins Creek Watershed, falling under the Toronto and Region Conservation Authority (TRCA) jurisdiction.
- The investigation has revealed that beneath a topsoil veneer and a layer of earth fill at most borehole locations, the Subject Site is generally underlain by strata of sandy silt till and silty sand till to the termination depth of investigation. These till deposits are interstratified with or overlie deposits of silty clay, silty clay till, silt, sandy silt, and sand.
- A review of the recorded groundwater table indicates that the highest and lowest groundwater tables were recorded at 291.97 masl and 286.90 masl in BH/MWs 102 and 303 respectively.
- The estimated hydraulic conductivity of 2.85×10^{-8} m/sec for the sandy silt till was utilized for the current assessment.
- The groundwater quality assessment results indicate exceedances of Total Kjeldahl Nitrogen (TKN) and total manganese when compared to the York Region Storm Sewer Use By-law (2021-102). However, it meets the York Region Sanitary Sewer Use By-Law. As such, if the collected groundwater is proposed to be discharged to the York Region storm sewer system, pretreatment would be required to ensure compliance with the by-law limits. This would apply to any short-term construction dewatering activities prior to discharge to the Region of York storm sewer system.
- The groundwater quality result indicated exceedances in total cobalt, total phosphorus, and total zinc when the water quality samples were compared against PWQO parameters. Additionally, Nonylphenol, Polychlorinated Biphenyls (PCBs) – Total and Bis(2-ethylhexyl)phthalate are reported at the detection limits. This indicates that any short-term construction dewatering discharge would require pre-treatment to lower the elevated parameters before being released into the nearby natural system.
- The estimated maximum short-term construction dewatering flow rate from the groundwater source, with a safety factor of 1.5 and a 2-year storm event for construction of the proposed installation of the underground services, can range from 3,100.0 L/day to 6,700.0 L/day, considering an open and active excavation trench with dimensions of 2 m width and 50 m length. As such, filing an EASR with the MECP is not required for the excavation and construction of the

proposed underground services is completed over phases. Furthermore, the estimated flow rates consider the seasonally high shallow groundwater table. As such, if excavation and construction are completed during dry seasons of a year, the lower construction dewatering flow rates are expected. Additionally, obtaining a discharge agreement from the Region of York is required if short-term dewatering effluent is proposed to be conveyed to the region's sewer system.

- Based on the reviewed plans and assumptions made in the current report, groundwater seepage is not anticipated for the proposed townhouse blocks. However, a potential 2-year storm event with a duration of 3 hr is expected to range from the 17,000.00 to 24,900.0 L/day. As such, filing an EASR with the MECP is not required for the excavation and construction of the proposed townhouse blocks. However, obtaining a discharge agreement from the Region of York is required if short-term dewatering effluent is proposed to be conveyed to the region's sewer system.
- Detail designs are not available for construction of the apartment buildings facing 10th Line for review at the time of preparation of the current report. As such, potential short-term dewatering assessment should be completed once details become available for review.
- Based on the review of the provided plan and assumptions made to estimate the short-term dewatering flow rates for the proposed townhouse blocks, the proposed basements and underside of the footings will be constructed between 0.6 and 2.0 m above the highest recorded shallow groundwater table within the glacial till. As such, long-term foundation drainage is not anticipated for the proposed townhouse blocks.
- The geotechnical assessment report dated March 2026 recommends that if the foundation of the proposed midrise building with 2 level underground parking extends below water table, then the proposed structure should be water proofed. As such, no long-term foundation drainage control is required for the proposed mid-rise development. Once the building design becomes available additional borehole monitoring wells should be installed to assess and verify the ground condition within the footprint of the future development.
- The maximum anticipated conceptual Zone of Influence (ZOI) for dewatering extends up to 1.6 meters from the dewatering area for the installation of underground services within the Subject Site.
    - A review of the records indicates that there are no structures located within the preliminary ZOI. Therefore, risk for the ground settlement is not anticipated for the proposed construction of the underground services. Additionally, the short-term dewatering is not anticipated for the proposed Townhouse development. Therefore, risk for the ground settlement is not anticipated for the construction of the proposed town house blocks. At the time of preparation of this report, the detailed design for the proposed mid-rise buildings, including the two-level underground parking, was not available for review. Accordingly,

recommendations related to ground settlement for the proposed mid-rise development should be reassessed once the detailed design information becomes available.

- Based on the review, no natural features are located within the conceptual zone of influence; therefore, no impacts are anticipated. However, this assessment and associated recommendations should be reviewed and confirmed once the detailed design for the Subject Site becomes available.
- A review of the MECP well records indicates that there are no records for water supply wells that are registered within the conceptual ZOI for dewatering. Considering the current available data, significant impacts to water supply wells are not anticipated for the proposed Subject Site. However, completion of a private water supply well is recommended in advance of, during and post-construction. The private water supply well monitoring should be completed a couple of months ahead of construction.

- A review of the findings indicates that a total decrease of 14,759.39 m^3/year and 8,041.14 m^3/year for ET and infiltration, respectively, and an increase of 22,800.51 m^3/year for runoff are expected for the post-development Site.

11.0 CLOSURE

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

Yours truly,
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DRAWINGS 1 to 9

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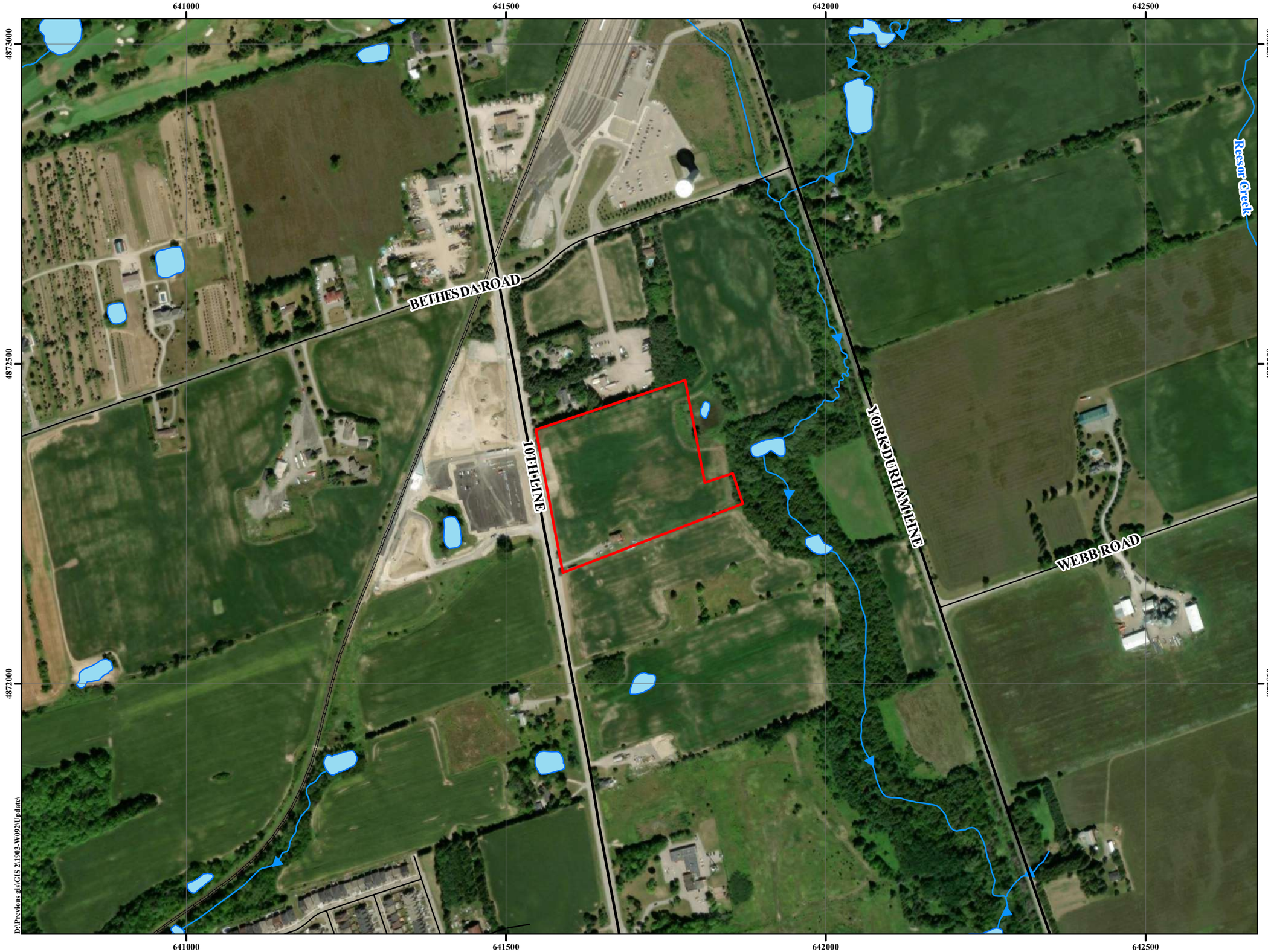

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References: Ontario Ministry of Natural Resources and Forestry
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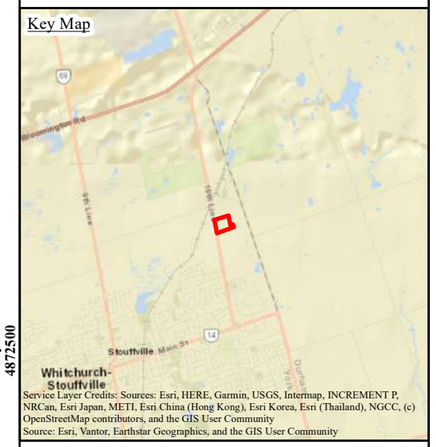
Key Map



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Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

Legend

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

Soil Engineers Ltd.

Site Location Plan

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 30 60 120 180 240 300
Metres

Drawing No. 1

D:\Previous gis\GIS 2\1903-W092\Update\

641600

641800

4872400

4872200

10TH LINE

BH/MW 101
BH/MW 102
BH/MW 103D
BH/MW 103S
BH/MW 104
BH/MW 105
BH/MW 106
BH/MW 201
BH/MW 202
BH/MW 203
BH/MW 301
BH/MW 302
BH/MW 303
BH/MW 304

N

References: Ontario Ministry of Natural Resources and Forestry
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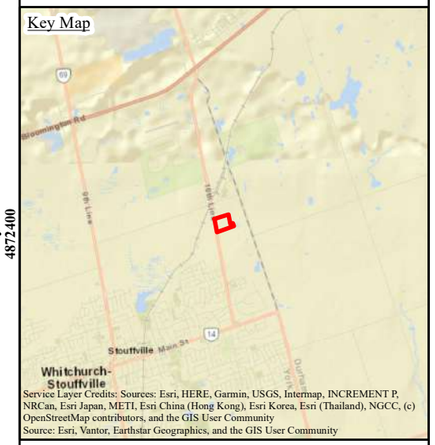
Key Map



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Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site
- Major Road
- Waterbody
- Watercourse
- Borehole With Monitoring Well (2019) (7)
- Borehole With Monitoring Well (2020) (3)
- Borehole With Monitoring Well (2025) (4)

Soil Engineers Ltd.

Borehole and Monitoring Well Location Plan

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 5 10 20 30 40 50
Metres

Drawing No. 2

D:\Previous gis\GIS 2\1903-W092\Update\

641000
641500
642000
642500
4873000
4872500
4872000

20
5d
8a

BETHESDA ROAD
10TH LINE
YORK-DURHAM LINE
WEBB ROAD
GREENWOOD ROAD

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N

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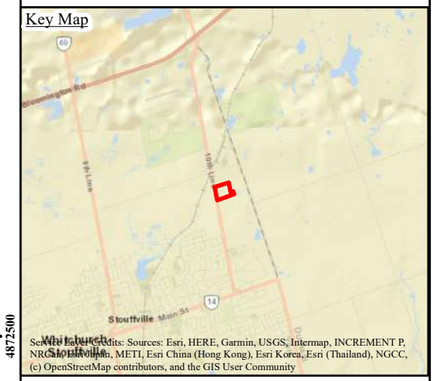
Key Map



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Legend

- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Railway
- 20: Organic deposits: Consisting of organic deposits
- 5d: Glacial deposits (Halton Till): Consisting of diamicton:
- 8a: Glacial lake deposits: Consisting of clay, silt: foreshore/basinal

Soil Engineers Ltd.

Surface Geology Map

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 60 120 180 240 300
Metres

Drawing No. 3

641000
641500
642000
642500
4873000
4872500
4872000

BETHESDA ROAD
10TH LINE
YORK-DURHAM LINE
WEBB ROAD
GREENWOOD ROAD

South Slope

Till Plains
(Drumlinized)

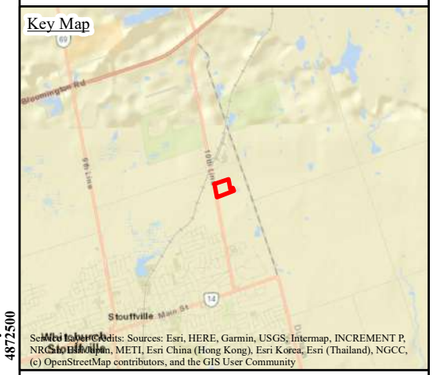
D:\Previous gis\GIS 21\1903-W092\Update\

Source: Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario;
Ontario Geological Survey, Miscellaneous Release--Data 228 ISBN 978-1-4249-5158-1

N

References: © Physiography Map was Produced by Soil Engineers Ltd. under license from the Ministry of North Development and Mines (MNDM). Copyright (c) is held by the King's Printer for Ontario, 2025. Physiography of Southern Ontario, 2007, Ontario Geological Survey, Miscellaneous Release — Date 228.

Key Map



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Legend

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

Soil Engineers Ltd.

Physiographic Map

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 30 60 120 180 240 300
Metres

Drawing No. 4

641000
641500
642000
642500
4873000
4872500
4872000

BETHESDA ROAD
10TH LINE
YORK-DURHAM LINE
WEBB ROAD
GREENWOOD ROAD
Rees or Creek

N

References: Ontario Ministry of Natural Resources and Forestry
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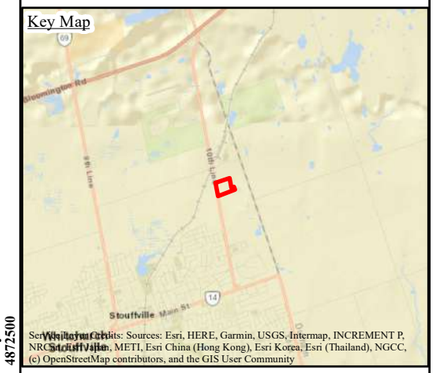
Key Map



Legend

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

Soil Engineers Ltd.

Topographic Map

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 30 60 120 180 240 300
Metres

Drawing No. 5

D:\Previous gis\GIS 2\1903-W092\Update\

641000
641500
642000
642500
4873000
4872500
4872000

Natural Linkage Area

Countryside Area

Settlement Area

BETHESDA ROAD

10TH LINE

YORK-DURHAM LINE

WEBB ROAD

GREENWOOD ROAD

Reesor Creek

N

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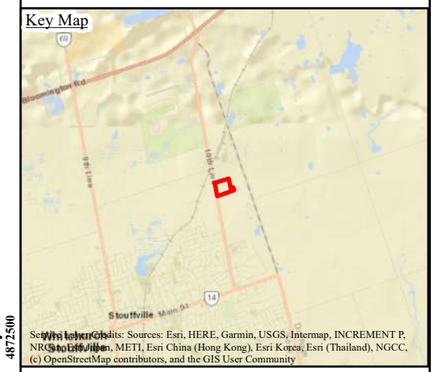
Key Map



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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
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 60 120 180 240 300
Metres

Drawing No. 6

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641000
641500
642000
642500
4873000
4872500
4872000

BETHESDA ROAD
10TH LINE
YORK-DURHAM LINE
WEBB ROAD
NOAH'S FARM TRAIL
GREENWOOD ROAD
Reesor Creek

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

Legend

- 500 Metres From Subject Site Boundary
- Approximate Boundary of Subject Site
- Major Road
- Local Road
- Waterbody
- Watercourse
- Unknown (21)
- Abandoned-Other (2)
- Observation Wells (16)
- Other Status (14)
- Test Hole (3)
- Water Supply (22)

Soil Engineers Ltd.

MECP Well Location Plan

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 30 60 120 180 240 300
Metres

Drawing No. 7

D:\Previous gis\GIS 2\1903-W092\Update\

641600

641800

4872400

4872200

TENTH LINE

A

A'

B

B'

BH/MW 101

BH/MW 102

BH/MW 103S

BH/MW 103D

BH/MW 104

BH/MW 105

BH/MW 106

BH/MW 201 (Projected)

BH/MW 202 (Projected)

BH/MW 203

BH/MW 301

BH/MW 302

BH/MW 303 (Projected)

BH/MW 304 (Projected)

N

References: Ontario Ministry of Natural Resources and Forestry
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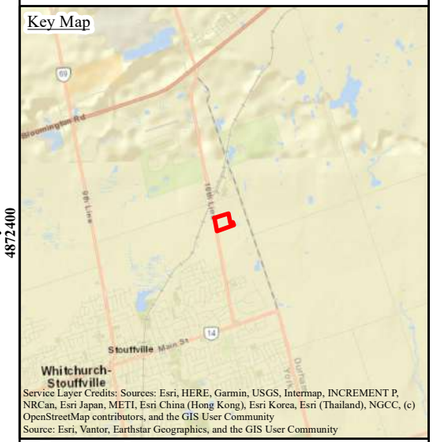
Key Map



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Source: Esri, Vantor, Earthstar Geographics, and the GIS User Community

Legend

- Approximate Boundary of Subject Site (1)
- Cross Section (2)
- Major Road (1)
- Waterbody (2)
- Watercourse (3)
- Borehole With Monitoring Well (2019) (7)
- Borehole With Monitoring Well (2020) (3)
- Borehole With Monitoring Well (2025) (4)

Soil Engineers Ltd.

Subsurface Profile Cross-Section Key Plan

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: March 24, 2026

Scale:
0 5 10 20 30 40 50
Metres

Drawing No. 8-1

D:\Precious gis\GIS 2\1903-W092\Update\

Northwest
A

Southeast
A'

Elevation (masl)

301.00 m
300.00 m
299.00 m
298.00 m
297.00 m
296.00 m
295.00 m
294.00 m
293.00 m
292.00 m
291.00 m
290.00 m
289.00 m
288.00 m
287.00 m
286.00 m
285.00 m
284.00 m

BH/MW 101
BH/MW 302
BH/MW 201 (Projected)
BH/MW 304 (Projected)
BH/MW 105

Topsoil
Silt
291.82 masl
291.27 masl
291.35 masl
291.19 masl
Silty Fine Sand
Earth Fill
Sand
289.33 masl
289.28 masl
289.00 masl
288.90 masl
Sandy Silt Till
Silty Clay
Sand
Silty Clay Till
Sand
Silty Sand Till
291.40 masl
290.53 masl
Sandy Silt

0.00 m
40.00 m
80.00 m
120.00 m
160.00 m
200.00 m
240.00 m
280.00 m
320.00 m

Section A-A'

Topsoil
Earth Fill
Silt
Silty Clay Till
Silty Fine Sand
Silty Sand Till
Sandy Silt
Silty Clay
Sandy Silt Till
Sand

3.0 m Screen

Spring Readings

- Water Table on April 30, 2019
- Water Table on May 23, 2019
- Water Table on June 17, 2019
- Water Table on April 7, 2020
- Water Table on May 25, 2020
- Water Table on June 29, 2020
- Water Table on March 22, 2023

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CONSULTING SOIL, FOUNDATION & ENVIRONMENTAL ENGINEERS

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

Project: Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line, Town of Whitchurch-Stouffville

Reference No:	Date:	Scale: V	Scale: H	Drawing No.
1903-W092	April 1, 2026	1:100	1:2000	8-2A

Southwest — **Northeast** **A'**

Elevation (masl)

302.00 m
301.00 m
300.00 m
299.00 m
298.00 m
297.00 m
296.00 m
295.00 m
294.00 m
293.00 m
292.00 m
291.00 m
290.00 m
289.00 m
288.00 m
287.00 m
286.00 m
285.00 m
284.00 m

BH/MW 106
BH/MW 303 (Projected)
Topsoil
BH/MW 202 (Projected)
BH/MW 201 (Projected)
BH/MW 103D

Silty Sand Till
Silty Fine Sand
289.76 masl
289.57 masl
289.45 masl
289.20 masl
289.08 masl
288.77 masl
288.39 masl
Sand
290.62 masl
289.90 masl
Earth Fill
291.82 masl
291.68 masl
291.61 masl
291.57 masl
291.27 masl
290.87 masl
289.33 masl
289.28 masl
289.00 masl
288.90 masl
Sandy Silt Till
Silt
Sand
Silty Clay
Sand
Silty Sand Till
Silt
291.74 masl

0.00 m
40.00 m
80.00 m
120.00 m
160.00 m
200.00 m
240.00 m
280.00 m
320.00 m

Section B-B'

Topsoil
Earth Fill
Silt
Silty Sand Till
Silty Fine Sand
Silty Clay
Sandy Silt Till
Sand

3.0 m Screen

Spring Readings

- Water Table on April 30, 2019
- Water Table on May 23, 2019
- Water Table on June 17, 2019
- Water Table on April 7, 2020
- Water Table on May 25, 2020
- Water Table on June 29, 2020
- Water Table on March 22, 2023

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

Project: Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line, Town of Whitchurch-Stouffville

Reference No:	Date:	Scale: V	Scale: H	Drawing No.
1903-W092	April 1, 2026	1:100	1:1000	8-2B

641510 641580 641650 641720 641790 641860 641930

4872480 4872410 4872340 4872270 4872200

BH/MW 101 (291.35)
BH/MW 102 (291.96)
BH/MW 103D (291.74)
BH/MW 104 (290.29)
BH/MW 106 (289.39)
BH/MW 201 (288.90)
BH/MW 202 (290.62)
BH/MW 203 (291.00)

10TH LINE

299 298 297 296 295 294 293 292 291 290 289

291.5 291.0 290.5 290.0 289.5 289.0

N

References: Ontario Ministry of Natural Resources and Forestry
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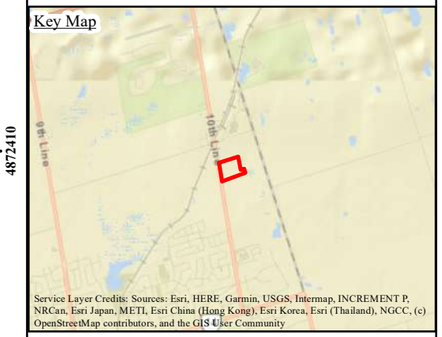
Key Map



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Legend

- Approximate Boundary of Subject Site
- Borehole With Monitoring Well (2019)
- Borehole With Monitoring Well (2020)
- Waterbody
- Watercourse
- Major Road
- York - 1 m
- Highest Interpreted Shallow Groundwater Elevation Contour
- Highest Inferred Shallow Groundwater Elevation Contour
- Interpreted Shallow Groundwater Flow Direction
- (157.09) Highest Shallow Groundwater Level Measured on March 22, 2023

Soil Engineers Ltd.

Shallow Groundwater Flow Pattern Plan

Hydrogeological Assessment
Proposed Residential Development
12875 Tenth Line
Town of Whitchurch-Stouffville

Reference No. 1903-W092

Date: April 02, 2026

Scale:

0 5 10 20 30 40 50
Metres

Drawing No. 9

D:\Previous gis\GIS 2\1903-W092\Update\

Soil Engineers Ltd.
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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-1

BOREHOLE LOGS
GEOTEHNICAL INVESTIGATION -Series 1- 2018
(1804-S036)

REFERENCE NO. 1903-W092

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

Standard Penetration Resistance or 'N' Value:

The number of blows of a 63.5 kg hammer falling from a height of 76 cm required to advance a 51 mm outer diameter drive open sampler 30 cm into undisturbed soil, after an initial penetration of 15 cm.

Plotted as '○'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows per each 30 cm of penetration of a 51 mm diameter, 90° point cone driven by a 63.5 kg hammer falling from a height of 76 cm.

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/30 cm)	Compactness
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
> 50	very dense

Cohesive Soils:

Undrained Shear Strength (kPa)	'N' (blows/30 cm)	Consistency
<12	<2	very soft
12 to <25	2 to <4	soft
25 to <50	4 to <8	firm
50 to <100	8 to <15	stiff
100 to 200	15 to 30	very stiff
>200	>30	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

METRIC CONVERSION FACTORS

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

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 11, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m^2) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
297.2	Ground Surface							
0.0	**35 cm TOPSOIL**	1	DO	2	0		19	
	EARTH FILL dark brown to brown sandy silt, some clay and gravel, scattered topsoil	2	DO	7	1		12	
295.8								
1.4	Brown, compact to dense **SANDY SILT TILL** some clay and gravel occ. sand seams and layers, cobbles and boulders	3	DO	18	2		11	
		4	DO	30			9	
		5	DO	32	3		11	
292.9					4			
4.3	Brown, very dense **SILT** some clay, occ. sand seams	6	DO	56	5		18	
291.2								
6.0	Brown, very dense	7	DO	60	6		7	
290.7	**SAND**							
6.5	fine grained, some silt				7			
	END OF BOREHOLE				8			
					9			
					10			

Dry on completion

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 2

FIGURE NO.: 2

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 11, 2018

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
298.0	Ground Surface							
0.0	**35 cm TOPSOIL**	1	DO	3	0		32	
297.2	**EARTH FILL**							
0.8	dark brown sandy silt mixed with topsoil Brown, loose to compact	2	DO	18	1		12	
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders	3	DO	9			16	
295.9					2			
2.1	Brown, compact							
	SILT occ. clay seams and layers	4	DO	13			22	
		5	DO	11	3		24	
293.7					4			
4.3	Brown, compact to very dense							
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders	6	DO	28	5		9	
		7A	DO		6		10	
291.5		7B	DO	74				
6.5	**END OF BOREHOLE**				7			
					8			
					9			
					10			

Dry on completion

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 3

FIGURE NO.: 3

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 11, 2018

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
294.4	Ground Surface							
0.0	**25 cm TOPSOIL**	1	DO	3	0		23	
	EARTH FILL dark brown to brown sandy silt, some clay, occ. topsoil pockets annd organics	2	DO	10	1		12	
293.0								
1.4	Brown, compact to dense	3	DO	18	2		11	
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders	4	DO	36			16	
291.6								
2.8	Brown, dense	5	DO	44	3		16	
	SILT seams of fine sand occ. clay layers				4			
		6	DO	42	5		18	
288.4								
6.0	Grey, dense	7	DO	36	6		12	
287.9	**SAND**							
6.5	fine to medium grained, some silt, a trace of gravel				7			
	END OF BOREHOLE				8			
					9			
					10			

W.L @ El. 288.5 m on completion
CAVE-IN @ El. 288.5 m on completion

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 4

FIGURE NO.: 4

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 11, 2018

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
290.6	Ground Surface							
0.0	**25 cm TOPSOIL**	1	DO	1	0		35	
	EARTH FILL dark brown to grey sandy silt, layers of silty sand mixture of topsoil at 0.6 m	2	DO	7	1		16	W.L @ El. 289.7 m on completion ▽
289.1								
1.5	Brown, stiff to very stiff	3	DO	11	2		11	
	SILTY CLAY TILL some sand and gravel — brown / grey occ. cobbles and boulders	4	DO	17			12	
287.3		5	DO	24	3		14	
3.3	Grey, very stiff to hard **SILTY CLAY** occ. seams of fine sand	6	DO	36	4 5		18	
284.1		7	DO	20	6		16	
6.5	**END OF BOREHOLE**				7 8 9 10			

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 5

FIGURE NO.: 5

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 11, 2018

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
292.1	Ground Surface							
0.0	**25 cm TOPSOIL**	1	DO	1	0		28	
291.4 / 0.7	**EARTH FILL** dark brown sandy silt, some clay, organics and rootlets Brown, compact to dense	2	DO	25	1		9	
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders	3	DO	47	2		7	
		4	DO	15			14	
		5	DO	48	3		10	W.L @ El. 289.1 m on completion ▽
287.8 / 4.3	Grey, stiff **SILTY CLAY** occ. seams of fine sand	6	DO	11	4 5		22	
286.1 / 6.0	Grey, compact	7	DO	22	6		10	
285.6 / 6.5	**SAND** fine grained, some silt				7			
	END OF BOREHOLE				8 9 10			

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 6

FIGURE NO.: 6

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 12, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m^2) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
293.1	Ground Surface							
0.0	**30 cm TOPSOIL**	1	DO	2	0		29	
	EARTH FILL dark brown sandy silt, some clay and gravel, scattered topsoil and organics Brown, loose to dense	2	DO	17	1		11	
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders	3	DO	8	2		11	
		4	DO	11			14	
		5	DO	33	3		11	
288.9 4.2	Grey, very stiff **SILTY CLAY** layers of sandy silt, occ. wet sand layers	6	DO	23	4 5		16	
286.6 6.5	**END OF BOREHOLE**	7	DO	26	6 7 8 9 10		16	W.L @ El. 287.6 m on completion ▽

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 7

FIGURE NO.: 7

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 12, 2018

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
296.4	Ground Surface							
0.0	**40 cm TOPSOIL**	1	DO	10	0		29	
	EARTH FILL dark brown to brown silty clay, some sand and gravel, scattered topsoil and organics	2	DO	5	1		14	
		3	DO	4	2		10	
294.2								
2.2	Brown, compact to dense	4	DO	24	3		17	
	SILT layers of silty clay occ. seams of fine sand	5	DO	32			18	
292.1					4			
4.3	Brown, dense	6	DO	36	5		12	
	SILTY SAND TILL a trace of gravel, some clay occ. sand seams and layers, cobbles and boulders							
290.4					6			
6.0	Brown, dense	7	DO	30			13	
289.9	**SANDY SILT**				7			
6.5	layers of silty fine sand							
	END OF BOREHOLE				8			
					9			
					10			Dry on completion

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 8

FIGURE NO.: 8

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 12, 2018

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
296.5	Ground Surface							
0.0	**35 cm TOPSOIL**	1	DO	10	0		24	
	EARTH FILL dark brown to brown silty clay, some sand and organics Brown, compact to dense	2	DO	15	1		3	
295.6 / 0.9	**SAND** fine grained occ. seams and layers of sandy silt	3	DO	24	2		5	
		4	DO	22			6	
		5	DO	35	3		4	
		6	DO	40	5		5	Dry on completion
290.5 / 6.0	Brown, very dense	7	DO	64	6		8	
290.0 / 6.5	**SANDY SILT TILL** some clay and gravel occ. sand seams and layers, cobbles and boulders				7			
	END OF BOREHOLE				8			
					9			
					10			

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 9

FIGURE NO.: 9

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 12, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m^2) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
295.3	Ground Surface							
0.0	**25 cm TOPSOIL**				0			
	Brown, very loose to dense	1	DO	2			17	
	SANDY SILT TILL							
	some clay and gravel weathered	2	DO	14	1		12	
	occ. sand seams and layers, cobbles and boulders	3	DO	16	2		10	
		4	DO	32			10	
		5	DO	30	3		14	
291.0					4			
4.3	Brown, dense							
	SAND fine grained some gravel	6	DO	50	5		6	
289.3								
6.0	Brown, dense	7	DO	42	6		19	
288.8	**SILT**							
6.5	layers of silty fine sand				7			
	END OF BOREHOLE				8			
					9			
					10			Dry on completion

Soil Engineers Ltd.

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 10

FIGURE NO.: 10

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 12, 2018

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
294.7	Ground Surface							
0.0	**25 cm TOPSOIL**	1	DO	4	0		18	
	EARTH FILL dark brown sandy silt, pockets of topsoil							
293.8		2	DO	5	1		14	
0.9	Brown, loose to compact							
	SANDY SILT TILL weathered some clay and gravel occ. sand seams and layers, cobbles and boulders	3	DO	24	2		10	
		4	DO	25			10	
		5	DO	25	3		11	
290.4					4			
4.3	Brown, dense							
	SILTY SAND TILL a trace of gravel, some clay occ. cobbles and boulders, silt layers	6	DO	44	5		8	
		7	DO	32	6		17	
288.2								
6.5	**END OF BOREHOLE**				7			
					8			
					9			
					10			

Dry on completion

JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 11

FIGURE NO.: 11

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 12, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m^2) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
293.9	Ground Surface							
0.0	**40 cm TOPSOIL**	1	DO	3	0		24	
293.0 / 0.9	**EARTH FILL** dark brown sandy silt mixed with topsoil, some organics Brown, stiff weathered	2	DO	7	1		13	
	SILTY CLAY TILL some sand and a trace of gravel	3	DO	14	2		12	
291.7 / 2.2	Brown, compact to dense	4	DO	25			11	
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders	5	DO	24	3		9	
		6	DO	42	4 5		9	Dry on completion
287.9 / 6.0	Grey, very dense	7	DO	82	6		14	
287.4 / 6.5	**SILT** seams of silty clay				7			
	END OF BOREHOLE				8 9 10			

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JOB NO.: 1804-S036

LOG OF BOREHOLE NO.: 12

FIGURE NO.: 12

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 12, 2018

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) 10 30 50 70 90 / Shear Strength (kN/m^2) 50 100 150 200 / Penetration Resistance (blows/30 cm) 10 30 50 70 90	Atterberg Limits PL LL / Moisture Content (%) 10 20 30 40	WATER LEVEL
291.8	Ground Surface							
0.0	**40 cm TOPSOIL**	1	DO	3	0		26	
	EARTH FILL dark brown sandy silt to silty sand layers of topsoil branch fragments at 1.0 m	2	DO	6	1		26	
290.4								
1.4	Brown, compact	3	DO	15	2		17	
	SAND well graded, layers of sandy silt, a trace of gravel — brown / grey	4	DO	21			19	W.L @ El. 289.4 m on completion ▽
289.0								
2.8	Brown, compact to very dense	5	DO	19	3		9	
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders	6	DO	64	4 5		7	
285.5		7	DO	50/15	6		10	
6.3	**END OF BOREHOLE**				7 8 9 10			

Soil Engineers Ltd.

Soil Engineers Ltd.
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Appendix A-2

BOREHOLE LOGS AND GRAIN SIZE DISTRIBUTION GRAPH
Series - 100 (2019), 200(2020) and 300(2025)

REFERENCE NO. 1903-W092

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.: 1903-W092 **LOG OF BOREHOLE NO.: BH/MW 101** ***FIGURE NO.:*** **1**

PROJECT DESCRIPTION: Due Diligence For Land Acquistion ***METHOD OF BORING:*** Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville ***DRILLING DATE:*** April 22, 2019

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
298.2	Ground Surface							
0.0	**20 cm TOPSOIL**	1	DO	9	0		19	
297.4	**EARTH FILL** dark brown sandy silt, some clay and gravel mixed with topsoil	2A	DO	25	1		9 10	
0.8	Brown, compact to very dense	2B	DO	25				
		3	DO	20	2		11	
	SANDY SILT TILL some gravel trace to some clay occ. sand seams and layers, cobbles and boulders	4	DO	33			10	
		5	DO	50/11	3		11	
293.6					4			
4.6	Brown, very dense **SILT** some clay trace of gravel trace of sand	6	DO	50/11	5		13	
292.1					6			
6.1	Brown, very dense **SILTY FINE SAND**	7	DO	50/10			10	
					7			
290.1		8	DO	50/15			15	
8.1	**END OF THE BORHOLE** Installed 50 mm Ø monitoring well to 7.3 m 3.0 m screen from 4.3 to 7.3 m Sand backfill from 3.7 to 7.3 m Bentonite seal from 0.0 to 3.7 m Provided with a steel monument casing **Water level reading:** W.L. @ El. 291.82 masl on Apr 30, 2019 W.L. @ El. 291.27 masl on May 23, 2019 W.L. @ El. 291.19 masl on Jun 17, 2019 Dry on Apr 07, 2020 Dry on May 25, 2020 Dry on Jun 29, 2020 W.L. @ El. 291.35 masl on Mar 22, 2023				8 9 10 11 12 13 14 15 16 17 18			

JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 102 **FIGURE NO.:** 2

PROJECT DESCRIPTION: Due Diligence For Land Acquistion

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 22, 2019

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
299.1	Ground Surface							
0.0	**23 cm TOPSOIL**	1	DO	2	0		23	
298.3	**EARTH FILL** dark brown sandy silt some clay mixed with topsoil							
0.8	Brown, loose to compact	2	DO	9	1		12	
	SANDY SILT TILL some clay and gravel	3	DO	14			12	
296.8	occ. sand seams and layers, cobbles and boulders				2			
2.3	Brown, compact	4	DO	28			21	
	SILT trace of gravel some clay occ. sand layers	5	DO	26	3		19	
294.5					4			
4.6	Brown, dense **SANDY SILT TILL** some clay and gravel occ. sand seams and layers, cobbles and boulders	6	DO	33	5		24	
293.0					6		3	
6.1	Brown, very dense **FINE SAND**	7	DO	65	7			
291.4								
7.6	Brown, very dense **SILTY FINE SAND** trace of gravel	8	DO	99	8		17	
291.0								
8.1	**END OF THE BORHOLE**				9			
	Installed 50 mm Ø monitoring well to 7.6 m				10			
	3.0 m screen from 4.6 to 7.6 m				11			
	Sand backfill from 4.0 to 7.6 m				12			
	Bentonite seal from 0.0 to 4.0 m				13			
	Provided with a steel monument casing				14			
	Water level reading:				15			
	W.L. @ El. 291.85 masl on Apr 30, 2019				16			
	W.L. @ El. 291.89 masl on May 23, 2019				17			
	W.L. @ El. 291.89 masl on Jun 17, 2019				18			
	Dry on Apr 07, 2020							
	W.L. @ El. 291.95 masl on May 25, 2020							
	W.L. @ El. 291.96 masl on Jun 29, 2020							
	W.L. @ El. 291.96 masl on Mar 22, 2023							

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JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 103D ***FIGURE NO.:*** 3

PROJECT DESCRIPTION: Due Diligence For Land Acquistion

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

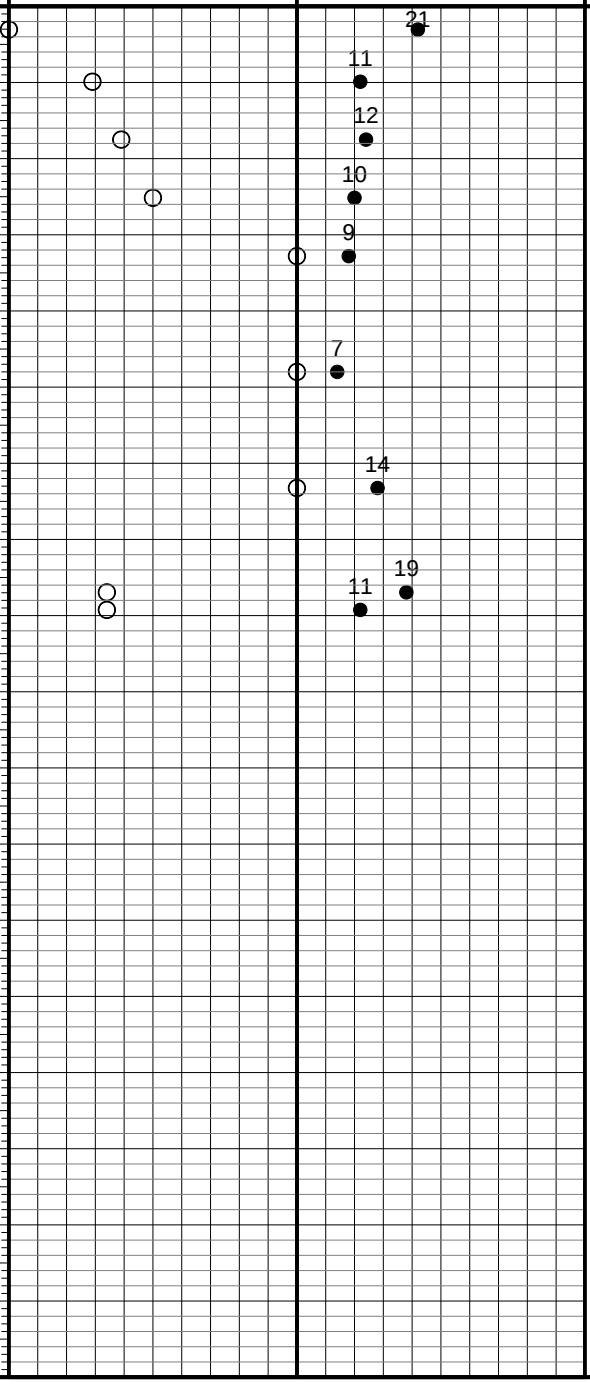
DRILLING DATE: April 22, 2019

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
292.2 / 0.0	Ground Surface			
	20 cm TOPSOIL	1	DO	0
291.4 / 0.8	**EARTH FILL** dark brown to brown sandy silt some clay occ. topsoil pockets and organics	2	DO	29
	Brown, compact to dense **SANDY SILT TILL** trace to some gravel some clay	3	DO	39
	occ. sand seams and layers, cobbles and	4	DO	50
289.1 / 3.0	boulders	5	DO	50/17
	Brown, very dense **SILTY SAND TILL** trace to some gravel trace of clay			
287.6 / 4.6	occ. sand seams and layers, cobbles and boulders	6	DO	50/9
	Grey, very dense **SANDY SILT TILL** some clay and gravel			
286.1 / 6.1	Grey, dense to very dense **SILT** some clay trace of sand and gravel	7	DO	50/4
284.4		8A	DO	34
284.1 / 8.1	Grey, dense **SANDY SILT TILL** some clay and gravel, occ. sand seams and layers, cobbles and boulders	8B	DO	34

END OF THE BORHOLE

Installed 50 mm Ø monitoring well to 7.6 m
3.0 m screen from 4.6 to 7.6 m
Sand backfill from 4.0 to 7.6 m
Bentonite seal from 0.0 to 4.0 m
Provided with a steel monument casing

Water level reading:
W.L. @ El. 291.82 masl on Apr 30, 2019
W.L. @ El. 291.57 masl on May 23, 2019
W.L. @ El. 291.61 masl on Jun 17, 2019
W.L. @ El. 291.68 masl on Apr 07, 2020
W.L. @ El. 291.27 masl on May 25, 2020
W.L. @ El. 290.87 masl on Jun 29, 2020
W.L. @ El. 290.74 masl on Mar 22, 2023



Soil Engineers Ltd.

JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 103S **FIGURE NO.:** 4

PROJECT DESCRIPTION: Due Diligence For Land Acquistion

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 22, 2019

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
292.1	Ground Surface							
0.0	**20 cm TOPSOIL**	1	DO	0	0		21	
291.3	**EARTH FILL** dark brown to brown sandy silt some clay occ. topsoil pockets and organics	2	DO	29	1		11	
0.8	Brown, compact to dense **SANDY SILT TILL** trace to some gravel some clay occ. sand seams and layers, cobbles and boulders	3	DO	39	2		12	
		4	DO	50			10	
289.0					3		9	
3.0	Brown, very dense **SILTY SAND TILL** trace to some gravel trace of clay occ. sand seams and layers, cobbles and boulders	5	DO	50/17	4			
287.5								
4.6		6	DO	50/9			7	
287.0					5			
5.0	Grey, very dense **SANDY SILT TILL** some clay and gravel				6			
					7			
					8			
					9			
					10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			

END OF THE BORHOLE

Installed 50 mm Ø monitoring well to 4.6 m
1.5 m screen from 3.1 to 4.6 m
Sand backfill from 2.4 to 4.6 m
Bentonite seal from 0.0 to 2.4 m
Provided with a steel monument casing

Water level reading:
W.L. @ El. 291.68 masl on Apr 30, 2019
W.L. @ El. 291.53 masl on May 23, 2019
W.L. @ El. 291.54 masl on Jun 17, 2019
W.L. @ El. 291.57 masl on Apr 07, 2020
W.L. @ El. 291.28 masl on May 25, 2020
W.L. @ El. 290.88 masl on Jun 29, 2020
W.L. @ El. 291.61 masl on Mar 22, 2023

JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 104 **FIGURE NO.:** 5

PROJECT DESCRIPTION: Due Diligence For Land Acquistion

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 18, 2019

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
296.4 / 0.0	Ground Surface			
	25 cm TOPSOIL	1	DO	5
295.6 / 0.8	**EARTH FILL** dark brown to brown silty clay trace to some sand occ. organics	2	DO	28
	Brown, compact **SANDY SILT TILL** some clay and gravel occ. sand seams and layers, cobbles and boulders	3	DO	16
		4	DO	28
293.3 / 3.0	Brown, dense **SILTY SAND TILL** trace to some clay some gravel occ. sand seams and layers, cobbles and boulders	5	DO	46
291.7 / 4.6		6A	DO	40
		6B	DO	40
	Brown, hard **SILTY CLAY** trace of sand			
289.8		7A	DO	42
289.5 / 6.9	Brown, dense **SAND** trace to some silt	7B	DO	42
	Brown, dense **SANDY SILT TILL** trace to some gravel some clay	8	DO	50
288.3 / 8.1	**END OF THE BORHOLE**			

Depth Scale (m): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

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

Moisture Content values: 19, 14, 9, 10, 8, 15, 18, 18, 23, 22

WATER LEVEL

Installed 50 mm Ø monitoring well to 7.6 m
3.0 m screen from 4.6 to 7.6 m
Sand backfill from 4.0 to 7.6 m
Bentonite seal from 0.0 to 4.0 m
Provided with a steel monument casing

Water level reading:
W.L. @ El. 290.24 masl on Apr 30, 2019
W.L. @ El. 290.83 masl on May 23, 2019
W.L. @ El. 290.50 masl on Jun 17, 2019
Dry on Apr 07, 2020
W.L. @ El. 290.12 masl on May 25, 2020
W.L. @ El. 289.63 masl on Jun 29, 2020
W.L. @ El. 290.29 masl on Mar 22, 2023

JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 105 **FIGURE NO.:** 6

PROJECT DESCRIPTION: Due Diligence For Land Acquistion

METHOD OF BORING: Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville

DRILLING DATE: April 18, 2019

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
297.1	Ground Surface							
0.0	**30 cm TOPSOIL**	1	DO	5	0		20	
296.4	**EARTH FILL**							
0.8	dark brown to brown sandy silt some clay trace to some gravel occ. organics	2	DO	8	1		12	
	Brown, stiff	3	DO	11	2		21	
294.8	**SILTY CLAY TILL**							
2.3	some sand trace of gravel	4	DO	62			12	
	Brown, very dense	5	DO	88	3		10	
	SILTY SAND TILL trace to some clay and gravel occ. sand seams and layers, cobbles and boulders	6	DO	61	4 5		20	
291.0								
6.1	Brown, very dense	7	DO	50/12	6		19	
	SANDY SILT trace of clay				7			
289.0		8	DO	73	8		17	
8.1	**END OF THE BORHOLE** Installed 50 mm Ø monitoring well to 7.6 m 3.0 m screen from 4.6 to 7.6 m Sand backfill from 4.0 to 7.6 m Bentonite seal from 0.0 to 4.0 m Provided with a steel monument casing **Water level reading:** W.L. @ El. 290.53 masl on Apr 30, 2019 Dry on May 23, 2019 Dry on Jun 17, 2019 W.L. @ El. 291.40 masl on Apr 07, 2020 Dry on May 25, 2020 Dry on Jun 29, 2020 Dry on Mar 22, 2023				9 10 11 12 13 14 15 16 17 18			

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JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 106 **FIGURE NO.:** 7

PROJECT DESCRIPTION: Due Diligence For Land Acquistion **METHOD OF BORING:** Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville **DRILLING DATE:** April 18, 2019

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**	1	DO	0	0		30	
294.7	**EARTH FILL** dark brown to brown sandy silt occ. organics	2	DO	25	1		12	
0.8	Brown, compact to dense							
	SILTY SAND TILL trace to some clay trace of gravel occ. sand seams and layers, cobbles and boulders	3	DO	29	2		12	
		4	DO	42			10	
292.4					3			
3.0	Brown, dense	5	DO	33			10	
	SANDY SILT TILL some clay and gravel				4			
290.9								
4.6	Brown, very dense	6	DO	61	5		14	
	SILTY FINE SAND							
		7	DO	92	6		19	
					7			
287.4		8	DO	73			18	
8.1	**END OF THE BORHOLE**				8			
	Installed 50 mm Ø monitoring well to 7.6 m 3.0 m screen from 4.6 to 7.6 m Sand backfill from 4.0 to 7.6 m Bentonite seal from 0.0 to 4.0 m Provided with a steel monument casing **Water level reading:** W.L. @ El. 289.08 masl on Apr 30, 2019 W.L. @ El. 289.57 masl on May 23, 2019 W.L. @ El. 289.45 masl on Jun 17, 2019 W.L. @ El. 289.76 masl on Apr 07, 2020 W.L. @ El. 289.20 masl on May 25, 2020 W.L. @ El. 288.77 masl on Jun 29, 2020 W.L. @ El. 289.39 masl on Mar 22, 2023				9 10 11 12 13 14 15 16 17 18			

JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 201 **FIGURE NO.:** 8

PROJECT DESCRIPTION: Due Diligence For Land Acquistion **METHOD OF BORING:** Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville **DRILLING DATE:** March 4, 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
292.4	Ground Surface							
0.0	**25 cm TOPSOIL**				0			
291.4 / 1.0	**EARTH FILL** dark brown sandy silt, some clay, organics and rootlets Brown, compact to dense				1			
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders				2 3 4			
287.8 / 4.6	Grey, stiff				5			
	SILTY CLAY occ. seams of fine sand				6			
286.1 / 6.3	Grey, compact to very dense				7			
	SAND fine grained, some silt to silty							
284.3		8	DO	55	8	○	10 ●	
8.1	**END OF THE BOREHOLE**				9 10 11 12 13 14 15 16 17 18			

Subsoil profile above El. 285.6 m is derived from BH 5 (2016).

Installed 50 mm Ø monotoring well to 7.6 m
3.0 m screen from 4.6 to 7.6 m
sand back fill from 3.9 to 7.6 m
Bentonite seal from 0.0 to 3.9 m
Provided with a Monument Steel Casing
Water level reading:
W.L. @ El. 289.33 masl on Apr 07, 2020
W.L. @ El. 289.28 masl on May 25, 2020
W.L. @ El. 289.00 masl on Jun 29, 2020
W.L. @ El. 288.90 masl on Mar 22, 2023

JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 202 **FIGURE NO.:** 9

PROJECT DESCRIPTION: Due Diligence For Land Acquistion **METHOD OF BORING:** Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville **DRILLING DATE:** March 4, 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
291.7	Ground Surface							
0.0	**40 cm TOPSOIL**				0			
290.4 / 1.3	**EARTH FILL** dark brown sandy silt to silty sand layers of topsoil branch fragments at 1.0 m Brown, compact — brown / grey				1			
289.0 / 2.7	**SAND** well graded, layers of sandy silt, a trace of gravel Brown, compact to dense				2			
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders				3			
					4			
					5			
					6			
					7			
283.7		8	DO	75	8	○	23 ●	
8.1	**END OF THE BOREHOLE**				9			
	Subsoil profile above El. 285.5 m is derived from BH 12 (2016). Installed 50 mm Ø monotoring well to 7.6 m 3.0 m screen from 4.6 to 7.6 m sand back fill from 3.9 to 7.6 m Bentonite seal from 0.0 to 3.9 m Provided with a Monument Steel Casing **Water level reading:** W.L. @ El. 290.20 masl on Apr 07, 2020 Damaged masl on May 25, 2020 W.L. @ El. 289.90 masl on Jun 29, 2020 W.L. @ El. 290.62 masl on Mar 22, 2023				10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			

JOB NO.: 1903-W092 # LOG OF BOREHOLE NO.: BH/MW 203 **FIGURE NO.:** 10

PROJECT DESCRIPTION: Due Diligence For Land Acquistion **METHOD OF BORING:** Flight-Auger

PROJECT LOCATION: 12875 Tenth Line
Town of Whitchurch-Stouffville **DRILLING DATE:** March 4, 2020

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)	Dynamic Cone (blows/30 cm) / Shear Strength (kN/m²) / Penetration Resistance (blows/30 cm)	Atterberg Limits PL LL / Moisture Content (%)	WATER LEVEL
293.1	Ground Surface							
293.0 0.1	**EARTH FILL** dark brown sandy silt mixed with topsoil, some organics				0			
291.7 1.4	Brown, stiff				1			
	SILTY CLAY TILL some sand and a trace of gravel Brown, compact to dense				2			
	SANDY SILT TILL some clay and gravel occ. sand seams and layers, cobbles and boulders				3			
					4			
287.9 5.2	Grey, very dense				5			
	SILT seams of silty clay some sand				6			
					7			
285.3 7.8	**END OF THE BOREHOLE**	8	DO	50/5	8		10	
	Subsoil profile above El. 287.4 m is derived from BH 11 (2016).				9			
	Installed 50 mm Ø monotoring well to 7.6 m 3.0 m screen from 4.6 to 7.6 m sand back fill from 3.9 to 7.6 m Bentonite seal from 0.0 to 3.9 m Provided with a Monument Steel Casing **Water level reading:** W.L. @ El. 290.75 masl on Apr 07, 2020 W.L. @ El. 289.45 masl on May 25, 2020 W.L. @ El. 289.02 masl on Jun 29, 2020 W.L. @ El. 291.00 masl on Mar 22, 2023				10			
					11			
					12			
					13			
					14			
					15			
					16			
					17			
					18			

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

Soil Engineers Ltd.

JOB NO.: 1903-W092

LOG OF BOREHOLE:BH/MW 301

FIGURE NO.: 11

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12875 Tenth Line, Town of Whitchurch-Stouffville

DRILLING DATE: December 8, 2025

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
297.0	Ground Surface							
0.0	**30 cm TOPSOIL**	1A	DO	4	0		18	
	Brown, loose to compact, wet weathered **SILT** a trace of clay	1B						
		2	DO	17	1		11	
295.5								
1.5	Brown, compact **SANDY SILT TILL** traces of clay and gravel	3	DO	16	2		13	
294.7								
2.3	Brown, compact **SILT** some clay	4	DO	17			22	
293.9					3			
3.1	Brown, dense to very dense **SANDY SILT TILL** a trace to some clay a trace of gravel occ. clay layers	5	DO	37			18	
					4			
	sand layer	6	DO	50/15			8	
					5			
	silt layer	7	DO	50/15	6		15	
					7			
288.9		8	DO	68	8		19	
8.1	**END OF BOREHOLE**							
	Installed 50 mm Ø monitoring well to 7.6 m completed with 1.5 m screen Sand backfill from 5.8 to 7.6 m Bentonite seal from 0.0 m to 5.8 m Provided with a momument steel casing **Water level reading:** Dry on Dec 19, 2025 Dry on Jan 07, 2026 Dry on Jan 21, 2026				9			
					10			
					11			
					12			

Soil Engineers Ltd.

JOB NO.: 1903-W092

LOG OF BOREHOLE:BH/MW 302

FIGURE NO.: 12

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12875 Tenth Line, Town of Whitchurch-Stouffville

DRILLING DATE: December 8, 2025

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
291.7	Ground Surface							
0.0	**40 cm TOPSOIL**				0			
	EARTH FILL dark brown sandy silt to silty sand layers of topsoil branch fragments at 1.0 m							
290.4								
1.3	Brown, compact **SAND** well graded, layers of sandy silt, a trace of gravel — brown / grey				1			
289.0								
2.7	Brown, compact to very dense **SANDY SILT TILL** some clay and gravel occ. sand seams and layers, cobbles and boulders				2			
					3			
					4			
					5			
					6			
					7			
284.1								
7.6	**END OF AUGER HOLE** **Subsoil profile is derived from BH 12 (2016) and BH202 (2020).** Installed 50 mm Ø monitoring well to 7.6 m completed with 3.0 m screen Sand backfill from 4.0 to 7.6 m Bentonite seal from 0.0 m to 4.0 m Provided with a momument steel casing **Water level reading:** W.L. @ El. 290.20 masl on Dec 19, 2025 W.L. @ El. 290.60 masl on Jan 07, 2026 W.L. @ El. 290.90 masl on Jan 21, 2026				8			
					9			
					10			
					11			
					12			

Soil Engineers Ltd.

JOB NO.: 1903-W092

LOG OF BOREHOLE:BH/MW 303

FIGURE NO.: 13

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12875 Tenth Line, Town of Whitchurch-Stouffville

DRILLING DATE: December 8, 2025

El. (m) / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value	Depth Scale (m)
294.3 / 0.0	Ground Surface				
	13 cm TOPSOIL	1A	DO	2	0
	Brown, very loose to very dense weathered **SANDY SILT TILL** traces of clay and gravel	1B			
		2	DO	19	1
		3	DO	30	2
		4	DO	50/15	
		5	DO	50/15	3
289.7 / 4.6	Brown, very dense **SILT** a trace to some sand wet below 6.1 m	6	DO	64	4 5
		7	DO	80	6
286.7 / 7.6	Brown, dense, wet **SAND** fine grained, silty	8	DO	36	7 8
286.2 / 8.1	**END OF BOREHOLE** Installed 50 mm Ø monitoring well to 7.6 m completed with 3.0 m screen Sand backfill from 4.0 to 7.6 m Bentonite seal from 0.0 m to 4.0 m Provided with a momument steel casing **Water level reading:** W.L. @ El. 286.90 masl on Dec 19, 2025 W.L. @ El. 286.90 masl on Jan 07, 2026 W.L. @ El. 287.08 masl on Jan 21, 2026				9 10 11 12

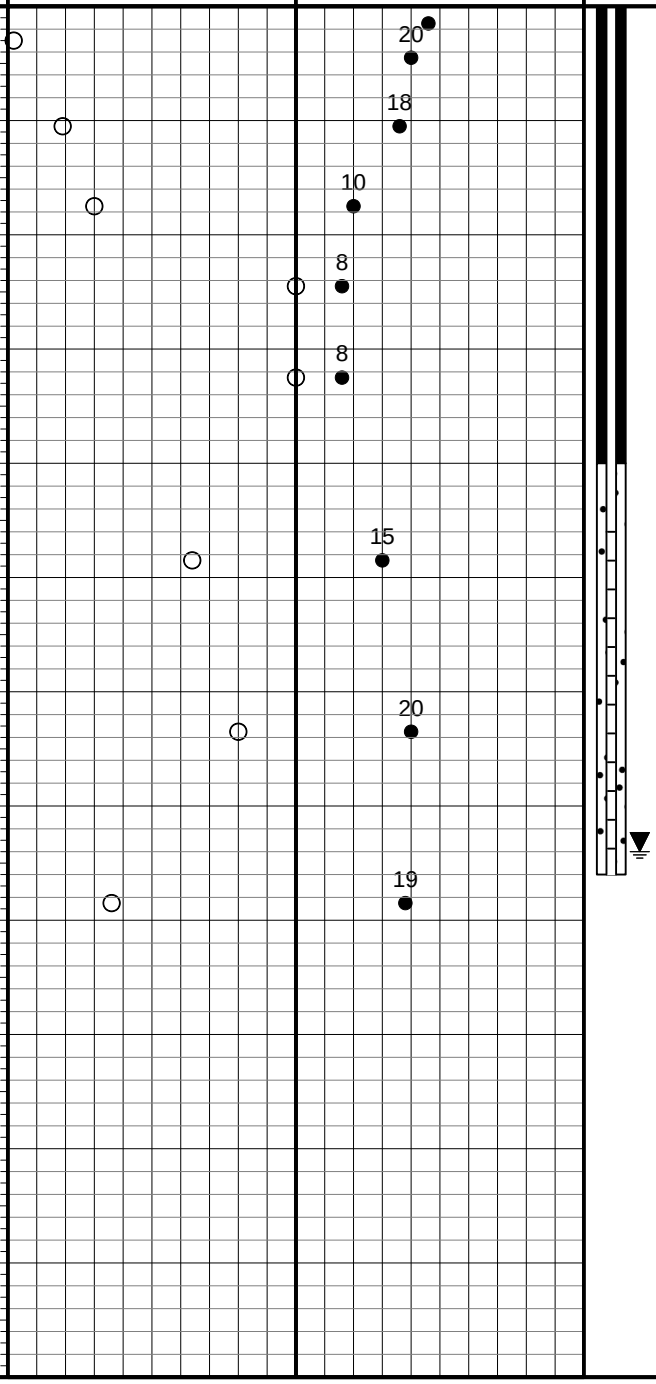
Dynamic Cone (blows/30 cm) 10 30 50 70 90

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

JOB NO.: 1903-W092

LOG OF BOREHOLE:BH/MW 304

FIGURE NO.: 14

PROJECT DESCRIPTION: Proposed Residential Development

METHOD OF BORING: Solid Stem Augers

PROJECT LOCATION: 12875 Tenth Line, Town of Whitchurch-Stouffville

DRILLING DATE: December 8, 2025

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
295.6	Ground Surface							
0.0	**35 cm TOPSOIL**				0			
	Brown, compact to dense **SAND** fine grained occ. seams and layers of sandy silt				1			
					2			
					3			
					4			
290.5					5			
5.1	Brown, very dense **SANDY SILT TILL** some clay and gravel occ. sand seams and layers, cobbles and boulders				6			
	sand layer	1	DO	52			9	
					7			
287.7		2	DO	50/15			8	
7.9	**END OF BOREHOLE** **Subsoil profile above El. 290.0 m is derived from Borehole 8 (2016).** Installed 50 mm Ø monitoring well to 7.6 m completed with 3.0 m screen Sand backfill from 4.0 to 7.6 m Bentonite seal from 0.0 m to 4.0 m Provided with a momument steel casing **Water level reading:** Dry on Dec 19, 2025 Dry on Jan 07, 2026 Dry on Jan 21, 2026				8			
					9			
					10			
					11			
					12			

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GRAIN SIZE DISTRIBUTION

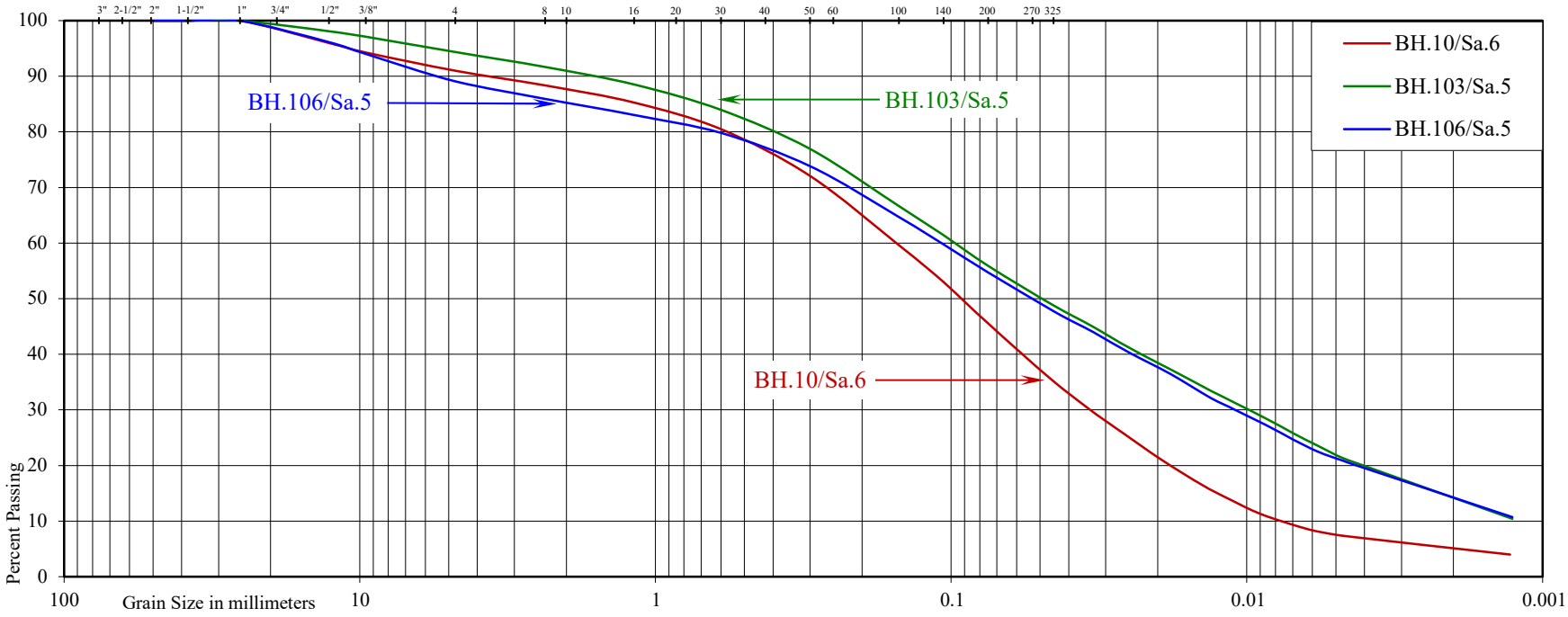
Reference No:1903-W092

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: 12875 Tenth Line, Town of Whitchurch-Stouffville

Borehole No:	10	103	106
Sample No:	6	5	5
Depth (m):	4.8	3.3	3.3
Elevation (m):	289.9	288.9	292.2

BH./Sa.	10/6	103/5	106/5
Liquid Limit (%) =	-	-	-
Plastic Limit (%) =	-	-	-
Plasticity Index (%) =	-	-	-
Moisture Content (%) =	8	9	10
Estimated Permeability (cm./sec.) =	10^{-5}	10^{-6}	10^{-6}

Classification of Sample [& Group Symbol]: BH.10/Sa.6 - SILTY SAND TILL, traces of clay and gravel

BH.103/Sa.5 and BH.106/Sa.5 - SANDY SILT TILL, some clay and gravel

Figure: 15

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

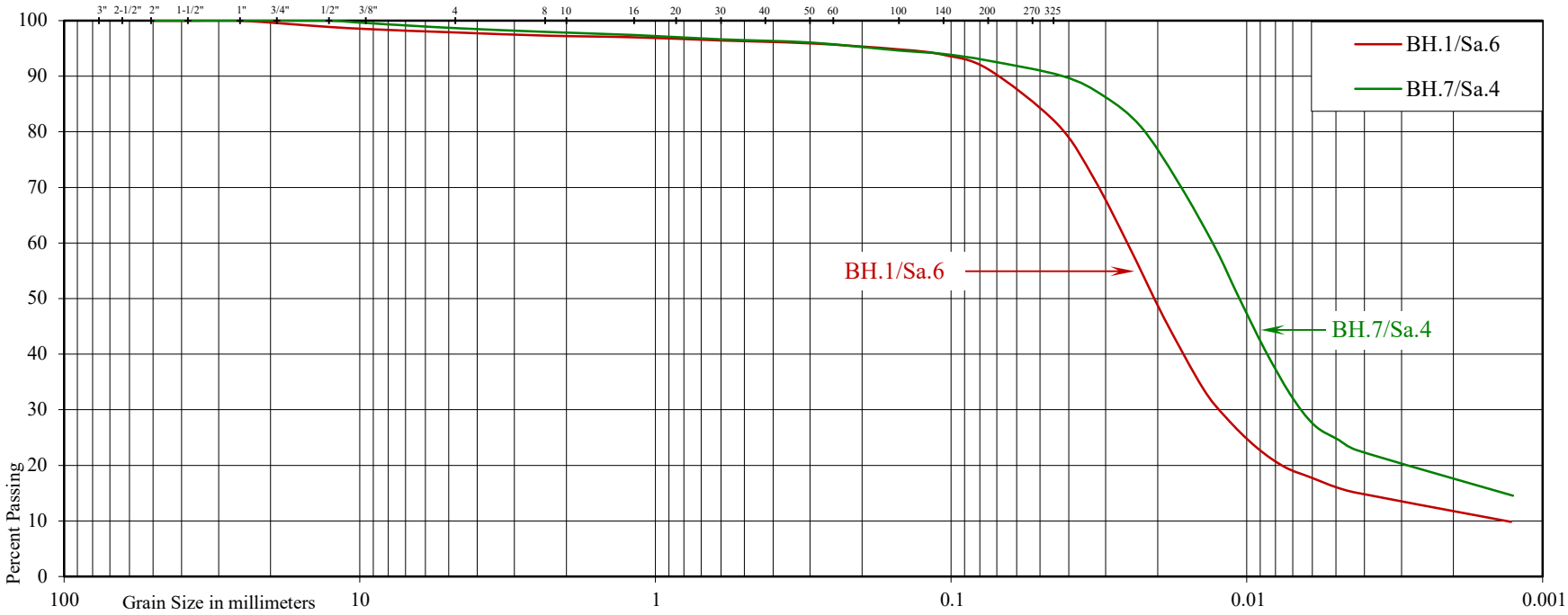
Reference No: 1903-W092

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: 12875 Tenth Line, Town of Whitchurch-Stouffville

Borehole No:	1	7
Sample No:	6	4
Depth (m):	4.8	2.5
Elevation (m):	292.4	293.9

BH./Sa.	1/6	7/4
Liquid Limit (%) =	-	-
Plastic Limit (%) =	-	-
Plasticity Index (%) =	-	-
Moisture Content (%) =	18	17
Estimated Permeability (cm./sec.) =	10^{-6}	10^{-7}

Classification of Sample [& Group Symbol]: SILT

some clay, traces of sand and gravel

Figure: 16

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

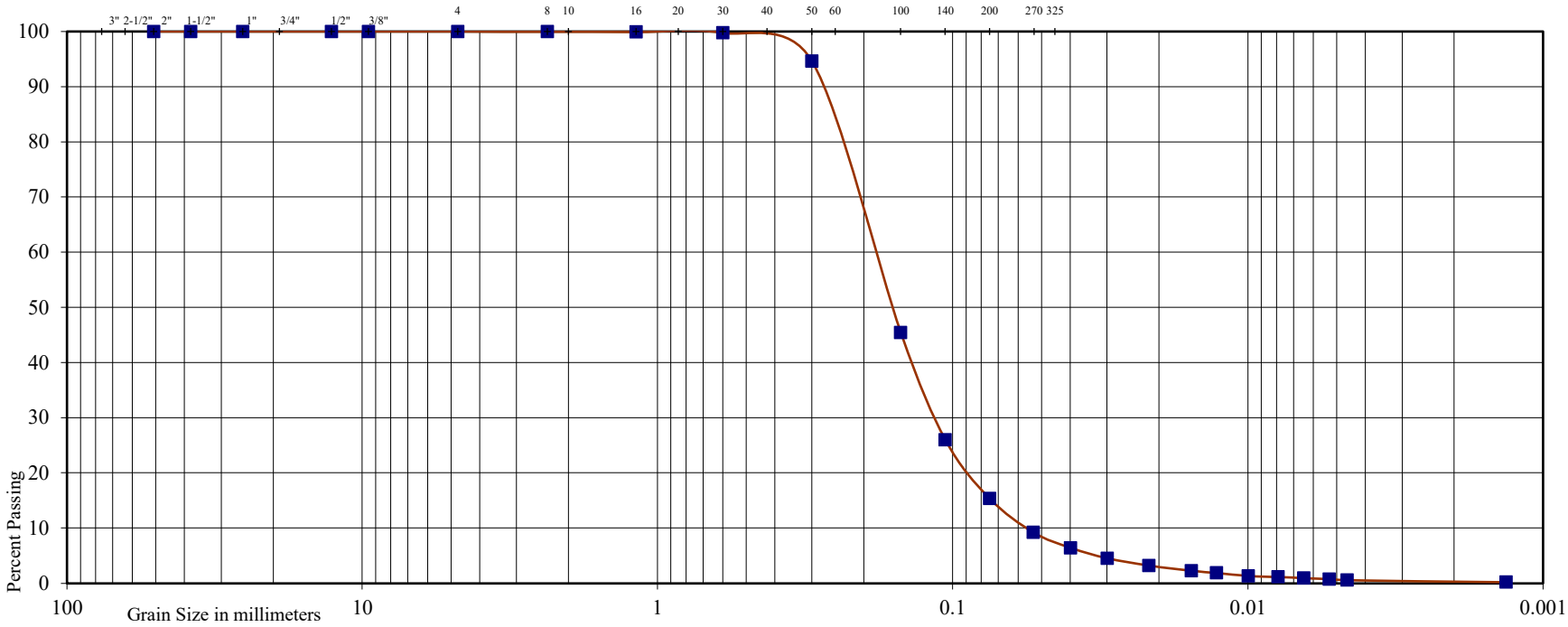
Reference No: 1903-W092

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: 12875 Tenth Line, Town of Whitchurch-Stouffville

Borehole No: 102

Sample No: 7

Depth (m): 6.3

Elevation (m): 292.75

Estimated Permeability (cm./sec.) = 10^{-3}

Classification of Sample [& Group Symbol]: FINE SAND
some silt

Figure: 17

Soil Engineers Ltd.

GRAIN SIZE DISTRIBUTION

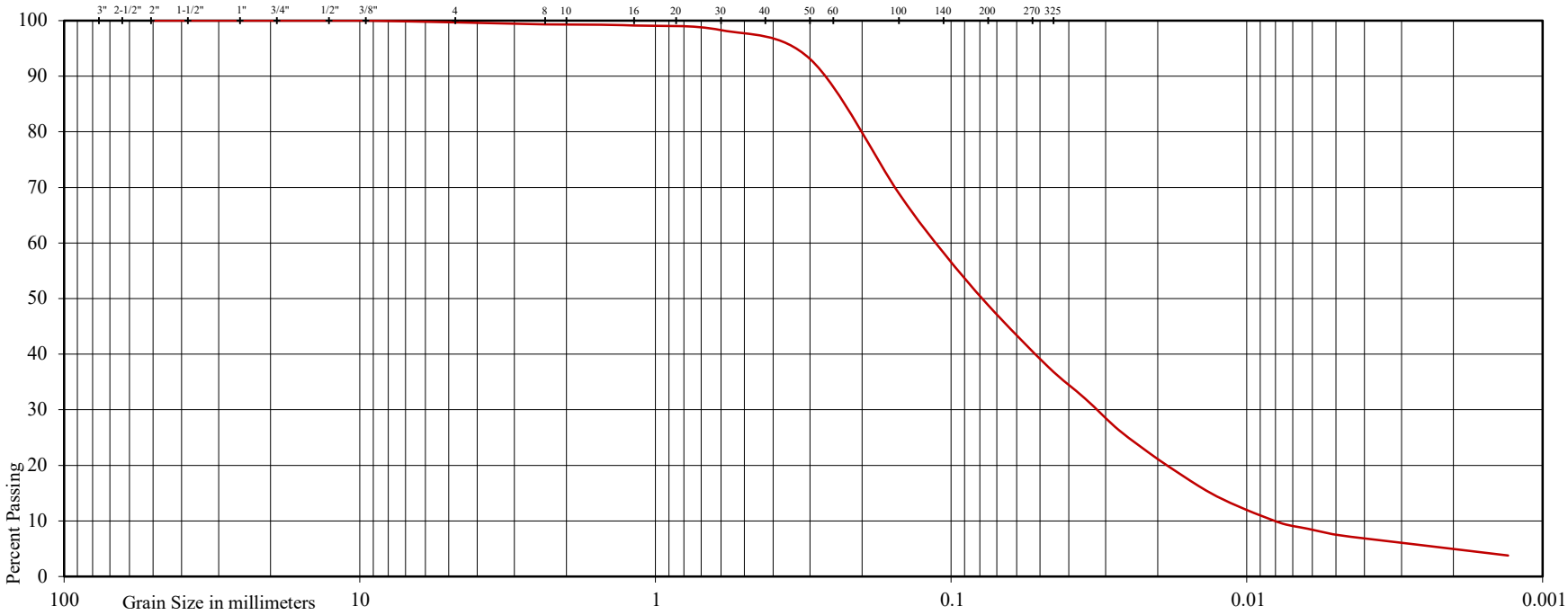
Reference No: 1903-W092

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: 12875 Tenth Line, Town of Whitchurch-Stouffville

BH./Sa. 106/7

Liquid Limit (%) = -

Borehole No: 106

Plastic Limit (%) = -

Sample No: 7

Plasticity Index (%) = -

Depth (m): 6.3

Moisture Content (%) = 19

Elevation (m): 289.2

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

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

a trace of clay

Figure: 18

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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

REFERENCE NO. 1903-W092

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	1913144	Rotary(Convemt.) (Reverse)	29.6	Water Supply	Domestic	5.8	28.7	29.6	1995-06-14
2	4602707	Jetting	10.7	Water Supply	Livestock	6.1	7.6	10.7	1958-10-30
3	4604125	Rotary(Convemt.) (Reverse)	65.8	Test Hole	-	-	0.0	0.0	1969-07-18
4	6908472	Cable Tool	20.7	Water Supply	Domestic	7.0	18.3	20.7	1966-10-16
5	6910491	Cable Tool	21.9	Water Supply	Livestock	11.0	21.0	21.9	1971-07-16
6	6912045	Rotary(Convemt.) (Reverse)	17.7	Water Supply	Domestic	8.8	14.6	15.8	1974-05-14
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	6915303	Cable Tool	22.9	Water Supply	Domestic	2.1	21.0	22.3	1979-10-07
11	6915456	Cable Tool	18.3	Water Supply	Domestic	7.6	17.4	18.3	1979-08-01
12	6915555	Rotary(Convemt.) (Reverse)	24.4	Water Supply	Domestic	3.7	18.0	19.8	1980-05-27
13	6924863	Cable Tool	19.5	Water Supply	Domestic	10.7	17.7	19.5	1999-04-12
14	6917898	Cable Tool	19.8	Water Supply	Domestic	5.8	18.9	19.8	1985-09-15
15	6919218	Cable Tool	25.0	Water Supply	Domestic	15.2	20.7	22.6	1987-06-12
16	6920552	Cable Tool	17.7	Water Supply	Domestic	7.6	16.8	17.7	1989-08-10
17	6920785	Cable Tool	23.2	Water Supply	Domestic	12.2	22.3	23.2	1989-10-31
18	6921454	Cable Tool	21.9	Water Supply	Domestic	11.3	20.7	21.6	1991-04-30
19	6922955	Rotary(Convemt.) (Reverse)	18.9	Water Supply	Domestic	13.1	17.7	18.6	1994-10-31
20	6923729	Cable Tool	18.0	Water Supply	Domestic	-0.9	16.2	18.0	1996-09-25
21	6926298	Rotary(Convemt.) (Reverse)	22.9	Water Supply	Domestic	11.9	21.3	22.9	2002-03-25
22	6930711	Rotary(Air)	115.0	Water Supply	Domestic	34.2	109.0	115.0	2006-08-21
23	6930712	-	-	Abandoned-Other	-	-	0.0	0.0	2006-08-29
24	7101690	-	6.4	Observation Wells	-	-	0.0	0.0	2007-11-28
25	7109188	Rotary(Air)	27.4	Water Supply	Domestic	11.6	0.0	0.0	2007-07-16
26	7194248	Rotary(Convemt.) (Reverse)	6.1	Observation Wells	Monitoring	-	4.6	6.1	2012-12-12
27	7205486	Rotary(Convemt.) (Reverse)	7.6	Test Hole	Monitoring and Test Hole	-	6.1	7.6	2013-01-14
28	7248277	-	-	Abandoned-Other	-	-	0.0	0.0	2015-05-23
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	-	-	-	-	-	0.0	0.0	2016-07-22
32	7279554	Rotary(Convemt.) (Reverse)	9.1	Other Status	Monitoring and Test Hole	-	6.1	9.1	2016-10-20
33	7283606	Rotary(Convemt.) (Reverse)	7.6	Other Status	Test Hole	-	6.1	7.6	2016-06-22
34	7295156	Other Method	3.4	-	Monitoring	-	2.9	3.4	2017-07-06
35	7308424	-	-	-	-	-	0.0	0.0	2018-01-19
36	7314016	Boring	-	Other Status	Test Hole	-	4.6	6.1	2018-04-30
37	7314017	Boring	-	Other Status	Test Hole	-	3.0	4.6	2018-05-01
38	7314018	Boring	-	Other Status	Test Hole	-	6.1	7.6	2018-05-01
39	7314019	Boring	-	Other Status	Test Hole	-	6.1	7.6	2018-04-30

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	7321547	Boring	-	Observation Wells	Test Hole	-	5.2	8.2	2018-09-24
41	7321548	Boring	-	Observation Wells	Test Hole	-	5.2	8.2	2018-09-24
42	7336393	-	-	-	-	-	0.0	0.0	2019-04-22
43	7353458	Rotary(Convemt.) (Reverse)	9.8	Other Status	Monitoring and Test Hole	-	6.7	9.8	2019-12-04
44	7353459	Rotary(Convemt.) (Reverse)	7.6	Other Status	Monitoring and Test Hole	-	4.6	7.6	2019-12-05
45	7353460	Rotary(Convemt.) (Reverse)	9.1	Other Status	Monitoring and Test Hole	-	6.1	9.1	2019-12-05
46	7353461	Rotary(Convemt.) (Reverse)	7.9	Other Status	Monitoring and Test Hole	-	4.9	7.9	2019-12-06
47	7354871	Rotary(Convemt.) (Reverse)	9.1	Observation Wells	Monitoring and Test Hole	-	6.1	9.1	2019-12-11
48	7354872	Rotary(Convemt.) (Reverse)	9.1	Observation Wells	Monitoring and Test Hole	-	6.1	9.1	2019-12-11
49	7354873	Rotary(Convemt.) (Reverse)	9.1	Observation Wells	Monitoring and Test Hole	-	6.1	9.1	2019-12-11
50	7360748	-	-	-	-	-	0.0	0.0	2020-03-06
51	7360761	-	-	-	-	-	0.0	0.0	2020-03-04
52	7361464	Boring	7.9	Observation Wells	Monitoring	-	4.9	7.9	2020-02-11
53	7361465	Boring	9.1	Observation Wells	Monitoring	-	5.8	8.8	2020-02-11
54	7361466	Boring	8.8	Observation Wells	Monitoring	-	5.8	8.8	2020-02-11
55	7361467	Boring	6.1	Observation Wells	Monitoring	-	3.7	5.2	2020-02-11
56	7374635	-	-	-	-	-	0.0	0.0	2020-08-11
57	7374637	-	-	-	-	-	0.0	0.0	2020-08-12
58	7380336	-	-	-	-	-	0.0	0.0	2020-12-07
59	7391893	Rotary(Convemt.) (Reverse)	6.1	Observation Wells	Monitoring	-	3.0	6.1	2021-05-30
60	7398439	H.S.A.	8.2	Other Status	Monitoring and Test Hole	-	5.2	8.2	2021-08-18
61	7398440	H.S.A.	8.1	Other Status	Monitoring and Test Hole	-	5.0	8.1	2021-06-19
62	7398441	Boring	12.2	Other Status	Monitoring and Test Hole	-	9.1	12.2	2021-08-18
63	7398442	Boring	8.1	Other Status	Monitoring and Test Hole	-	5.0	8.1	2021-08-17
64	7400893	Boring	6.1	Test Hole	Test Hole	-	3.7	6.7	2021-06-09
65	7402887	-	-	-	-	-	0.0	0.0	2021-04-17
66	7412138	-	-	-	-	-	0.0	0.0	2021-12-16
67	7429150	-	-	-	-	-	0.0	0.0	2022-09-06
68	7429151	-	-	-	-	-	0.0	0.0	2022-09-06
69	7429152	-	-	-	-	-	0.0	0.0	2022-09-06
70	7429153	-	-	-	-	-	0.0	0.0	2022-09-07
71	7435307	-	-	-	-	-	0.0	0.0	2022-03-16
72	7439519	-	-	-	-	-	0.0	0.0	2022-09-30
73	7451897	-	-	-	-	-	0.0	0.0	2022-06-24
74	7467973	-	-	-	-	-	0.0	0.0	2023-08-10
75	7467971	-	-	-	-	-	0.0	0.0	2023-08-10
76	7467972	-	-	-	-	-	0.0	0.0	2023-06-10
77	7482923	H.S.A.	7.6	Observation Wells	Monitoring	-	4.6	7.6	2024-05-08

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	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

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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. 1903-W092

BH/MW	Ground Level Elevation (masl)	Units	30-Apr-19	23-May-19	17-Jun-19	16-Jul-19	7-Apr-20	25-May-20	29-Jun-20	20-Jul-20	28-Aug-20	25-Sep-20	28-Oct-20	27-Nov-20	29-Dec-20	8-Dec-21	29-Sep-22	27-Oct-22	28-Nov-22	19-Dec-22	22-Mar-23	28-Apr-23	26-May-23	9-Jun-23	19-Dec-25	7-Jan-26	21-Jan-26
101	298.2	mbgs	6.38	6.93	7.01	7.02	Dry	Dry	Dry	Dry	Dry	Dry	6.91	6.91	6.92	6.90	6.90	6.91	6.90	6.91	6.85	6.85	6.86	6.85	NA	NA	NA
		masl	291.82	291.27	291.19	291.18	<290.9	<290.9	<290.9	<290.9	<290.9	<290.9	291.29	291.29	291.28	291.30	291.30	291.29	291.30	291.29	291.35	291.35	291.34	291.35			
102	299.05	mbgs	7.20	7.16	7.16	7.16	Dry	7.10	7.09	7.09	Dry	7.08	7.09	7.10	7.12	7.10	7.11	7.11	7.10	7.11	7.09	7.10	7.10	7.09	NA	NA	NA
		masl	291.85	291.89	291.89	291.89	<291.45	291.95	291.96	291.96	<291.45	291.97	291.96	291.95	291.93	291.95	291.94	291.94	291.95	291.94	291.96	291.95	291.95	291.96			
103S	292.07	mbgs	0.39	0.54	0.53	0.90	0.50	0.79	1.19	1.58	2.41	2.62	3.04	3.07	0.57	0.43	2.27	2.65	2.80	1.97	0.46	0.62	0.62	0.91	NA	NA	NA
		masl	291.68	291.53	291.54	291.17	291.57	291.28	290.88	290.49	289.66	289.45	289.03	289.00	291.50	291.64	289.80	289.42	289.27	290.10	291.61	291.45	291.45	291.16			
103D	292.17	mbgs	0.35	0.60	0.56	1.03	0.49	0.90	1.30	1.67	4.08	2.59	3.04	3.18	0.59	0.42	2.29	2.65	2.87	2.14	0.43	0.62	Damaged	Damaged	NA	NA	NA
		masl	291.82	291.57	291.61	291.14	291.68	291.27	290.87	290.50	288.09	289.58	289.13	288.99	291.58	291.75	289.88	289.52	289.30	290.03	291.74	291.55					
104	296.35	mbgs	6.11	5.52	5.85	6.24	Dry	6.23	6.72	Dry	Dry	7.28	7.29	7.28	7.30	7.31	7.31	7.41	7.41	7.43	6.06	6.06	6.02	6.18	NA	NA	NA
		masl	290.24	290.83	290.50	290.11	<288.75	290.12	289.63	<288.75	<288.75	289.07	289.06	289.07	289.05	289.04	289.04	288.94	288.94	288.92	290.29	290.29	290.33	290.17			
105	297.12	mbgs	6.59	Dry	Dry	Dry	5.72	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	NA	NA	NA
		masl	290.53	<289.52	<289.52	<289.52	291.40	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52	<289.52			
106	295.48	mbgs	6.40	5.91	6.03	6.43	5.72	6.28	6.71	Dry	Dry	Dry	7.10	7.12	7.13	7.15	5.13	7.13	7.13	7.14	6.09	6.08	6.12	6.30	NA	NA	NA
		masl	289.08	289.57	289.45	289.05	289.76	289.20	288.77	<287.88	<287.88	<287.88	288.38	288.36	288.35	288.33	290.35	288.35	288.35	288.34	289.39	289.40	289.36	289.18			
201	292.41	mbgs	NI	NI	NI	NI	3.08	3.13	3.41	3.57	4.11	4.23	4.79	4.99	4.69	4.30	4.95	5.11	5.23	5.26	3.51	3.54	3.50	3.72	NA	NA	NA
		masl					289.33	289.28	289.00	288.84	288.30	288.18	287.62	287.42	287.72	288.11	287.46	287.30	287.18	287.15	288.90	288.87	288.91	288.69			
202	291.73	mbgs	NI	NI	NI	NI	1.53	Damaged	1.83	2.09	2.53	2.60	2.60	2.40	1.23	1.08	2.57	2.57	2.60	2.42	1.11	1.17	1.28	1.63	NA	NA	NA
		masl					290.20		289.90	289.64	289.20	289.13	289.13	289.33	290.50	290.65	289.16	289.16	289.13	289.31	290.62	290.56	290.45	290.10			
203	293.08	mbgs	NI	NI	NI	NI	2.33	3.63	4.06	4.26	4.43	4.57	4.53	4.07	3.11	2.78	4.25	4.44	4.63	4.09	2.08	1.61	1.33	1.88	NA	NA	NA
		masl					290.75	289.45	289.02	288.82	288.65	288.51	288.55	289.01	289.97	290.30	288.83	288.64	288.45	288.99	291.00	291.47	291.75	291.20			
301	297.00	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	Dry	Dry	Dry
		masl																							<289.4	<289.4	<289.4
302	291.70	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	1.50	1.10	0.80
		masl																							290.20	290.60	290.90
303	294.30	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	7.40	7.40	7.22
		masl																							286.90	286.90	287.08
304	295.60	mbgs	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	Dry	Dry	Dry
		masl																							<288	<288	<288

NI - Not Installed
NA - Not Available

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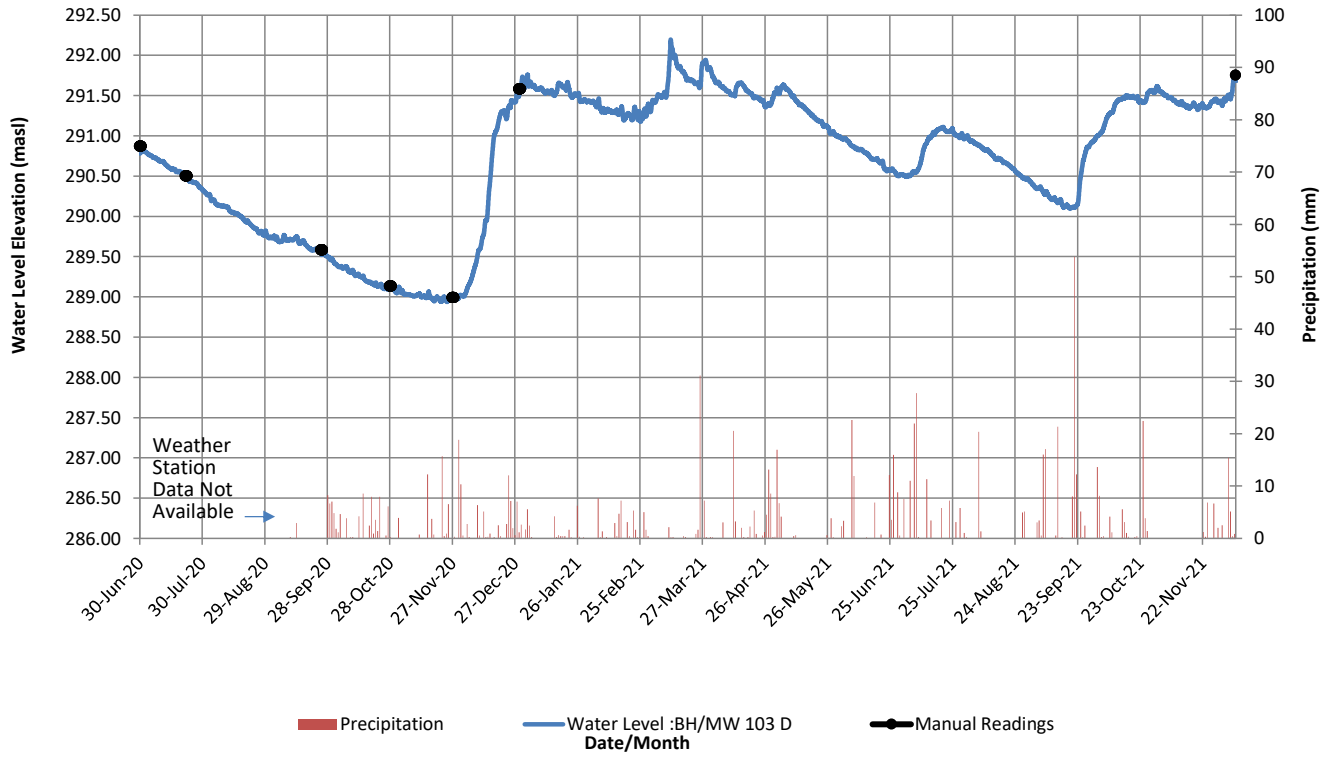
Appendix C-2

Hydrogrphs

REFERENCE NO. 1903-W092

Hydrograph : BH/MW 103 D(June 6, 2020 and December 8, 2021)



Soil Engineers Ltd

Water Level Hydrograph

Project:

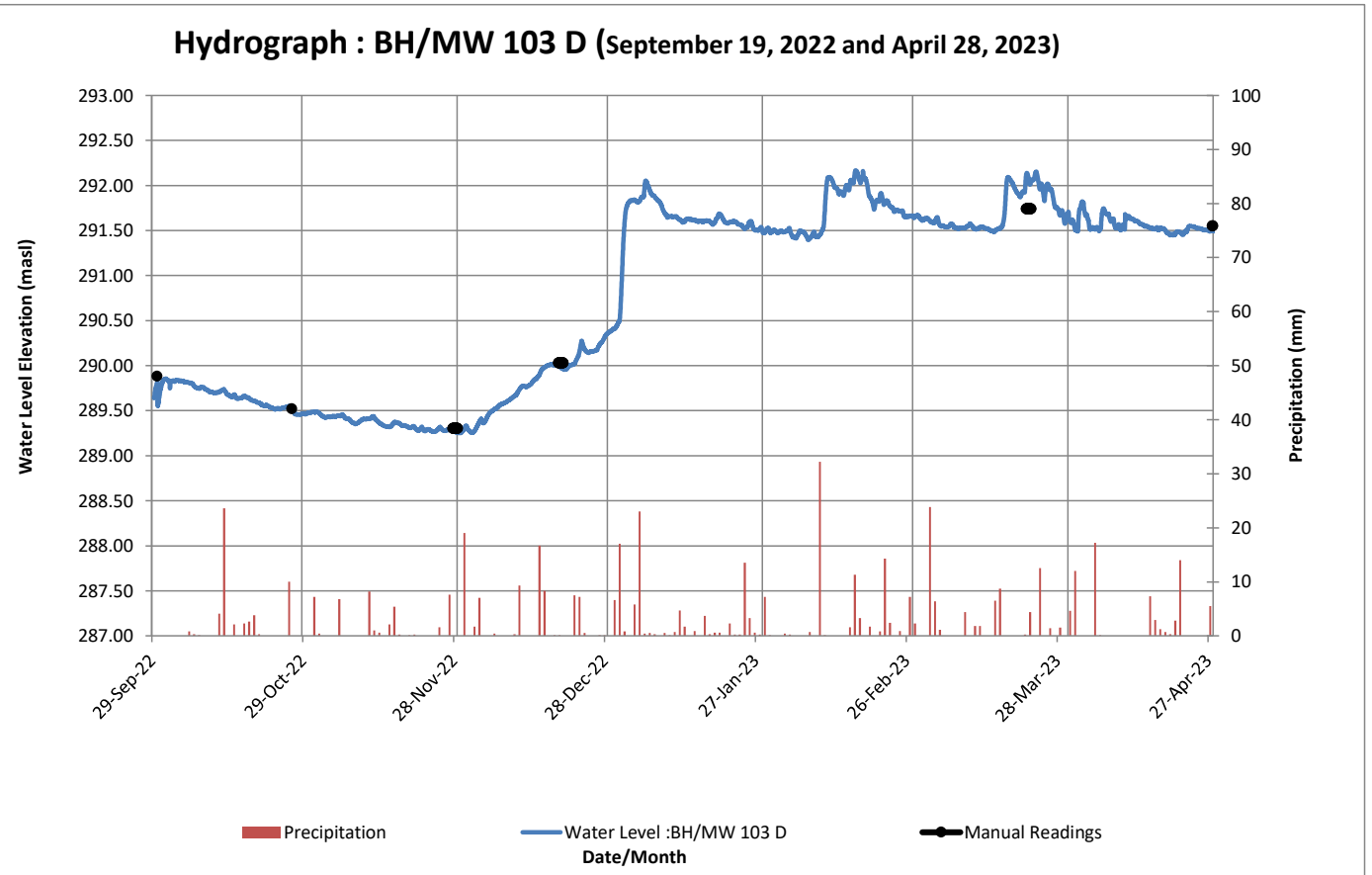
Proposed Residential Development

Date: June 2023

Ref. No.: 1903-W092

Scale: NTS

Figure No. 14



Soil Engineers Ltd.

Water Level Hydrograph

Project:

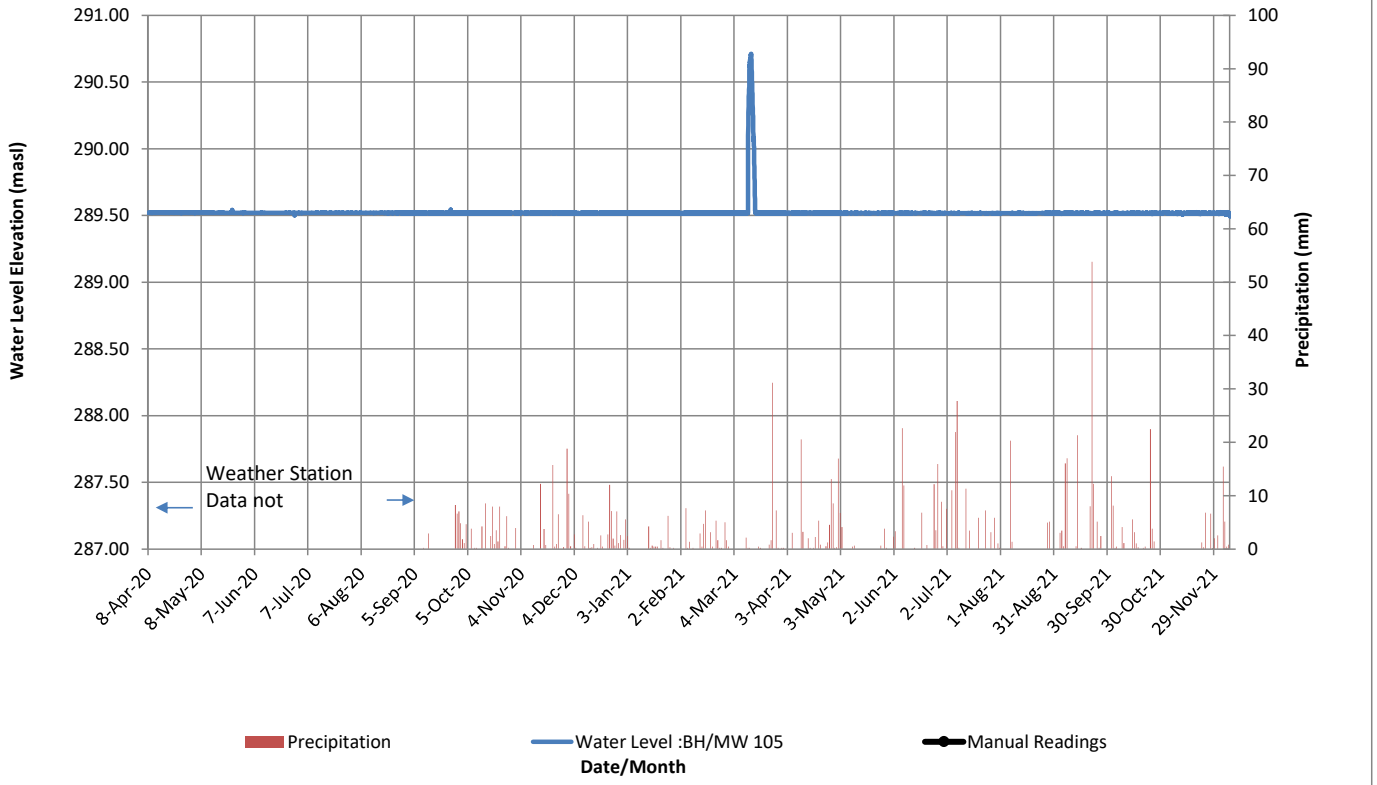
Proposed Residential Development

Date: June 2023

Ref. No.: 1903-W092

Scale: NTS

Figure No. 15



Soil Engineers Ltd.

Water Level Hydrograph

Project:

Proposed Residential Development

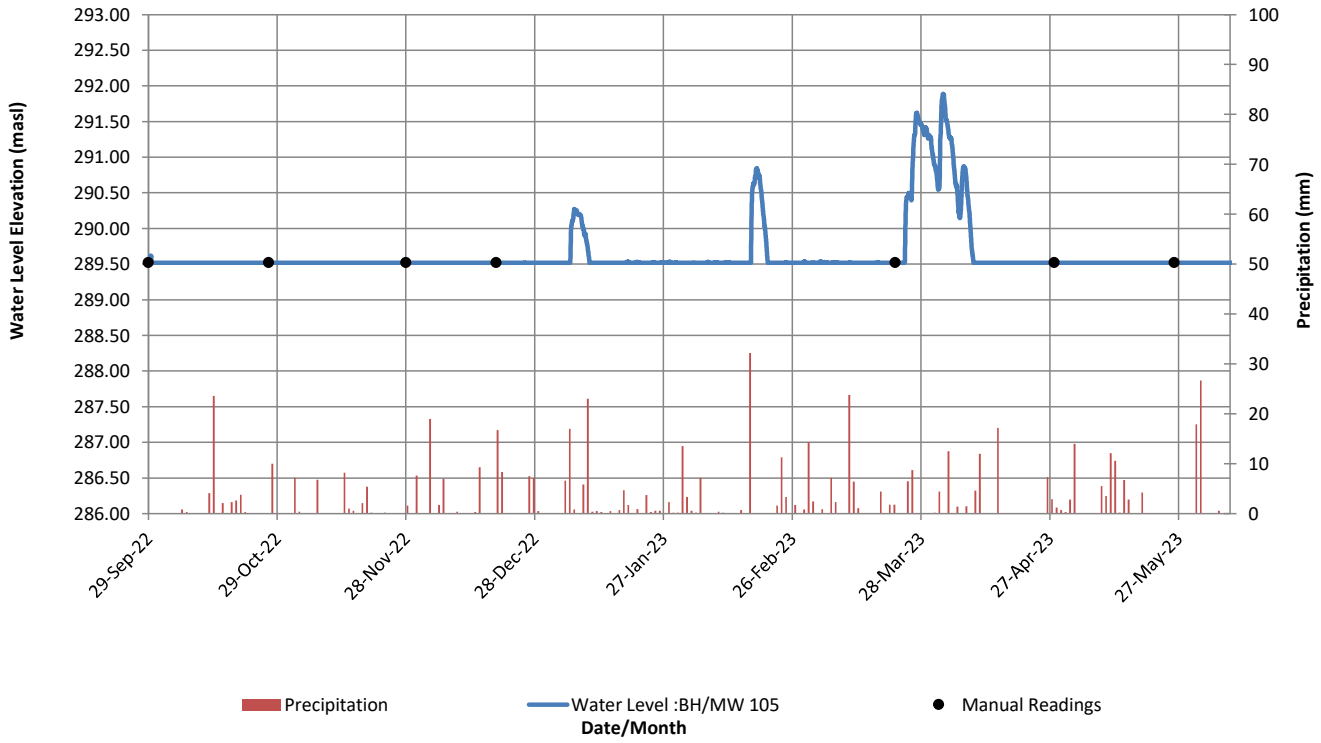
Date: June 2023

Ref. No.: 1903-W092

Scale: NTS

Figure No. 16

Hydrograph : BH/MW 105 (Between September 19, 2022 and June 08, 2023)



Soil Engineers Ltd

Water Level Hydrograph

Project:

Proposed Residential Development

Date: June 2023

Ref. No.: 1903-W092

Scale: NTS

Figure No. 4

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FAX: (705) 721-7864	FAX: (905) 542-2769	FAX: (905) 725-1315	FAX: (905) 881-8335	FAX: (705) 684-8522	FAX: (905) 542-2769

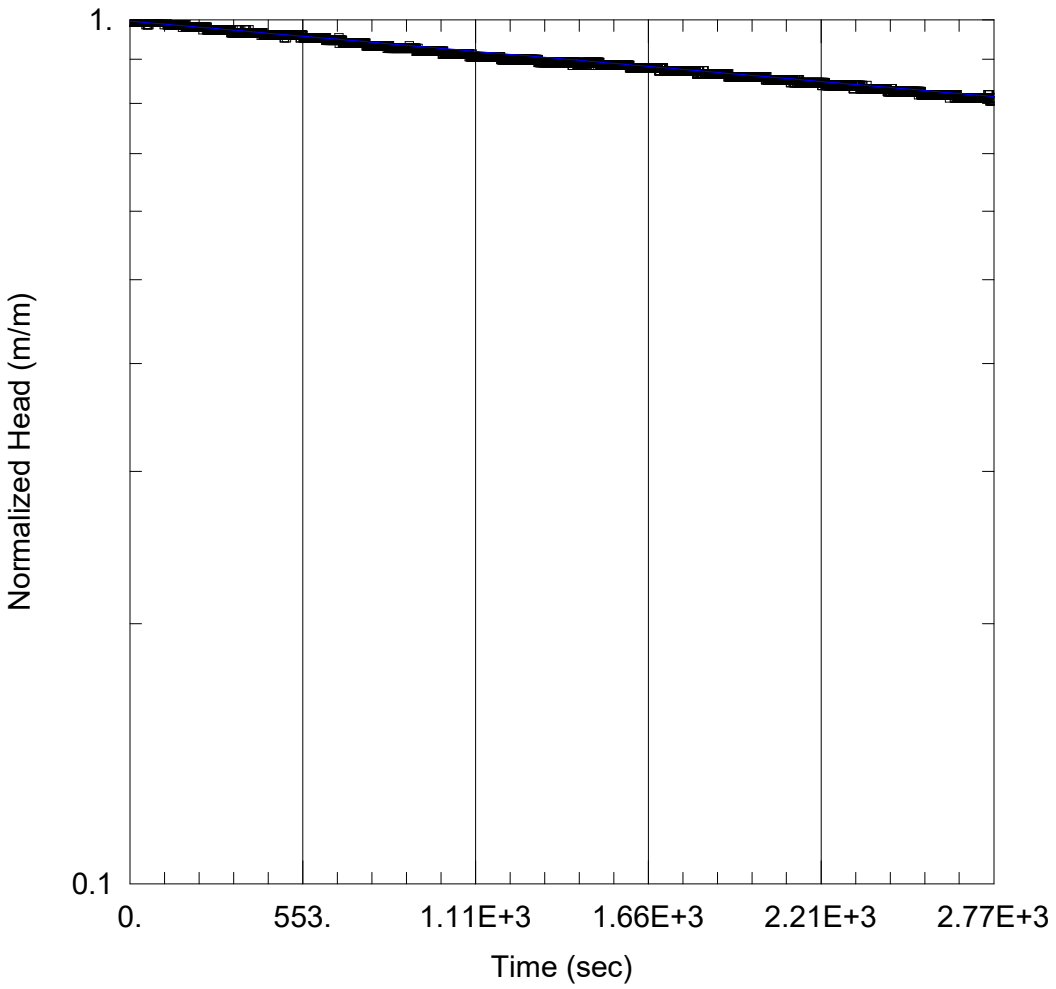
Appendix D

IN-SITU HYDRAULIC CONDUCTIVITY TESTING DETAILS

REFERENCE NO. 1903-W092

Falling Head SWRT of BHMW 302

Prepared By:	Prepared For:
Soil Engineers Ltd.	Acorn NE Stouffville Inc.
Project:	**Location:**
1903-W092	12875 Tenth Line, Whitchurch



SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 2.855E-8 m/sec y0 = 0.4454 m

AQUIFER DATA

Saturated Thickness: 6.9 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BHMW 302)

Initial Displacement: 0.447 m
Static Water Column Height: 6.9 m
Total Well Penetration Depth: 6.9 m
Screen Length: 3. m
Casing Radius: 0.0254 m
Well Radius: 0.0508 m

Soil Engineers Ltd.

NI - Not Installed
NA - Not Available

Soil Engineers Ltd.
CONSULTING ENGINEERS
GEOTECHNICAL • ENVIRONMENTAL • HYDROGEOLOGICAL • BUILDING SCIENCE
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Appendix E

GROUNDWATER QUALITY TEST RESULTS

REFERENCE NO. 2308-W005

How did we do today?

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START SURVEY

FINAL REPORT

CA40014-JAN26 R1

1903-W092, 12875 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	Yogiraj Rana
Telephone	705-341-1987
Facsimile	416-754-8516
Email	yogiraj.rana@soilengineersltd.com
Works #	
Project Reference	1903-W092, 12875 Tenth Line Whitchurch-Stouffville
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	CA40014-JAN26
Received	2026-01-07
Approved	01/14/2026
Report Number	CA40014-JAN26 R1
Date Reported	01/14/2026

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:046409

SIGNATORIES

Brad Moore Hon. B.Sc

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Client: Soil Engineers Ltd.
Project: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

Sample Number 9
Sample Name MW-302
Sample Matrix Ground Water
Sample Date 2026-01-07 00:00

L1 = SANSEW / WATER / - - York Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2021_102

L2 = SANSEW / WATER / - - York Sewer Use ByLaw - Storm Sewer Discharge - BL_2021_102

General Chemistry

Parameter	Units	RL	L1	L2	Result
Alkalinity	mg/L as CaCO3	2			362
Bicarbonate	mg/L as CaCO3	2			362
Carbonate	mg/L as CaCO3	2			< 2
OH	mg/L as CaCO3	2			< 2
Colour	TCU	3			17
Conductivity	uS/cm	2			824
Turbidity	NTU	0.10			4.4
Ammonia+Ammonium (N)	as N mg/L	0.1			0.9
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03			< 0.03
Total Organic Carbon	mg/L	1			5
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15	< 4 ↑
Total Suspended Solids	mg/L	2	350	15	6
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	1.4

Client: Soil Engineers Ltd.
Project: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

Sample Number	9
Sample Name	MW-302
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

L1 = SANSEW / WATER / - - York Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2021_102

L2 = SANSEW / WATER / - - York Sewer Use ByLaw - Storm Sewer Discharge - BL_2021_102

Metals and Inorganics

Parameter	Units	RL	L1	L2	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			< 0.06
Sulphate	mg/L	2	1500		81
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01
Fluoride	mg/L	0.06	10		0.14
Aluminum (0.2µm)	mg/L	0.001			0.008
Aluminum (total)	mg/L	0.001	50		0.029
Antimony (total)	mg/L	0.0009	5		< 0.0009
Arsenic (total)	mg/L	0.0002	1	0.02	0.0013
Boron (total)	mg/L	0.002			0.015
Barium (total)	mg/L	0.00008			0.230
Beryllium (total)	mg/L	0.000007			0.000011
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000099
Chromium (total)	mg/L	0.00008	2	0.08	0.00016
Calcium (total)	mg/L	0.01			151
Cobalt (total)	mg/L	0.000004	5		0.00135
Copper (total)	mg/L	0.001	3	0.05	0.002
Lead (total)	mg/L	0.00009	1	0.12	0.00020
Iron (total)	mg/L	0.007			0.046
Potassium (total)	mg/L	0.009			4.49
Magnesium (total)	mg/L	0.001			16.9

Client: Soil Engineers Ltd.
Project: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

Sample Number	9
Sample Name	MW-302
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

L1 = SANSEW / WATER / - - York Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2021_102

L2 = SANSEW / WATER / - - York Sewer Use ByLaw - Storm Sewer Discharge - BL_2021_102

Metals and Inorganics (continued)

Parameter	Units	RL	L1	L2	Result
Manganese (total)	mg/L	0.00001	5	0.15	0.620
Molybdenum (total)	mg/L	0.0004	5		0.0023
Nickel (total)	mg/L	0.0001	2	0.08	0.0042
Sodium (total)	mg/L	0.01			5.93
Silicon (total)	mg/L	0.02			14.8
Phosphorus (total)	mg/L	0.003	10	0.4	0.032
Selenium (total)	mg/L	0.00004	1	0.02	0.00035
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Strontium (total)	mg/L	0.00008			0.374
Thallium (total)	mg/L	0.000005			0.000024
Tin (total)	mg/L	0.00006	5		0.00021
Titanium (total)	mg/L	0.0001	5		0.0014
Uranium (total)	mg/L	0.000002			0.00133
Vanadium (total)	mg/L	0.00001			0.00220
Zinc (total)	mg/L	0.002	2	0.04	0.023
Hardness	mg/L as CaCO3	0.05			447

Client: Soil Engineers Ltd.
Project: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

Sample Number	9
Sample Name	MW-302
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

L1 = SANSEW / WATER / - - York Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2021_102

L2 = SANSEW / WATER / - - York Sewer Use ByLaw - Storm Sewer Discharge - BL_2021_102

Parameter	Units	RL	L1	L2	Result
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			< 4 ↑
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	7.72
Chloride	mg/L	1			22
Mercury (total)	mg/L	0.00001	0.01	0.0004	0.00001
Mercury (dissolved)	mg/L	0.00001			0.00001

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Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

Sample Number	9
Sample Name	MW-302
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

L1 = SANSEW / WATER / - - York Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2021_102

L2 = SANSEW / WATER / - - York Sewer Use ByLaw - Storm Sewer Discharge - BL_2021_102

Parameter	Units	RL	L1	L2	Result
PCBs					
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.0001	0.001	0.0004	< 0.0001
Phenols					
4AAP-Phenolics	mg/L	0.001	1	0.008	0.001
SVOCs					
di-n-Butyl Phthalate	mg/L	0.002	0.08	0.015	< 0.002
Bis(2-ethylhexyl)phthalate	mg/L	0.002	0.012	0.0088	< 0.002
VOCs					
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethylene	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			< 0.02
Styrene	mg/L	0.0005	0.2		< 0.0005

Client: Soil Engineers Ltd.
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Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

Sample Number 9
Sample Name MW-302
Sample Matrix Ground Water
Sample Date 2026-01-07 00:00

L1 = SANSEW / WATER / - - York Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2021_102

L2 = SANSEW / WATER / - - York Sewer Use ByLaw - Storm Sewer Discharge - BL_2021_102

Parameter	Units	RL	L1	L2	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 Sewer Use ByLaw - Sanitary Sewer Discharge - BL_2021_102 L1	SANSEW / WATER / - - York Sewer Use ByLaw - Storm Sewer Discharge - BL_2021_102 L2
MW-302					
Manganese	SM 3030/EPA 200.8	mg/L	0.620		0.15
Total Kjeldahl Nitrogen	SM 4500-N C/4500-NO3- F	as N mg/L	1.4		1

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	EWL0108-JAN26	mg/L as CaCO3	2	< 2	1	20	102	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	EWL0108-JAN26	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0108-JAN26	mg/L as CaCO3	2	< 2	1	10	NA	90	110	NA		
OH	EWL0108-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	EWL0108-JAN26	uS/cm	2	< 2	0	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
Aluminum (0.2µm)	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

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
Phosphorus (total)	EMS0093-JAN26	mg/L	0.003	<0.003	ND	20	98	90	110	NV	70	130
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

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	EWL0108-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	EWL0150-JAN26	mg/L	2	< 2	3	10	100	90	110	NA		

Total Nitrogen

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0054-JAN26	as N mg/L	0.5	<0.5	3	10	102	90	110	100	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-[ENV]GC-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.

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Please refer to SGS General Conditions of Services located at http://www.sgs.com/terms_and_conditions.htm (Printed copies are available upon request.)

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: 046409 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 40014 - JAN 26
LAB LIMS #:

REPORT INFORMATION

Company: Soil Engineers Ltd.
Contact: Yogiraj Rana
Address: 90 W Beaver Creek St. Suite #100
Phone: 416-779-2825
Fax:
Email: Yogiraj.rana@soilengineersltd.com

INVOICE INFORMATION

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

Quotation #:
P.O. #:
Project #: 1903-W092
Site Location/ID: 12875 Tenth line Whitchurch-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: ☐ 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: Region of York

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: 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 (please specify): Gen. Chem Package Compared to PWQO	Sewer Use: Specify pkg: Region of York Storm & Sanitary	Water Characterization Pkg ☐ Extended General	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-302	01/07/26	12:00	26	GW	N												✓	✓	✓			
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

Observations/Comments/Special Instructions

Sampled By (NAME): Jalil Ghalamghash Signature: Ghalamghash Date: 01/07/26 (mm/dd/yy)
Relinquished by (NAME): Signature: Ghalamghash Date: 01/07/2026 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.8
Date of Issue: 06 SEP 2024

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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START SURVEY

FINAL REPORT

CA40014-JAN26 R1

1903-W092, 12875 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	Yogiraj Rana
Telephone	705-341-1987
Facsimile	416-754-8516
Email	yogiraj.rana@soilengineersltd.com
Works #	
Project Reference	1903-W092, 12875 Tenth Line Whitchurch-Stouffville
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	CA40014-JAN26
Received	2026-01-07
Approved	01/14/2026
Report Number	CA40014-JAN26 R1
Date Reported	01/14/2026

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:046409

SIGNATORIES

Brad Moore Hon. B.Sc

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Client: Soil Engineers Ltd.
Project: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

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

Sample Number 9
Sample Name MW-302
Sample Matrix Ground Water
Sample Date 2026-01-07 00:00

General Chemistry

Parameter	Units	RL	L1	Result
Alkalinity	mg/L as CaCO3	2		362
Bicarbonate	mg/L as CaCO3	2		362
Carbonate	mg/L as CaCO3	2		< 2
OH	mg/L as CaCO3	2		< 2
Colour	TCU	3		17
Conductivity	uS/cm	2		824
Turbidity	NTU	0.10		4.4
Ammonia+Ammonium (N)	as N mg/L	0.1		0.9
Total Reactive Phosphorous (o-phosphate as P)	mg/L	0.03		< 0.03
Total Organic Carbon	mg/L	1		5
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 ↑
Total Suspended Solids	mg/L	2		6
Total Kjeldahl Nitrogen	as N mg/L	0.5		1.4

Client: Soil Engineers Ltd.
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MATRIX: WATER

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

Sample Number	9
Sample Name	MW-302
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		< 0.06
Sulphate	mg/L	2		81
Cyanide (total)	mg/L	0.01		< 0.01
Fluoride	mg/L	0.06		0.14
Aluminum (0.2µm)	mg/L	0.001	0.015	0.008
Aluminum (total)	mg/L	0.001		0.029
Antimony (total)	mg/L	0.0009	0.02	< 0.0009
Arsenic (total)	mg/L	0.0002	0.1	0.0013
Boron (total)	mg/L	0.002	0.2	0.015
Barium (total)	mg/L	0.00008		0.230
Beryllium (total)	mg/L	0.000007	0.011	0.000011
Cadmium (total)	mg/L	0.000003	0.0002	0.000099
Chromium (total)	mg/L	0.00008		0.00016
Calcium (total)	mg/L	0.01		151
Cobalt (total)	mg/L	0.000004	0.0009	0.00135
Copper (total)	mg/L	0.001	0.005	0.002
Lead (total)	mg/L	0.00009	0.001	0.00020
Iron (total)	mg/L	0.007	0.3	0.046
Potassium (total)	mg/L	0.009		4.49
Magnesium (total)	mg/L	0.001		16.9

Client: Soil Engineers Ltd.
Project: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

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

Sample Number	9
Sample Name	MW-302
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		0.620
Molybdenum (total)	mg/L	0.0004	0.04	0.0023
Nickel (total)	mg/L	0.0001	0.025	0.0042
Sodium (total)	mg/L	0.01		5.93
Silicon (total)	mg/L	0.02		14.8
Phosphorus (total)	mg/L	0.003	0.01	0.032
Selenium (total)	mg/L	0.00004	0.1	0.00035
Silver (total)	mg/L	0.00005	0.0001	< 0.00005
Strontium (total)	mg/L	0.00008		0.374
Thallium (total)	mg/L	0.000005	0.0003	0.000024
Tin (total)	mg/L	0.00006		0.00021
Titanium (total)	mg/L	0.0001		0.0014
Uranium (total)	mg/L	0.000002	0.005	0.00133
Vanadium (total)	mg/L	0.00001	0.006	0.00220
Zinc (total)	mg/L	0.002	0.02	0.023
Hardness	mg/L as CaCO3	0.05		447

Client: Soil Engineers Ltd.
Project: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

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

Sample Number	9
Sample Name	MW-302
Sample Matrix	Ground Water
Sample Date	2026-01-07 00:00

Parameter	Units	RL	L1	Result
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		< 4 ↑
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	7.72
Chloride	mg/L	1		22
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: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

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

Sample Number	9
Sample Name	MW-302
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	0.001
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: 1903-W092, 12875 Tenth Line Whitchurch-Stouffville
Project Manager: Yogiraj Rana
Samplers: Jalil Ghalamghash

MATRIX: WATER

Sample Number 9
Sample Name MW-302
Sample Matrix Ground Water
Sample Date 2026-01-07 00:00

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

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-302				
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
Cobalt	SM 3030/EPA 200.8	mg/L	0.00135	0.0009
Phosphorus	SM 3030/EPA 200.8	mg/L	0.032	0.01
Zinc	SM 3030/EPA 200.8	mg/L	0.023	0.02

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	EWL0108-JAN26	mg/L as CaCO3	2	< 2	1	20	102	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	EWL0108-JAN26	mg/L as CaCO3	2	< 2	ND	10	NA	90	110	NA		
Bicarbonate	EWL0108-JAN26	mg/L as CaCO3	2	< 2	1	10	NA	90	110	NA		
OH	EWL0108-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	EWL0108-JAN26	uS/cm	2	< 2	0	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
Aluminum (0.2µm)	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

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
Phosphorus (total)	EMS0093-JAN26	mg/L	0.003	<0.003	ND	20	98	90	110	NV	70	130
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

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	EWL0108-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	EWL0150-JAN26	mg/L	2	< 2	3	10	100	90	110	NA		

Total Nitrogen

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0054-JAN26	as N mg/L	0.5	<0.5	3	10	102	90	110	100	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-[ENV]GC-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.

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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: 046409 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 40014 - JAN 26
LAB LIMS #:

REPORT INFORMATION

Company: Soil Engineers Ltd.
Contact: Yogiraj Rana
Address: 90 W Beaver Creek St. Suite #100
Phone: 416-779-2825
Fax:
Email: Yogiraj.rana@soilengineersltd.com

INVOICE INFORMATION

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

Quotation #:
P.O. #:
Project #: 1903-W092
Site Location/ID: 12875 Tenth line Whitchurch-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: ☐ 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: Region of York

RECORD OF SITE CONDITION (RSC) ☐ YES ☐ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	M&I: 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 (please specify): Gen. Chem Package Compared to PWQO	Sewer Use: Specify pkg: Region of York Storm & Sanitary	Water Characterization Pkg ☐ Extended General	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-302	01/07/26	12:00	26	GW	N												✓	✓	✓			
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

Observations/Comments/Special Instructions

Sampled By (NAME): Jalil Ghalamghash Signature: Ghalamghash Date: 01/07/26 (mm/dd/yy)
Relinquished by (NAME): Signature: Ghalamghash Date: 01/07/2026 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.8
Date of Issue: 06 SEP 2024

Note: Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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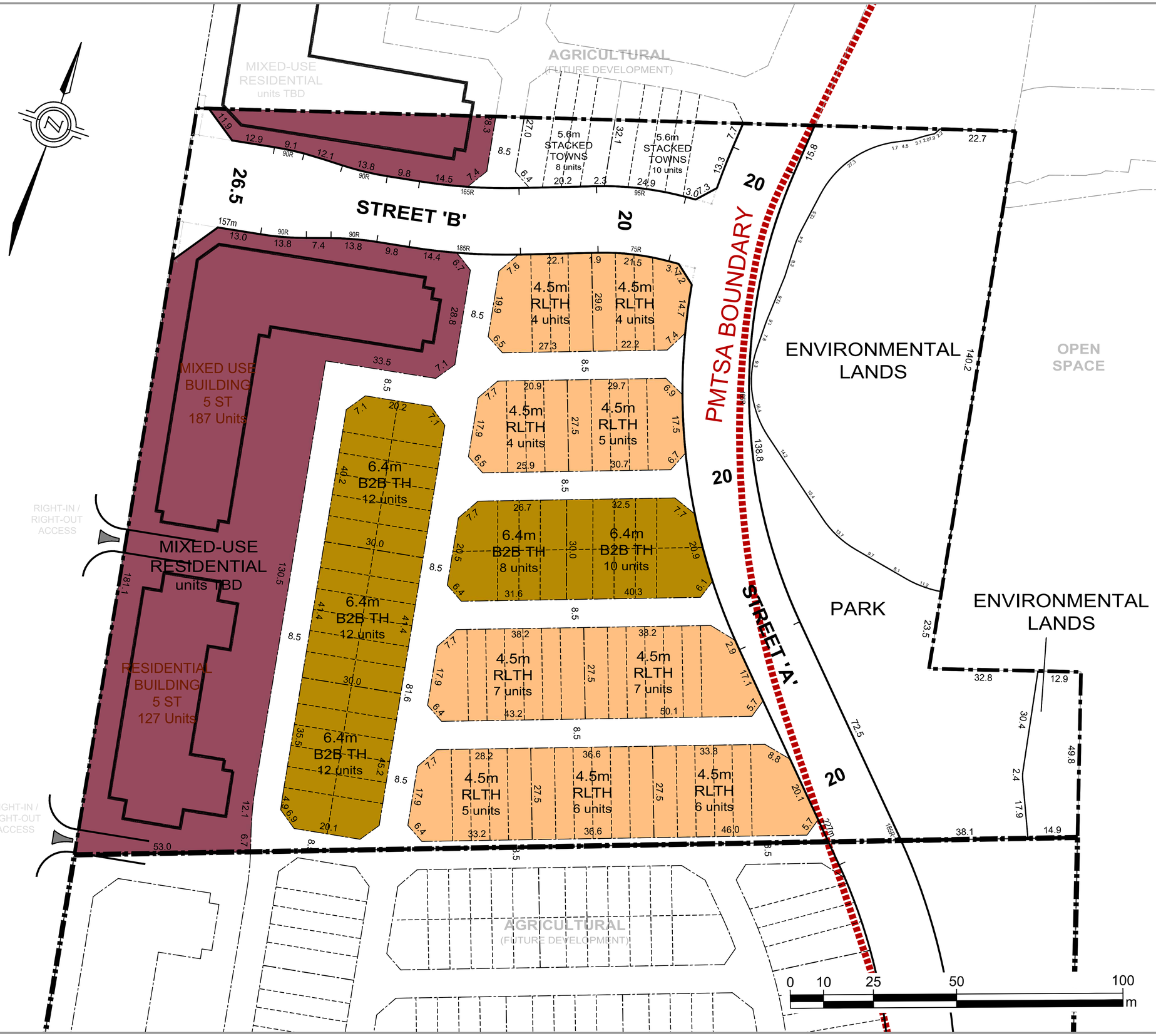
Appendix F

SHORT-TERM DEWATERING FLOW RATE ESTIMATES AND REVIEWED PLANS

REFERENCE NO. 1903-W092



ACORN NORTH - Conceptual Demonstration Plan

ESTIMATED UNIT COUNT	18360 - 121cp	January 26, 2026
4.5m Rear Lane Towns	40%	48
6.4m Back-to-Back Towns	45%	54
5.6m Stacked Towns	15%	18
Mixed Use Residential		TBD
Total	**100%**	**120 units**

- Back-to-Back Townhouses
- Rear Lane Townhouses
- Stacked Townhouses
- Mixed Use Residential
- Environmental Lands
- Park
- PMTSA Boundary
  (4.17 ha within PMTSA Boundary)

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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_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 202	BH/MW 203	BH/MW 104
Total Anticipated Short-Term Dewatering Flow including Storm Event and Groundwater Seepage with Safety Factor:	L/day	**6,550.0**	**6,700.0**	**6,400.0**
Anticipated Storm Flow:				
Anticipated Storm Flow (2Year-3Hr event)	L/day	3,100.0	3,100.0	3,100.0
Storm Event (2Year-3Hr event)	m	0.03098	0.03098	0.03098
Groundwater Seepage Estimate:				
Q s.f. 1.5	L/day	3,450.0	3,600.0	3,300.0
Q	L/day	2,300.0	2,400.0	2,200.0
Q	m^3/day	2.3	2.3	2.1
K	m/day	0.0025	0.0025	0.0025
H	m	2.7	3.6	2.4
h	m	2.0	2.0	2.0
R_0	m	0.4	0.8	0.2
Trench width (b)	m	2.0	2.0	2.0
r_s	m	1.0	1.0	1.0
x (a)	m	50.0	50.0	50.0
L	m	0.2	0.4	0.1
	a/b	25.0	25.0	25.0
Conceptual Zone of Influence:				
R_0	m	0.4	0.8	0.2
D	m	0.7	1.6	0.4
K	m/s	2.85E-08	2.85E-08	2.85E-08
Empirical constant (conservative)		3000	3000	3000
Assumptions:				
Assumed Grading Elevation	masl	294.9	294.4	293.9
Highest Interpreted Groundwater Elevation	masl	290.6	291.0	290.3
Proposed Invert Elevation for the Excavation	masl	290.9	290.4	289.9
Trench Width	m	2.0	2.0	2.0
Trench Length	m	50.0	50.0	50.0
Area	m^2	100.0	100.0	100.0
Perimeter	m	104.0	104.0	104.0

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Appendix G

Pre and Post Development Water Balance Assessment

REFERENCE NO. 1903-W092

Pre- and Post-Development Water Balance

12875 Tenth Line, Whitchurche Staufville

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	209	165	0.165
Recharge	273	217	0.217
Evapotranspiration	611	485	0.485

Subject Site Subsurface Conditions

Surface Soil — Topsoil and Earth fill and Glacial Till

Subject Site Breakdown Area (m^2)

A: Pre-Development	
Existing Impervious Area (Building and Paved Areas)	1,600.00
Existing Pervious Area (Green Area)	55,070.00
Total	56,670.00
B: Post-Development	
Proposed Impervious Area (Parks-Hard Landscape)	814.50
Proposed Impervious Area (Stacked Townhouses-SKTH)	1,152.00
Proposed Impervious Area (Rear Lot Townhouses-RLTH)	8,226.00
Proposed Impervious Area (Back to Back Townhouse- B2B)	5,553.00
Proposed Impervious Area (Mixed Use Residential Area)	11,402.84
Proposed Impervious Area (8.5 m Lane Way)	6,700.00
Proposed Impervious Area (20 m ROW)	4,807.60
Proposed Pervious Area (Parks)	4,615.50
Proposed Pervious Area (Stacked Townhouses-SKTH)	128.00
Proposed Pervious Area (Rear Lot Townhouses-RLTH)	914.00
Proposed Pervious Area (Back to Back Townhouse- B2B)	617.00
Proposed Pervious Area (Mixed Use Residential Area)	877.16
Proposed Pervious Area (20 m ROW)	3,292.40
Proposed Pervious Area (Open Space/ Environmental Area/Future Development	7,570.00
Total	56,670.00

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 (Building and Paved Areas)	1,600.00	1,387.20	138.72	0.00	1,248.48
Existing Pervious Area (Green Area)	55,070.00	47,745.69	26,708.95	11,950.19	9,086.55
Total	**56,670.00**	**49,132.89**	**26,847.67**	**11,950.19**	**10,335.03**

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)	814.50	706.17	70.62	0.00	635.55
Proposed Impervious Area (Stacked Townhouses-SKTH)	1,152.00	998.78	99.87	0.00	898.91
Proposed Impervious Area (Rear Lot Townhouses-RLTH)	8,226.00	7,131.94	713.19	0.00	6,418.75
Proposed Impervious Area (Back to Back Townhouse- B2B)	5,553.00	4,814.45	481.45	0.00	4,333.00
Proposed Impervious Area (Mixed Use Residential Area)	11,402.84	9,886.26	988.63	0.00	8,897.63
Proposed Impervious Area (8.5 m Lane Way)	6,700.00	5,808.90	580.89	0.00	5,228.01
Proposed Impervious Area (20 m ROW)	4,807.60	4,168.19	416.82	0.00	3,751.37
Proposed Pervious Area (Parks)	4,615.50	4,001.64	2,238.52	1,001.56	761.56
Proposed Pervious Area (Stacked Townhouses-SKTH)	128.00	110.98	62.08	27.78	21.12
Proposed Pervious Area (Rear Lot Townhouses-RLTH)	914.00	792.44	443.29	198.34	150.81
Proposed Pervious Area (Back to Back Townhouse- B2B)	617.00	534.94	299.24	133.89	101.81
Proposed Pervious Area (Mixed Use Residential Area)	877.16	760.50	425.43	190.34	144.73
Proposed Pervious Area (20 m ROW)	3,292.40	2,854.51	1,596.81	714.45	543.25
Proposed Pervious Area (Open Space/ Environmental Area/Future Development	7,570.00	6,563.19	3,671.45	1,642.69	1,249.05
Total	**56,670.00**	**49,132.89**	**12,088.28**	**3,909.05**	**33,135.54**

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	49,132.89	26,847.67	11,950.19	10,335.03
Post-Development	49,132.89	12,088.28	3,909.05	33,135.54
Gain/Loss (-)		-14,759.39	-8,041.14	22,800.51
Gain/Loss (%)	-	55 ↓	67 ↓	221 ↑

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	473.76	210.87	182.37
Post-Development	867.00	213.31	68.98	584.71
Gain/Loss (-)	-	-260.45	-141.89	402.34
Gain/Loss (%)	-	55 ↓	67 ↓	221 ↑

DRAFT