HYDROGEOLOGICAL INVESTIGATION
150 CEMETERY ROAD
UXBRIDGE, ONTARIO
L9P 1R1

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1 Introduction

1.1 Project Background

Toronto Inspection Ltd. (TIL) was retained by Coral Creek Homes (the Client) to conduct a hydrogeological investigation for the property at 150 Cemetery Road in the Township of Uxbridge, Ontario (the Site). A residential subdivision development is proposed for the Site which will include 23 townhouse units and associated municipal servicing, including water and sanitary. Additionally, an existing residential dwelling on the Site will be severed and sold with the west side of the Site. These areas are beyond the proposed development area. Existing structures that fall within the proposed townhouse lots will be demolished.

It is understood that the townhouses will be constructed with 1-level basements. However, architectural plans and civil servicing and grading plans were not available for review at the time of reporting. Therefore, the true basement depths and depths of services were not known. It is assumed that the basements will be constructed within 3 m below ground surface (mbgs), and the services within 4 mbgs. Where these assumptions are invalidated, notice to this office should be provided such that the final conclusions of the current investigation can be confirmed and/or revised as needed.

This hydrogeological investigation has been completed in accordance with Conservation Authority Guidelines for Development Applications – Hydrogeological Assessment Submissions dated June, 2013.

The physical address of the Site is as follows:

150 Cemetery Road,
Uxbridge, Ontario L9P 1R1
E 649314 N 4883866

The Site is owned by the Client. The relevant information for the Client contact is as follows:

1 Brownscombe Crescent,
Uxbridge, Ontario L9P 1X9

1.2 Site Description

The Site is a 10-acre irregular shaped property located on the west side of Cemetery Road, approximately 250m north of Toronto Street South. The eastern quarter of the Site is a tableland, and the remaining three-quarters comprise a slope, a pond with a small creak and a densely treed floodplain. The proposed development will be built on the tableland.

At the time of the investigation, a two-storey house occupied the west side of the tableland, and was accessible by a driveway on the south side of the Site. An in-ground swimming pool was located to the north of the house and a tennis court was located to the east of the swimming pool. The remainder of the tableland was mostly vacant sodded area.

The location of the Site is shown in **Figure 1**. The Survey Plan prepared by H. F. Grander Co. Ltd., dated June 24, 2020, illustrates the proposed boundaries and lots of the residential subdivision and is attached as **Appendix A**.

1.3 Objectives of the Hydrogeological Investigation

The report herein identifies regulations which may be relevant to the development of the Site from a groundwater perspective. The report also develops a conceptual understanding of the Site setting by characterizing the existing geological and hydrogeological conditions at the Site; including groundwater elevations, groundwater flow direction, hydraulic properties of soils and groundwater quality. Based on the conceptual understanding of the Site and proposed development, an evaluation is made of potential dewatering requirements during-construction and during occupancy in the long-term. As the Site is located within the Lake Simcoe Watershed, an impact assessment is provided along with options for mitigation concerning changes to the Site's water balance and phosphorus exports.

1.4 Scope of Work

1.4.1 Conceptual Understanding

A conceptual understanding of the regional and local geological and hydrogeological systems was developed through the review of existing reports and available geological and hydrogeological data. These included:

- Mapping and reports by the Lake Simcoe Region Conservation Authority (LSRCA);
- Geological information from the Ontario Geological Survey (OGS);
- Geological and hydrogeological data from the Oak Ridges Moraine Groundwater Program (ORMGP);
- Mapping from the Ontario Ministry of Natural Resources and Forestry (MNRF);
- Source water protection information for the Lake Simcoe Source and Couchiching-Black River Source Protection Region;
- Ministry of the Environment, Conservation, and Parks (MECP) Water Well Information System (WWIS) and Permit to Take Water (PTTW) database; and
- Geotechnical Investigation for 150 Cemetery Road, Uxbridge, ON prepared by TIL, dated January 12, 2020.

1.4.2 Field Investigation

Local Site conditions were characterized by TIL's 2020 geotechnical drilling program.

Boreholes were drilled at five on-Site locations on July 20, 2020, to depths ranging from 6.55 m below ground surface to 12.65 mbgs. Four boreholes were completed as monitoring wells constructed of 0.051 m (2 inch) diameter polyvinyl chloride (PVC) riser pipe and 3.05 m (10 foot) long PVC slotted screens. All monitoring wells were installed with stick-up above ground and protected within monument casings. Monitoring wells were installed according to the relevant provisions of O.Reg. 903 by a licensed drilling contractor with TIL field staff in attendance. Monitoring wells were used to measure static groundwater levels, to conduct in-situ hydraulic conductivity testing and to collect representative groundwater quality samples.

Once it is determined that monitoring wells installed on the Site are no longer required, they should be decommissioned by a licensed well contractor as per O.Reg. 903.

1.4.3 Data Analysis

The data analysis component of this study will include the following items:

- Determination of soil stratigraphy and hydrostratigraphy;
- Determination of groundwater level elevations and seasonal variability;
- Determination of the hydraulic conductivity of soils;
- Assessment of groundwater quality;
- Evaluation of potential dewatering requirements during and after construction;
- Evaluation of water balance:
- Evaluation of phosphorus balance and,
- Evaluation of potential impacts to surrounding receptors within the anticipated dewatering and construction zones of influence.

2 Relevant Regulations and Policies

Environmental regulations and policies which may be relevant to the development of the Site and for which this investigation has been completed in accordance with are listed below and discussed briefly:

- Township of Uxbridge Official Plan – Office Consolidation January 2014;
- Durham Region Official Plan – Office Consolidation May 2020;
- Durham Region Sewer Use By-Law Number 55-2013;
- Lake Simcoe Protection Plan (2009);
- Ontario Water Resource Act (1990);
- O.Reg. 387/04: Water Taking and Transfer;
- The Clean Water Act (2006); and
- South Georgian Bay Lake Simcoe Source Protection Plan (2019).

Township of Uxbridge Official Plan

The Township of Uxbridge (Town) Official Plan identifies development and land-use objectives within the Town and conforms to Durham Region's Official Plan. Based on Official Plan mapping (Schedule 'A'), the Site is located within the Town's designated Urban Area where residential land uses are permitted. Moreover, to the west of the designated residential land use areas are designated Natural Hazard Areas within the Town Natural Heritage System and Natural Linkage Areas of the Oak Ridges Moraine Conservation Plan. The current development is proposed approximately 120 m to the east of the Natural Hazard Area boundary.

Durham Region Official Plan

The Durham Region Official Plan identifies development and land-use objectives for the long-term growth of Durham Region. Based on a review of the Official Plan maps (Schedule 'A-2'), the Site is located within designated Living Areas of the Region's Urban Area. Based on a review of Schedule 'B-2', the Site is also shown to be located with the Region's designated High Aquifer Vulnerability Areas and a Well Head Protection Area (WHPA-D) for Well #6 of the Uxbridge Drinking Water System.

Durham Region Sewer Use By-Law Number 55-2013

Durham Region, under the provisions and powers of *Sewer Use By-Law Number 55-2013*, is responsible for managing the discharge of private water to the Region's land drainage works or sewer systems. Any private water on the Site which will require discharge to the Region's sewer systems or to land drainage woks will require prior approval from Durham. Durham Region will review short-term and long-term discharge plans, discharge water quality, and estimated flows to determine if sewers can accommodate the proposed private water discharge flows.

LSRCA Policies and Regulations (O.Reg. 179/06)

Under Section 28 of the Conservation Authorities Act, the 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 Lake Simcoe Region Conservation Authority (LSRCA), through its regulatory mandate, is responsible for issuing permits under Ontario Regulation (O.Reg.) 179/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses for development proposals or site alteration work within the LSRCA regulated areas.

A preliminary review indicates that a portion of the area proposed for development falls within an LSRCA regulated area. As such, a permit under O.Reg. 179/06 will be required for alternations to land or for new construction in these areas.

The LSRCA regulation limits and areas and features of the Town's and Region's Natural Heritage System are illustrated in **Figure 2a**.

Lake Simcoe Protection Plan

The Lake Simcoe Protection Plan (LSPP), approved in July 2009, was prepared following the establishment of the Lake Simcoe Protection Act in 2008. The objective of the Lake Simcoe Protection Act and of the LSPP, is to safeguard the ecological health and function of Lake Simcoe and its tributaries. The LSPP requires applications for major development, i.e., developments with greater than 500 m^2 of impervious area, evaluate the potential losses in groundwater infiltration and increases in phosphorus loadings to Lake Simcoe, and how each will be mitigated. In accordance with the LSPP, the LSRCA requires the water and phosphorus balance analyses to meet the following targets:

- The water balance must demonstrate a net-zero change in pre-development infiltration volume. Compensation for an infiltration deficit is administered by the LSRCA under their *LSPP Water Budget Policy for LSPP 4.8-DP and 6.40-DP* (LSRCA, 2019a); and
- The phosphorus balance must demonstrate compliance with the "Zero Export Target" for post-development phosphorus loadings. Compensation for surplus phosphorus loadings is administered by the LSRCA under their *Phosphorus Offsetting Policy* (LSRCA, 2019b).

Ontario Water Resource Act (1990)

Under Section 34 of the OWRA, a PTTW is required from the MECP for any water taking that is greater than 50,000 L/day. For construction site dewatering or road construction, water takings of more than 50,000 L/day but less than 400,000 L/day may be registered on the Environmental Activity and Sector Registry (EASR) under O.Reg. 63/16: *Registrations Under Part II.2 of the Act – Water Taking*. Water takings during construction that will exceed more than 400,000 L/day will require a PTTW issued by the MECP as will water takings post-construction that will exceed 50,000 L/day.

O.Reg. 387/04: Water Taking and Transfer Regulation

O.Reg. 387/04 under the OWRA outlines prohibited water taking and transfer activities, which must be evaluated by the MECP prior to issuing a PTTW or applicants who are self-registering on the EASR. The regulation also clarifies which activities are exempt from water taking permit requirements and outlines the data collection and reporting commitments for PTTW and EASR registration holders. Any water taking activity that is regulated by the OWRA will need to be undertaken in accordance with O.Reg. 387/04.

The Clean Water Act (2006)

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 vulnerable areas for drinking water quality, i.e., Wellhead Protection Areas (WHPAs), Significant Groundwater Recharge Areas (SGRAs), Intake Protection Zones (IPZs) and Highly Vulnerable Aquifers (HVAs); and drinking water quantity, i.e., WHPA-Q1, WHPA-Q2 and IPZ-Q. Source Protection Plans were developed for all source protection regions in Ontario which outline the actual policies to be implemented by area municipalities in their development planning processes for the restriction, regulation, and prohibition of certain land use activities within vulnerable drinking water quality/quantity areas.

The Site is within the South Georgian Bay Lake Simcoe Source Protection Region and is subject to the source protection policies of the South Georgian Bay Lake Simcoe Source Protection Plan (SPP).

South Georgian Bay Lake Simcoe Source Protection Plan

Based on a review of the MECP Source Water Protection Information Atlas (MECP, 2020a), the Site is located within a WHPA-Q1, WHPA-Q2 and HVA areas. The Site is also shown to be partially within an IPZ-3 area for the Uxbridge Brook with a vulnerability score of 4.5, a WHPA-D, and an SGRA with a vulnerability score of 6 (MECP, 2020a).

Based on our review of the land-use policies of the SPP in context with the land uses activities proposed in the built-out condition of the Site, there are no restrictive land use policies under the SPP that are shown to apply, excepting LUP-12. Pursuant to LUP-12, proposals for major development shall maintain pre-existing annual groundwater recharge rates to the extent possible at the Site. A climate-based water balance was prepared to evaluate the Site's water balance and changes thereto, and is discussed later in this report.

The vulnerable drinking water areas of the SPP at and near the Site are presented in **Figure 2b**.

3 Regional Geological and Hydrogeological Understanding

3.1 Topography and Drainage

Regional topography slopes from the topographic highest associated with the Oak Ridges Moraine to the south, to the topographic lows of the Lake Simcoe shoreline in the north. The proposed development area of the Site, the eastern portion, slopes towards the southeast from approximately 299 m above sea level (asl) to 294 masl, with an approximate average elevation of 295 masl. A steep slope exists to the west of the proposed development area dropping down to an approximate elevation of 287 masl and remains relatively flat towards the western Site boundary.

A topographic map of the Site and surrounding area is shown in **Figure 3**. The Survey Plan dated June 24, 2020, prepared by H. F. Grander Co. Ltd. provides 1 m contours and mapped stream and pond locations and is included in **Appendix A.**

The Site is located within the Pefferlaw-Uxbridge Brook Subwatershed located in the Lake Simcoe basin and has an approximate drainage area of 466.2 km^2. The subwatershed traverses a distance of approximately 77 km from its headwaters in the wetland areas of the southern flank of the Oak Ridges Moraine to its discharge into Lake Simcoe in the north (LSRCA, 2012).

A tributary of Uxbridge Brook intersects the Site at the foot of the slope and drains via the Uxbridge Brook to Pefferlaw River and ultimately to Lake Simcoe. The tributary traverses through the Uxbridge Brook Headwater Wetland Complex which extends from the south to the north through the western portion of the Site. The Uxbridge Brook Headwater Wetland Complex is a registered Provincially Significant Wetland (PSW) according to the Ontario Wetland Evaluation System (OWES). Based on the topographic contours presented in **Appendix A**, the developable area of the Site is anticipated to drain to the east to Cemetery Road and is therefore not in the catchment area of the wetland.

3.2 Physiography

The Site is located within the Oak Ridges Moraine (ORM) physiographic region. The ORM was deposited approximately 12,000 to 13,000 years B.P. and is a prominent geological feature within the subwatershed. The deposits of the ORM generally consist of layers of sand and gravel. (Chapman and Putnam, 1984). Off of the topographic highs of the ORM and within the subwatershed, the physiography of the ORM physiographic region is described as consisting of surficial sand and gravel deposits; however, select areas may be characterized by thick deposits of silt covered in places by a relatively thin layer of till (LSRCA, 2012).

A physiographic map of the Site and the surrounding area is presented in **Figure 4**.

3.3 Surficial Geology

Surficial geology mapping by the OGS (2010), indicates that the Site is located within three distinct areas. The eastern half of the Site is characterized by ice-contact stratified deposits, which include deposits of sand and gravel with minor deposits of silt, clay and till. Organic deposits and older alluvial deposits are located in the current floodplain of the wetland and extend to the western Site boundary.

The surficial geology at the Site and in the surrounding area per the OGS (2010) is presented in **Figure 5**.

3.4 Bedrock Geology

Regional geological mapping from the OGS (Armstrong and Dodge, 2007), indicates that shale bedrock of the Blue Mountain Formation underlies the overburden soils in this area. The top of bedrock elevation is at approximately 179 masl at the eastern boundary to 184 masl at the western boundary (ORMGP, 2020).

The bedrock geology at the Site and in the surrounding area per the OGS is presented in **Figure 6**.

3.5 Hydrogeology

The current understanding of the regional hydrogeology is based on work completed by the York, Peel, Durham, Toronto and The Conservation Authorities Moraine Coalition (YPDT-CAMC) and made available through the ORMGP. The following discussion is based on information provided by Earthfx Inc. (2006) and the ORGMP (2020).

3.5.1 Hydrostratigraphy

The following hydrostratigraphic units overlie the bedrock (from youngest to oldest) in the area of the Site:

A. Recent Deposits
B. Halton Till (Aquitard)
C. Oak Ridges Moraine (Aquifer)
D. Newmarket Till (Aquitard)
E. Thorncliffe Formation (Aquifer)
F. Sunnybrook Drift (Aquitard)
G. Scarborough Formation (Aquifer)

A conceptualization of the regional hydrostratigraphy through the subwatershed in a west-east direction is depicted in **Figure 7**. The cross-section illustrates the hydrostratigraphic profile through the subwatershed which was adopted for regional groundwater flow modelling studies in the subwatershed (Earthfx, 2006). The section is offset from the Site by approximately 1.5 km north. A description of each hydrostratigraphic unit depicted in **Figure 7** is provided below:

- **Recent Deposits** – This unit consists of a thin veneer of glaciolacustrine deposits of fine sands, silts, and clays or modern alluvial or organic deposits. Locally, recent deposits can reach several meters thick; however, at the Site, this unit is interpreted to be present in limited amounts.
- **Halton Till** – The Halton Till was deposited approximately 13,000 years before present (B.P.) during the last glacial advance in the area. The Halton Till is comprised of sandy silt till to clayey silt till. The Halton Till is not expected to be present at the Site.
- **Oak Ridges Moraine** – The Oak Ridges Moraine Aquifer was deposited approximately 12,000 to 13,000 years B.P. Regionally, the aquifer is 160 km long and 5 to 20 km wide with a thickness of approximately 150 m. The unit consists of fine sands and silt materials, with coarse sand and gravel occurring locally. Based on ORMGP mapping, the Oak Ridges Moraine Aquifer is expected to be encountered at approximately 292 masl (3 mbgs) at the proposed development area at the Site.

- **Newmarket Till** – The Newmarket Till was deposited by the Laurentide ice sheet approximately 18,000 to 20,000 years B.P. It consists of mainly sandy silt to silty sand with limestone clasts. Discontinuous sand units up to 2 m thick may be present. The Newmarket Till formation is expected to be encountered at 269 masl (26 mbgs) at the proposed development area at the Site.

  As is illustrated in **Figure 7**, the Newmarket Till is shown in regional groundwater flow modelling to have been eroded glacial meltwater that incised a deep valley in the Uxbridge area. The valley was subsequently infilled by channel sediments described as fining upward sequences of sands and silt which were deposited progressively as the glacial meltwater erosional process subsided. The channel sediments are believed to provide a potential hydraulic connection to the deeper Thorncliffe Aquifer Formation (LSRCA, 2010).
- **Thorncliffe Formation** – The Thorncliffe Formation was deposited approximately 45,000 years B.P. and consists of glaciofluvial deposits of sand and silty sand. Regionally, it acts as an aquifer with variable grain size and thickness. Based on ORMGP mapping, the Thorncliffe Formation is estimated to be encountered at approximately 256 masl (39 mbgs) at the proposed development area at the Site.
- **Sunnybrook Drift** – The Sunnybrook Drift was deposited approximately 45,000 years B.P. It is interpreted to be a silt and clay formation with a thickness of 10 m to 20 m, where present. Based on the hydrostratigraphic section of **Figure 7**, the Sunnybrook Drift is expected to be present at the Site at an approximate elevation of 200 masl (95 mbgs).
- **Scarborough Formation** – The Scarborough Formation was deposited during the Wisconsin glaciation approximately 70,000 years to 90,000 years B.P. The Scarborough Formation is an aquifer of regional extent and it is interpreted to be a fluvial-deltaic system consisting of sand, silt, and clay deposits. The Scarborough Formation is estimated to be encountered at approximately 188 masl (107 mbgs) at the proposed development at the Site.

3.5.2 Groundwater Flow

At a regional scale, groundwater flows through the subwatershed from the topographic highs associated with the Oak Ridges Moraine, south of the Site, towards Lake Simcoe in the north. Regional shallow groundwater flow will be influenced by variations in surficial geological materials which offer limited recharge potential, and by the many watercourses that meander within the subwatershed and which are supported by groundwater discharge.

4 Local Geology and Hydrogeology

The current understanding of the Site geology and hydrogeology is based on the geotechnical and hydrogeological investigations conducted by TIL in 2020.

4.1 Overburden

The overburden encountered during TIL's drilling program was as follows: disturbed soil up to a depth of 0.15 mbgs, followed by sand and silt textured deposits to the terminal depths of the investigation of 12.65 mbgs. The sand and silt textured deposits are described as silty sand, sandy silt, and sand in the borehole logs. The borehole logs included in TIL's geotechnical investigation are attached as **Appendix B**.

For the purposes of Low Impact Development (LID) design, in-situ infiltration testing will be undertaken in a spring monitoring season in areas of proposed infiltration LIDs once these are identified at a later stage in the Site's design. The results of this testing will be provided under a separate cover.

4.2 Bedrock

Bedrock was not encountered at the terminal depth of 12.65 mbgs. Bedrock is expected to be encountered at approximately 180 masl (~115 mbgs).

4.3 Groundwater Conditions

4.3.1 On-Site Monitoring Network

The location of the monitoring well included in the current investigation are illustrated together with static water level elevations from a monitoring event on January 5, 2021, in plan view and in a west-east oriented cross-section in **Figure 8** and **Figure 9**, respectively. A summary of the monitoring well construction details is provided in **Table 4-1**.

Table 4-1 Monitoring Well Construction Details

Well ID	Ground Elevation	Screen Interval	Well Diameter	Screen Length	Screened Unit
	(masl)	(mbgs / masl)	(m)	(m)	
20BH-1(MW)	296.20	9.25 - 12.30 /286.95 - 283.90	0.051	3.048	Sand / Sandy Silt
20BH-3(MW)	295.95	3.05 - 6.10 / 292.90 - 289.85	0.051	3.048	Silty Sand
20BH-4(MW)	299.00	3.05 - 6.10 / 295.95 - 292.90	0.051	3.048	Sandy Silty / Silty Sand
20BH-5(MW)	296.30	3.05 - 6.10 / 293.25 - 290.20	0.051	3.048	Silty Sand / Sand

4.3.2 Groundwater Levels

A summary of static water level measurements is presented in **Table 4-2** in mbgs and **Table 4-3** in masl, respectively. Groundwater level measurements are presented for December of 2020 to January of 2021.

Based on current monitoring results, the shallow monitoring wells at the Site, including 20BH-3(MW), 20BH-4(MW) and 20BH-5(MW), were reported as dry in all cases and have therefore not intersected the groundwater table at the Site in their area of installation. Groundwater elevations

from the single deep monitoring well, 20BH-1(MW), were reported in both monitoring events presented, including the current high of 284.32 masl at this location on January 5, 2021.

It should be noted that the shallow groundwater table at the Site will fluctuate coincidentally with seasonal trends in precipitation and snowmelt, which both supply recharge to the groundwater system. Correspondingly, the groundwater table is typically highest in the spring, when recharge is higher, and lowest in the summer and late fall/early winter when recharge is lower. The variability as a cause of recharge can vary from 1 m to 3 m throughout the year. Variability in groundwater levels is Site-specific and is influenced by several factors, including geography, underlying soil types and their hydraulic properties, and connectivity to surrounding surface water features. Due to the prominent wetland feature to the west, it is expected that the shallow groundwater system discharges to the adjacent wetland areas and maintains water levels within the existing pond on-Site. Therefore, the groundwater table may vary only slightly from the surface water levels in the pond on-Site, which is estimated at approximately 285 to 286 masl.

A long-term groundwater level monitoring program is underway at the Site to capture the seasonal variability in the shallow groundwater system and to determine the high groundwater level for this Site. The results of long-term monitoring will be reported in a future revision of this report.

Table 4-2 Groundwater Levels (mbgs)

Well ID	Screen Interval	7-Dec-20	5-Jan-21
20BH-1(MW)	9.25 - 12.3	11.92	11.88
20BH-3(MW)	3.05 - 6.1	Dry	Dry
20BH-4(MW)	3.05 - 6.1	Dry	Dry
20BH-5(MW)	3.05 - 6.1	Dry	Dry

Note – water levels measured from existing ground surface

Table 4-3 Groundwater Elevations (masl)

Well ID	Screen Interval	7-Dec-20	5-Jan-21
20BH-1(MW)	286.95 - 283.90	284.28	284.32
20BH-3(MW)	292.90 - 289.85	Dry	Dry
20BH-4(MW)	295.95 - 292.90	Dry	Dry
20BH-5(MW)	293.25 - 290.20	Dry	Dry

4.3.3 Hydraulic Conductivity

Due to dry or otherwise low water column conditions in the monitoring wells, in-situ single well response testing could not be completed for inclusion in the current report. Instead, an estimate of the hydraulic conductivity of underlying soils was prepared using the Hazen (1911) method with grainsize analyses from samples collected on-Site. In-situ single well response testing will be completed during the long-term monitoring program as conditions allow and reported in a future revision of this report.

The Hazen (1911) method provides an estimate of the isotropic permeability of the fine-grained fraction (D10) of a disturbed soil sample. Originally applied in groundwater studies for estimating permeabilities of clean sands, the results of this analysis can be used to estimate permeabilities for other materials as well, recognizing that the results may not be representative of in-situ conditions for all soil types and potentially representative of only a localized volume of soil.

The corresponding analyses are presented in **Appendix C**. A summary of hydraulic conductivities is presented in **Table 4-4**.

Table 4-4 Summary of Hydraulic Conductivity Calculations

Well/Borehole ID	Borehole Depth Analyzed (mbgs)	Material Tested	Hazen Method K (m/s)
20BH-1(MW)	9.1	Sand	2.9×10^{-6}
20BH-3(MW)	1.5	Silt	4.4×10^{-7}
20BH-5(MW)	2.3	Sandy Silt	6.8×10^{-7}

The results of the laboratory testing showed that the hydraulic conductivity ranged between 4.4×10^{-7} and 2.9×10^{-6} m/s for the depths tested. The range in reported results falls within the expected range of hydraulic conductivity for sand, silt, and sandy silt materials, which is generally between 10^{-6} to 10^{-12} m/s (Freeze and Cherry, 1979).

4.3.4 Groundwater Flow

Locally, groundwater is anticipated to be influenced by the presence of surface water features of the Uxbridge Brook, which transects the Site at the base of the slope. Based on the topographic relief observed towards the pond and the understanding of local hydrostratigraphy and regional drainage patterns, it is anticipated that a portion of groundwater flow will converge locally at the Uxbridge Brook on-Site.

The available data is incomplete with respect to spatial variation in the shallow groundwater system and therefore a quantitative characterization of shallow groundwater flow at the Site cannot be completed at this time. The local groundwater flow direction will be determined using the results of the long-term monitoring program in a future revision of this report.

4.3.5 Groundwater Quality

Unfiltered groundwater quality samples were collected from 20BH-1(MW) on January 5, 2021. Subsequent samples were collected on January 12, 15, and 29, 2021, due to low water levels and slow water level recovery rates in order to complete sampling for the full suite of parameters. The collected samples were sent to SGS Environmental Services (SGS), in Lakefield, Ontario for analysis. The sample results are compared to Durham Region By-Law Number 55-2013, Table 1 – Limits for Sanitary Sewer Discharge and Table 2 – Limits for Storm Sewer Discharge in **Table 4-5**. The laboratory certificates of analyses are provided in **Appendix D**.

Based on laboratory analyses, the groundwater quality meets the discharge criteria for *Table 1 sanitary sewer limits* of the *Durham Region By-Law Number 55-2013,* except for TSS. However, considering the conditions under which the well was sampled, it is anticipated that the elevated concentration of TSS is not representative of raw groundwater quality but rather of sediment suspended in the water column during sampling. With regard to the Table 2 storm sewer limits of the *Durham Region By-Law Number 55*-2013, analytical water quality results suggest that manganese (total), phosphorus (total), zinc (total) and Total Kjeldahl Nitrogen are present in the groundwater in concentrations above the discharge criteria.

Table 4-5 Groundwater Quality Results

Sample ID	Units	Durham By-law 55-2013 Table 1 (Sanitary) Limit	Durham By-law 55-2013 Table 2 (Storm) Limit	RL	20BH-1(MW)
E. Coli	cfu/100mL	---	200	2	0*
pH	no unit	6.0-10.5	6.0-9.0	0.05	7.37**
Biochemical Oxygen Demand (BOD5)	mg/L	300	15	2	<4**
Total Suspended Solids	mg/L	350	15	2	616**
Fluoride	mg/L	10	---	0.06	<0.06
Cyanide (total)	mg/L	2	0.02	0.01	<0.01
Total Kjeldahl Nitrogen	as N mg/L	100	1	0.5	2.5*
4AAP-Phenolics	mg/L	1	0.008	0.002	<0.002*
Sulphate	mg/L	1500	---	2	5
Oil & Grease (animal/vegetable)	mg/L	150	---	4	NA
Oil & Grease (mineral/synthetic)	mg/L	15	---	4	NA
Mercury (total)	mg/L	0.01	0.0004	0.00001	<0.00001
Aluminum (total)	mg/L	50	---	0.001	10.9
Antimony (total)	mg/L	5	---	0.0009	<0.0009
Arsenic (total)	mg/L	1	0.02	0.0002	0.0036
Cadmium (total)	mg/L	0.7	0.008	0.000003	0.000135
Chromium (total)	mg/L	2	0.08	0.00008	0.0210
Copper (total)	mg/L	3	0.05	0.0002	0.0236
Cobalt (total)	mg/L	5	---	0.000004	0.00913
Lead (total)	mg/L	1	0.12	0.00001	0.0113
Manganese (total)	mg/L	5	0.15	0.00001	0.954
Molybdenum (total)	mg/L	5	---	0.00004	0.00320
Nickel (total)	mg/L	3	0.08	0.0001	0.0196
Phosphorus (total)	mg/L	10	0.4	0.003	0.613
Selenium (total)	mg/L	1	0.02	0.00004	0.00013
Silver (total)	mg/L	5	0.12	0.00005	<0.00005
Tin (total)	mg/L	5	---	0.02	0.0102
Titanium (total)	mg/L	5	---	0.00005	0.476
Zinc (total)	mg/L	2	0.04	0.002	0.055
Polychlorinated Biphenyls (PCBs) - Total	mg/L	0.001	0.0004	0.0001	NA
Benzene	mg/L	0.01	0.002	0.0005	<0.0005
Chloroform	mg/L	0.04	0.002	0.0005	<0.0005
1,2-Dichlorobenzene	mg/L	0.05	0.0056	0.0005	<0.0005
1,4-Dichlorobenzene	mg/L	0.08	0.0068	0.0005	<0.0005

cis-1,2-Dichloroethene	mg/L	4	0.0056	0.0005	<0.0005
trans-1,3-Dichloropropene	mg/L	0.14	0.0056	0.0005	<0.0005
Ethylbenzene	mg/L	0.16	0.002	0.0005	<0.0005
Methylene Chloride	mg/L	2	0.0052	0.0005	<0.0005
1,1,2,2-Tetrachloroethane	mg/L	1.4	0.017	0.0005	<0.0005
Methyl ethyl ketone	mg/L	8	---	0.02	<0.02
Styrene	mg/L	0.2	---	0.0005	<0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	1	0.0044	0.0005	<0.0005
Toluene	mg/L	0.27	0.002	0.0005	<0.0005
Trichloroethylene	mg/L	0.4	0.008	0.0005	<0.0005
Xylene (total)	mg/L	1.4	0.0044	0.0005	<0.0005
di-n-Butyl Phthalate	mg/L	0.08	0.015	0.002	NA
Bis(2-ethylhexyl)phthalate	mg/L	0.012	0.0088	0.002	NA
Nonylphenol	mg/L	0.02	---	0.001	NA
Nonylphenol Ethoxylates	mg/L	0.2	---	0.01	NA

Notes:

1. RL: the laboratory reportable limit for the analysis
2. Yellow shaded cells indicate an exceedance of Durham Region By-Law 55-2013, Table 2 criteria.
3. Red shaded cells indicate an exceedance of both Table 1 and Table 2 criteria.
4. *Sample January 12, 2021
5. ** Sample January 15, 2021
6. NA indicates sample results not available at time of writing

5 Dewatering Estimates

The townhouses are each assumed to have a basement foundation of approximately 3 mbgs. Additionally, it is expected that water and wastewater services for the development will be installed within a depth of approximately 4 mbgs.

Based on the highest groundwater level observed on-site of 11.88 mbgs on January 5, 2021, at 20BH-1(MW); therefore, there is anticipated to be no requirement for dewatering during construction or in Site occupancy at this time.

Should substantial changes occur in the engineering plans for the Site prior to construction or the results of the long-term monitoring program suggest a groundwater table is present within the anticipated depth of excavation during construction, the conclusions made concerning the potential need for groundwater dewatering should be re-evaluated.

6 Water Balance Analysis

6.1 Proposed Water Balance Approach

At the time of reporting, the details of the Site's stormwater management system were not available. As such, the current climate-based water balance has been completed for the pre-development and post-development conditions, considering only the land cover categories of pervious or impervious and does not consider the influence of Low Impact Developments (LIDs) in facilitating attenuation of runoff for supplemental infiltration.

The water balance analysed the area to the east of the top-of-bank where alterations to the Site will occur and where construction of the townhouses will take place, herein referred to as the development area. It does not include the area to the west of the development area as it is understood that no alterations will be made to this area and it will be severed into a single lot under the Plan of Subdivision and sold. There are anticipated to be no changes to the water balance for the areas west of the development area.

The development area was sub-divided into pervious and impervious catchment areas based on the existing and proposed land cover as illustrated in the Draft Plan of Subdivision that was referenced in this report and which is provided in **Appendix A**. The current water balance analysis evaluates the impact of urbanization on current conditions and highlights a potential infiltration deficit which shall require mitigation to comply with the water balance requirements of the regulatory documents listed in **Section 2**.

The water balance should be refined at the Site Plan stage once further details of the design are available and shown to be different from the assumptions made for the current analysis. This will include changes in grading and landscape and streetscape design. It is anticipated that the design of the stormwater management system and LID mitigation plan will also be made available at this stage and that the pertinent details of each can be incorporated into the water balance.

Details of the water balance analysis are presented in **Appendix E**. The pre-development and post-development catchment areas are illustrated in **Figure 10** and **Figure 11**, respectively

6.2 Water Balance Analysis Methodology

A water balance analysis was prepared using the Thornthwaite and Mather (1957) water balance method outlined in *Chapter 3 of the MOECC's SWM Planning and Design Manual* (MOECC, 2003) and the LSRCA Hydrogeological Assessment Submission Guidelines (2013). The water balance method accounts for evapotranspiration, infiltration, and runoff volumes based on soil types, vegetation cover, topography, and precipitation for pre-development and post-development conditions.

The water balance equation represents an accounting system for the quantity and distribution of water within a given area. The water balance equation tracks all inputs and outputs of the system and is represented as follows:

$$P = R + I + ET$$

where:

P is total precipitation
R is the total runoff
I is the total infiltration
ET is the potential evapotranspiration

The total precipitation and other pertinent climatic details for the water balance can be obtained from a single meteorological station using the nearest neighbour approach. The Udora climate station (ID# 6119055), located south of Ravenshoe Road and east of Lakeridge Road in Udora, ON, is the closest meteorological station to the Site at 19.04 km. Data collected from this station over 30 year intervals is hosted by Environment Canada as Climate Normals and represents the average of all climate variables which are relevant to the water balance calculation. Therefore, the Climate Normals data from the Udora climate station, for the period from 1981 to 2010, were obtained from Environment Canada and used in the water balance analysis.

The water surplus (R+I) is the amount of water available in a given month to infiltrate, runoff, or recharge. The individual components of water surplus, runoff, and infiltration were determined using a set of infiltration factors. The infiltration factors depend on the land topography, the soil type, and the land cover of an area. The infiltration factors are multiplied by the estimated annual water surplus to determine the components of runoff and infiltration within each catchment. For this water balance analysis, the percentage of precipitation lost to evapotranspiration from impervious surfaces was considered to be 10%.

The Thornthwaite Equation (1948) was used to estimate the monthly potential evapotranspiration and is based on the average length of a day in a month, the average number of days in that month, and the average daily temperature in that month and is adjusted using a daylight correction factor to account for varying lengths of daylight throughout the year.

The pre-development and post-development conditions for the water balance have the Site subdivided into the following discrete catchment areas:

Pre-development:

- S1: Grass Area
- S2: Impervious Area

Post-development:

- S1: Grass Area
- S2: Paved Area
- S3: Building Area

With respect to the development area, the existing ground cover consists of a driveway servicing an existing dwelling, as well as sodded areas and amenities associated with the existing dwelling. The pre-development area is currently occupied by one residential dwelling and associated driveway as well as associated accessory buildings and amenities. In the pre-development scenario, the impervious percentage for S1 – Grass Area is assumed to be 0% while the S2 – Paved Area is assumed to be 100%. In total, the pre-development scenario had an impervious land area percentage of 10%.

In the post-development scenario, the impervious percentage for S1 – Grass Area is assumed to be 0%, and the S2 – Paved Area and S3 – Building Area are each assumed to have an impervious percentage of 100%. In total, the post-development scenario had an impervious land area percentage of 60%.

Infiltration factors for each catchment area were selected from the *MOECC SWM Planning and Design Manual (2003) Table 3.1*. A summary of the infiltration factors used in this water balance is presented in **Table 6-1**.

Table 6-1 Inputs to the Water Balance Analysis

Area ID			Area (m^2)	MOECC Infiltration Factors	Runoff Factors
Pre-Development	S1	Grass Area	7,118	0.5	0.5
	S2	Paved Area	852	0	0.9*
Post-Development	S1	Grass Area	3,155	0.6	0.4
	S2	Paved Area	2,290	0	0.9*
	S3	Building Area	2,525	0	0.9*

Notes:
1. * Assuming 10% lost to evapotranspiration on impervious surfaces.

6.3 Water Balance Calculation

Pre- and Post-Development Without Mitigation

Based on the water balance calculations for the pre-development conditions, infiltration represents 15% of the total precipitation, runoff represents 24% of the total precipitation and evapotranspiration represents 61% of the total precipitation. The estimated pre-development annual infiltration rate for the proposed development area is approximately 1,047 m^3/year.

The post-development water balance without mitigation showed an increase in surface runoff and reductions in evapotranspiration and infiltration due to an increase in impervious area. In the post-development scenario, infiltration represents 8% of the total precipitation, runoff represents 60% of the total precipitation, and evapotranspiration represents 32% of the total precipitation. Based on the water balance analysis, the estimated overall infiltration rate in the post-development scenario without mitigation is approximately 557 m^3/year. The corresponding post-development infiltration deficit, assuming no mitigation, is approximately 490 m^3/year, which represents a negative change of 47% from pre-development infiltration.

A summary of the results of the water balance analysis is provided in **Table 6-2**.

Table 6-2 Water Balance Summary

Scenario	Total Infiltration (m^3/yr)	Total Runoff (m^3/yr)	Total Evapotranspiration (m^3/yr)	Total Infiltration Deficit (m^3/yr)
Pre-Development	1,047	1,726	4,290	0
Post-Development (without mitigation)	557	4,212	2,295	490

Based on the results of this water balance analysis without mitigation, it is anticipated that the post-development infiltration deficit will be present. Therefore, post-development mitigation will be required to meet the groundwater recharge objectives of the SGBLS SPP LUP-12.

7 Phosphorus Balance Analysis

7.1 Phosphorus Balance Analysis Methodology

A phosphorus balance analysis was prepared using the *Phosphorus Budget Tool in Support of Sustainable Development for the Lake Simcoe Watershed* (the Tool) (MOECC, 2012). The Tool, which can be used to estimate phosphorus loadings for development applications in the Lake Simcoe Watershed, was developed in response to a "no net increase" in phosphorus target initiated by the establishment of the LSPP policy 4.8e. The target for this phosphorus balance, and for the design of stormwater treatment at the Site, will be a net-zero post-development total phosphorus export in accordance with the requirements of the LSRCA's *Phosphorus Offsetting Policy* (LSRCA, 2019b) "Zero Export Target".

The Tool provides a standardized approach across all subwatersheds for estimating the phosphorus loading from stormwater runoff in pre-development and post-development scenarios for new developments in the Lake Simcoe Watershed. The Tool uses an Export Coefficient Modelling approach to facilitate direct evaluation and comparison of phosphorus loadings between pre-development and post-development stages of development.

The Export Coefficient Modelling approach is based on the idea that the physical characteristics and land uses for a property dictate, and can be associated with known quantities of phosphorus loads or "exports" which have been pre-determined by extensive literature review in the development of the Tool. The phosphorus loading equation used in the pre-development and post-development scenarios is represented as follows:

$$L = \sum E_i \times A_i$$

Where:

L is the total estimated phosphorus loading in kg/yr;
E_i is the export coefficient for land use *i*; and
A_i is the area over which land use *i* applies.

7.2 Phosphorus Balance Calculation

The inputs to the Tool include land-uses and corresponding phosphorus export coefficients, which are prescribed in the Tool for the Pefferlaw-Uxbridge Brook and are outlined in the accompanying documentation for the Tool in *Table 1. Description of Berger (2010) Land Uses in the Lake Simcoe Watershed* and *Table 2. Land-Use Specific Phosphorus Export Coefficients (kg/ha/yr) for Lake Simcoe Subwatersheds*, respectively.

The Site was assigned a land-use classification of Low-Intensity (Residential) in the pre-development condition, and High-Intensity Development (Residential) in the post-development condition. The development area in the pre-development and post-development scenarios was subdivided into the land-uses and assigned the export coefficients outlined in **Table 7-1**.

The phosphorus balance analysis is presented in **Appendix F**. The pre-development and post-development land uses for the phosphorus balance are illustrated in **Figure 12** and **Figure 13**, respectively.

Table 7-1 Inputs to the Phosphorus Balance Analysis

Scenario	Land Use	Percentage of Site Area	Phosphorus Export Coefficient (E_i)	Area (A_i)	
			(kg/ha/yr)	ha	m^2
Pre-Development	Low Intensity Development	100%	0.13	0.797	7,970
Post-Development	High Intensity Development	100%	1.32	0.797	7,970

7.3 Phosphorus Balance Summary

Based on the outputs of the Tool for the phosphorus balance analysis without mitigation, the pre-development scenario had a phosphorus loading of 0.10 kg/year, and the post-development scenario without mitigation had a phosphorus loading of 1.05 kg/year. A summary of the phosphorus balance analysis is provided in **Table 7-2**.

Table 7-2 Phosphorus Balance Summary

Scenario	Land-Use	Area (ha)	Export Coefficient (kg/ha/yr)	Total Residual Phosphorus Loading (kg/yr)
Pre-Development	Low Intensity Development	0.797	0.13	0.10
Post-Development	High Intensity Development	0.797	1.32	1.05

Since the LSRCA's *Phosphorus Offsetting Policy* (LSRCA, 2019b) "Zero Export Target" for post-development phosphorus loadings is not achieved, additional on-Site mitigation to reduce post-development phosphorus loadings to zero is required. Further consultation with the LSRCA is recommended for Site-specific mitigation strategies.

Similar to the water balance, the phosphorus balance should be refined at the Site Plan stage to incorporate options for phosphorus treatment within the proposed stormwater management system.

8 Potential Receptors and Impacts

8.1 Potential Receptors

As part of this program, potential groundwater receptors including domestic or permitted water supplies were identified. Additionally, the surrounding area was evaluated for potential ecological receptors to construction activities including dewatering.

An understanding of typical groundwater usage in the area was obtained by:

- Querying MECP Water Well Information System (WWIS) (2020b) within a 500 m radius of the Site;
- Querying MECP PTTW records (2020c) within a 500 m radius of the Site; and
- Reviewing the MNRF (2020) Natural Heritage Areas mapping portal to identify potential ecological receptors within a 500 m radius of the Site.

8.1.1 MECP Water Well Record Search

A search of the MECP (2020b) WWIS was conducted within a 500 m radius of the Site boundary. The search results returned a total of 65 well records within the search area. The Site and surrounding areas have municipal water supplies available for use. However, the rural residential properties along Cemetery Road are anticipated to be serviced by private groundwater wells.

Well usage details are summarized in **Table 8-1**. **Appendix G** provides the list of MECP water well records returned by the search. **Figure 14** shows the location of MECP water well records within the 500 m search radius.

Table 8-1 Water Well Records within 500 m Buffer

Primary Well Use	Number of Wells within 500 m Buffer of Study Area	Percentage of Total
Water Supply - Domestic	20	31%
Water Supply – Livestock/Irrigation	10	15%
Water Supply – Commercial/Industrial	2	3%
Test Hole/Monitoring	22	34%
Abandoned/Unknown	11	17%
Total	65	100%

Water supply wells comprise 49% of all well records found within a 500 m buffer of the Site, including 31% for domestic supply. The records show that these wells were installed between 1961 and 2014 and, considering surrounding rural residential land uses, are presumed to be active. The municipal water supply in Uxbridge is also sourced from groundwater. The nearest municipal well, Well #6, is located approximately 1.1 km to the northeast and is screened at approximately 58.2 mbgs. Municipal water is available near the Site; however, the lots on Cemetery Road are not observed to be connected.

8.1.2 Permitted Water Users

A search was conducted of the MECP (2020c) PTTW database to identify the permitted groundwater takers within 500 m of the Site boundary. There are no active groundwater PTTWs currently identified within the search area.

8.1.3 Ecological Receptors

Based on a review of MNRF's Natural Heritage Areas mapping portal (MNRF, 2020), the Site is not located within 500 m of Areas of Natural Scientific Interest (ANSI); however, a tributary of the Uxbridge Brook intersects the Site. The Site is bordered by woodlands and the Uxbridge Brook Headwater Wetland Complex, a designated PSW in Ontario. Development is anticipated to occur approximately 100 m from the approximate delineated area of the PSW (MNRF, 2020). It is understood that an Environmental Impact Study (EIS) is required to evaluate the habitat and sensitive receptors associated with the PSW (LSRCA, 2020). It is our understanding that the proposed development area does not currently drain toward the PSW, therefore the hydrological inputs to the wetland are not anticipated to be impacted by development. The Site is not known to be within an Ecologically Significant Groundwater Recharge Area (ESGRA). Based on reverse particle tracking analyses, the PSWs in the subwatershed have an estimated travel time for recharge of approximately 10 years (LSRCA, 2012). These initial conclusions should be confirmed following the EIS.

A map of the ecological receptors was presented in **Figure 2a**.

8.2 Vulnerable Drinking Water Areas

Based on a review of the source water protection mapping, the proposed development is located within a WHPA-D area associated with Uxbridge Drinking Water System Well #6 as well as within an SGRA and designated WHPA-Q1 and WHPA-Q2 areas and HVA areas. The vulnerable drinking water areas were presented in **Figure 2b**.

As the Site is located within a Recharge Management Area (WHPA-Q2) and SGRA, it will be necessary to demonstrate that there will be no significant reductions to groundwater recharge that may impact drinking water quantity.

9 Impact Assessment and Mitigation

9.1 Potential Short-Term Impacts

Groundwater System

Impacts to the groundwater system during construction can include a temporary lowering of the groundwater table during construction dewatering or the introduction of contamination to the groundwater system through a reduction in ground cover and exposed native soils nearer to the groundwater table which are susceptible to dry and wet weather spills. Based on the current findings of this investigation, no groundwater dewatering is anticipated during construction. However, construction Site's may store potential sources of contamination in the short-term and the release of these to the exposed ground can contribute to groundwater contamination.

A Spill Prevention and Response Plan is recommended during construction to mitigate potential spills and it is recommended that potentially hazardous materials be stored in designated areas with appropriate containment as well as away from areas of high vehicle traffic. Assuming protocols are in place for managing construction related sources of groundwater contamination, no short-term impacts to the groundwater system are anticipated.

Surface Water System

Short-term impacts to the surface water system include changes in the hydrologic regime caused by land grading changes or the deposition of sediment, hazardous materials, or other deleterious substances into waterbodies and watercourses. As the development area is adjacent to a slope which drains into an existing pond as well as a PSW, mitigation of potential impacts to the surface water system is warranted during construction.

Potential impacts are anticipated to be effectively mitigated where a Site-specific Spill Prevention and Response Plan as well as an Erosion and Sediment Control (ESC) Plan are in place. Routine monitoring of ESC measures will ensure the form and function of these controls in preventing off-Site impacts to the sensitive surface water system adjacent to the Site. No unacceptable impacts to the surface water system during construction are anticipated.

Other Groundwater Users

Impacts to other groundwater users include impacts to both the quantity and quality of groundwater available to private water supplies as well as permitted groundwater takers through the reduction in recharge or introduction of contamination to the water supply aquifer.

In the short-term, no groundwater takings within the development area are proposed nor are unacceptable losses to groundwater recharge anticipated. Therefore, no impacts to the quantity of groundwater available are anticipated. Impacts from contamination are expected to mitigable where a Spill Prevention and Response Plan is in place and protocols for the storage and use of potential sources of contamination are followed. Correspondingly, no unacceptable impacts to other groundwater users during construction are expected.

9.2 Potential Long-Term Impacts

Groundwater System

Long-term impacts to the groundwater system include reductions in annual recharge which have a compounding effect on groundwater levels as well as from land-uses where high-risk activities are proposed, including, for example, industrial and commercial areas where hazardous materials may be stored/used, where hazardous waste is generated, and where significant quantities of road salt are used for winter ice management.

Based on the preliminary results of the water balance analysis, it is anticipated that an infiltration deficit will be realized following construction due to the increase in impervious area. However, with the implementation of LIDs, it is expected that the infiltration deficit can be effectively mitigated. Therefore, the influence of LIDs within the water balance should be investigated further once these details are available.

The development area will be occupied for high-density residential purposes, which, as it concerns the groundwater system, is generally associated with low-risk activities. As the Site is nearby a municipal well, it is recommended that “Smart About Salt” contractors and best management practices related to de-icing and snow management are used as part of the long-term occupancy of the Site.

Based on the current findings of this investigation, no unacceptable impacts to the groundwater system which cannot be mitigated are anticipated.

Surface Water System

Potential long-term impacts to the surface water system can include reductions in the catchments which are tributary to the system as well as reductions in groundwater recharge where the groundwater contributes baseflow in the system or supports ecologically sensitive habitats in the system.

It is our understanding that the proposed development area does not currently drain toward the sensitive surface water areas to the west and outside the development area; therefore, the hydrologic inputs to the wetland are not anticipated to be impacted by development. Further, the Site is not known to be within an ESGRA. As a result of the foregoing, unacceptable long-term impacts to the surface water system with respect to the quantity of inputs to the system are not expected. These initial conclusions should be confirmed following the EIS.

Based on the current findings of the phosphorus balance analysis, there will be a surplus in phosphorus loadings from the Site following development. However, an analysis could not be completed at this time to account for stormwater treatment which will be provided by the stormwater management system. Therefore, the influence of LIDs in providing effective removal of phosphorus from surface runoff should be investigated further once these details are available.

Potential Long-Term Impacts to Other Groundwater Users

As no long-term water takings from local water supply aquifers are required in the long-term and no reductions in groundwater recharge to the local water supply aquifers are expected following the implementation of LIDs, no unacceptable long-term impacts to other groundwater users identified in this investigation are expected.

10 Summary

A summary of the hydrogeological investigation, completed in support of the proposed development at 150 Cemetery Road, Uxbridge, Ontario, is included below:

- The Site falls within the Lake Simcoe and Couchiching/Black River Source Protection Area. Vulnerable drinking water areas at the Site and in the near surrounding area include WHPA-Q1 and WHPA-Q2, a WHPA-D area, an SGRA, an HVA area and an IPZ-3 area.
- The Site is located within the Pefferlaw-Uxbridge Brook Subwatershed of the Lake Simcoe Watershed, which is under the jurisdiction of the LSRCA. The Site is partially located in an LSRCA regulated area. A permit from the LSRCA will be required for construction in these areas.
- A Provincially Significant Wetland associated with the Uxbridge Brook Headwater Wetland Complex is located to the west and within 120 m of the development. A tributary of Uxbridge Brook traverses through the wetland area in a south to north direction and there is an existing natural pond adjacent to the wetland as well. The wetland is not anticipated to receive significant inputs from infiltration or runoff within the development area. It is understood that an EIS will be completed and therefore the findings from that study should be consulted for potential connectivity of the development area to the wetland or corresponding options for mitigation of potential impacts.
- The proposed development area of the Site slopes towards the southeast from approximately 299 masl to 294 masl. A steep slope exists to the west of the proposed development area dropping down to an approximate elevation of 287 masl and remains relatively flat towards the western Site boundary.
- The Site is situated in the Oak Ridges Moraine (ORM) physiographic region. In the area of the Site, this physiographic region is characterized by a thick deposit of silt overlain by a relatively thin layer of glacial till sediments.
- The overburden material consists of soil up to a depth of 0.15 mbgs, followed by sand and silt textured deposits to the terminal depth of investigation, 12.65 mbgs. The sand and silt textured deposits are described as silty sand, sandy silt, and sand.
- Groundwater levels have been monitored at the Site between December of 2020 to January of 2021, including at least two weeks after installation. Current monitoring results from the shallow wells at the Site (6.55 mbgs) did not suggest that the shallow groundwater table is present within this depth from the ground surface in the development area. However, monitoring results from a deep well (12.65 mbgs), do suggest that the groundwater table was encountered at an approximate elevation of 284.32 masl. Based on the conceptual hydrogeological model for the Site, the shallow groundwater table at the Site is not expected to vary significantly from the surface water levels in the existing pond down gradient. A long-term monitoring program is currently underway and will investigate the shallow groundwater system and corresponding variability further.

- Based on the estimates of hydraulic conductivity using the results of grain-size analysis from samples collected in the field, the hydraulic conductivity of the sand and silt textured overburden is anticipated to range between 10^{-7} and 10^{-6} m/s.
- Based on laboratory analyses, the groundwater quality meets the discharge criteria for *Table 1 sanitary sewer limits* of the *Durham Region By-Law Number 55-2013,* except TSS. However, considering the conditions under which the well was sampled, it is anticipated that the elevated concentration of TSS is not representative of raw groundwater quality but rather of sediment suspended in the water column activated during sampling. Concerning the *Table 2 storm sewer limits* of the *Durham Region By-Law Number 55*-2013, analytical water quality results suggest that manganese (total), phosphorus (total), zinc (total) and Total Kjeldahl Nitrogen are present in the groundwater in concentrations above the discharge criteria.
- Based on current groundwater levels and the anticipated depths of excavations required for construction, dewatering of groundwater is not anticipated in the short-term or in the long-term.
- The water balance analysis presented in this report determined a potential post-development infiltration deficit of approximately 490 m^3/year, without mitigation. Therefore, to determine the potential future infiltration deficit following development, the current water balance should be revised once an approach to mitigation has been prepared by the incumbent stormwater engineer.
- A phosphorus balance analysis presented in this report determined a potential post-development phosphorus loading of approximately 1.05 kg/year, without mitigation. Therefore, to determine the potential future phosphorus loadings, the current phosphorus balance should be revised once an approach to mitigation has been prepared by the incumbent stormwater engineer.
- A review of the MECP WWIS for the area within a 500 m radius of the Site identified a total of 32 records for water supply of some kind, including 20 for domestic water supply. The records for domestic water supply wells suggest that the wells were installed between 1961 and 2014 and, considering surrounding rural residential land uses, they are presumed to be active.
- A site-specific Spill Prevention and Response Plan, as well as a site-specific ESC Plan, are recommended during construction. Where well designed and implemented environmental management plans are in place, unacceptable short-term impacts to the environment are not expected.
- Potential long-term impacts to the groundwater system and surface water system identified in this investigation are anticipated to be mitigated following the implementation of LIDs designed to infiltrate and treat stormwater runoff from the Site. Therefore, unacceptable long-term impacts to the groundwater system and surface water system are not expected following development.

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York, Peel, Durham, Toronto and The Conservation Authorities Moraine Coalition (YPDT-CAMC). 2006. Groundwater Modelling of the Oak Ridges Moraine Area. CAMC-YPDT Technical Report # 01-06. Prepared by Earthfx Inc.

12 General Statement of Limitation

The comments presented in this report are based on the soil and groundwater samples gathered from the borehole/monitoring well locations indicated on the plan of this report. There is no warranty expressed or implied or representations made by Toronto Inspection Ltd. that this program has discovered all potential environmental risks or liabilities associated with the subject site.

Although we consider this report to be representative of the subsurface conditions at the subject property in the areas investigated, any interpretation of factual data or unexpected soil conditions which exhibit noticeable discolouration, odour, etc. in areas not investigated in this report, should be discussed in consultation with us prior to any initiation of activity. Our responsibility is limited to an accurate assessment of the soil condition prevailing at the locations investigated at the time of the study.

To the fullest extent permitted by law, the client's maximum aggregate recovery against Toronto Inspection Ltd., its directors, employees, sub-contractors and representatives, for any and all claims by Coral Creek Homes for all causes including, but not limited to, claims of breach of contract, breach of warranty and/or negligence, shall be the amount of fees paid to Toronto Inspection Ltd. for its professional engineering services rendered with respect to the particular site which is the subject of the claim by the client.

Any use and/or interpretation of the data presented in this report, and any decisions made on it by the third party are responsibility of the third party. Toronto Inspection Ltd. accepts no responsibility for loss of time and damages, if any, suffered by the third party as a result of decisions or actions based on this report.

Any legal actions arising directly or indirectly from this work and/or Toronto Inspection Ltd.'s performance of the services shall be filed no longer than two years from the date of Toronto Inspection Ltd.'s substantial completion of the services. Toronto Inspection Ltd. shall not be responsible to the client for lost revenues, loss of profits, cost of content, claims of customers, or other special indirect, consequential, or punitive damages.

Yours truly,

Toronto Inspection Ltd.

Sanjay Goel, B.E.S.
Environmental Scientist
Vice-President

Tabitha Lee, M.A.Sc., P.Eng.
Senior Hydrogeologist

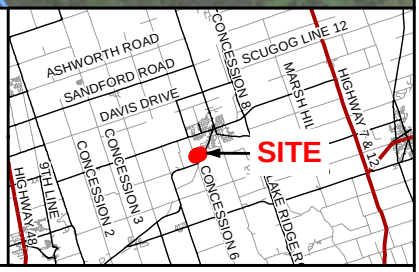
FIGURES

Legend

- Highway
- Arterial Road
- Local Road
- Watercourse
- Waterbody
- Site Location

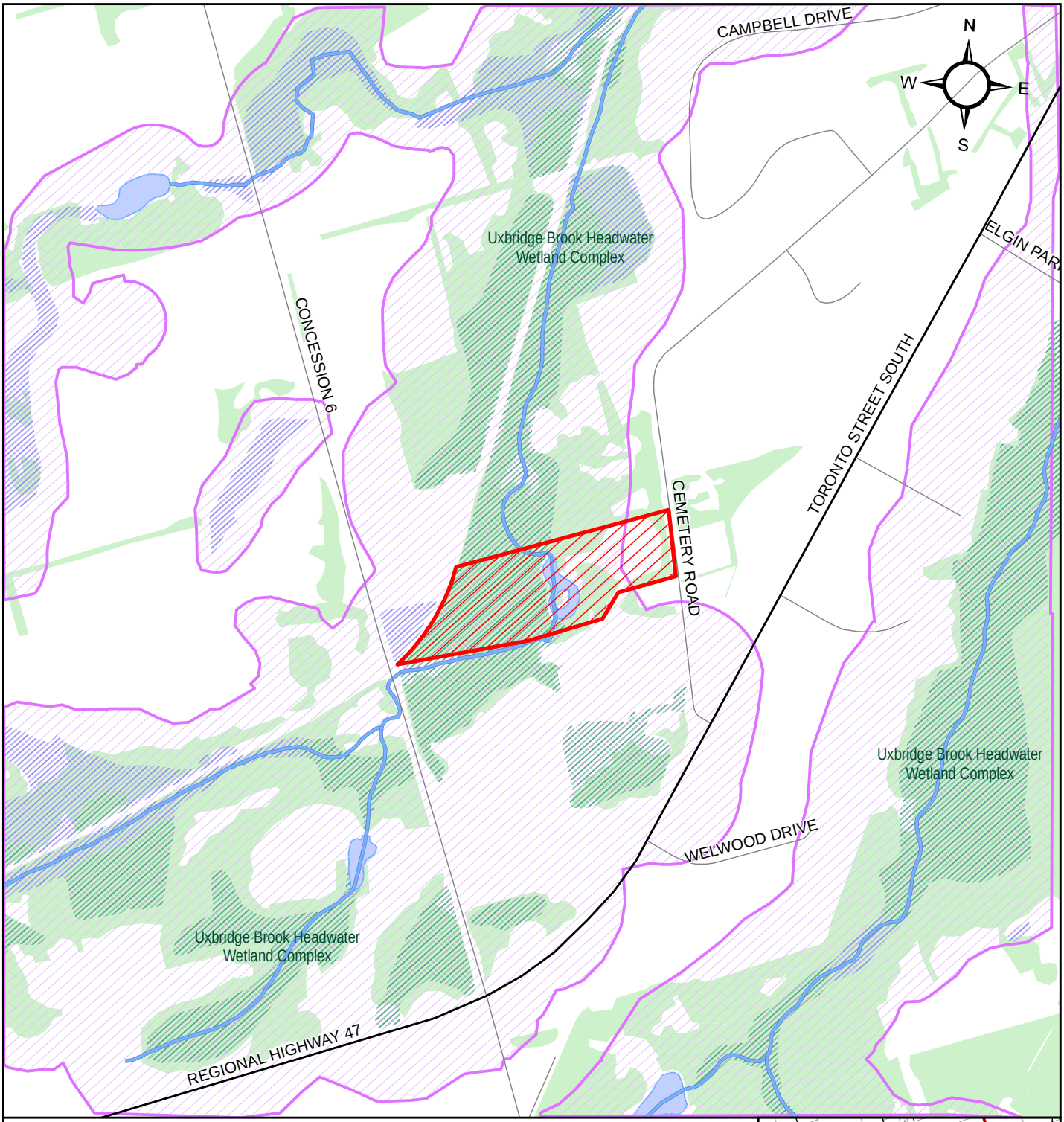
0 50 100 200 300 400 m

1:10,000



TorontoInspection Ltd.
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Site Location
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO.	5431W-20-HB
DATE:	February 2021
FIGURE NO.	1

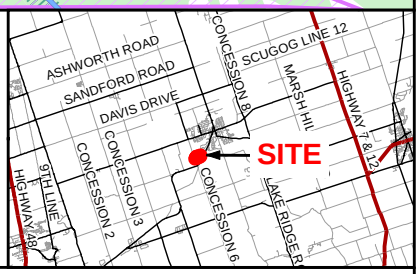


Legend

- Highway
- Arterial Road
- Local Road
- Watercourse
- Waterbody
- Site Location
- LSCRA Regulated Area
- Provincially Significant Wetland
- Wetland
- Wooded Area

0 37.5 75 150 225 300 m

1:8,500



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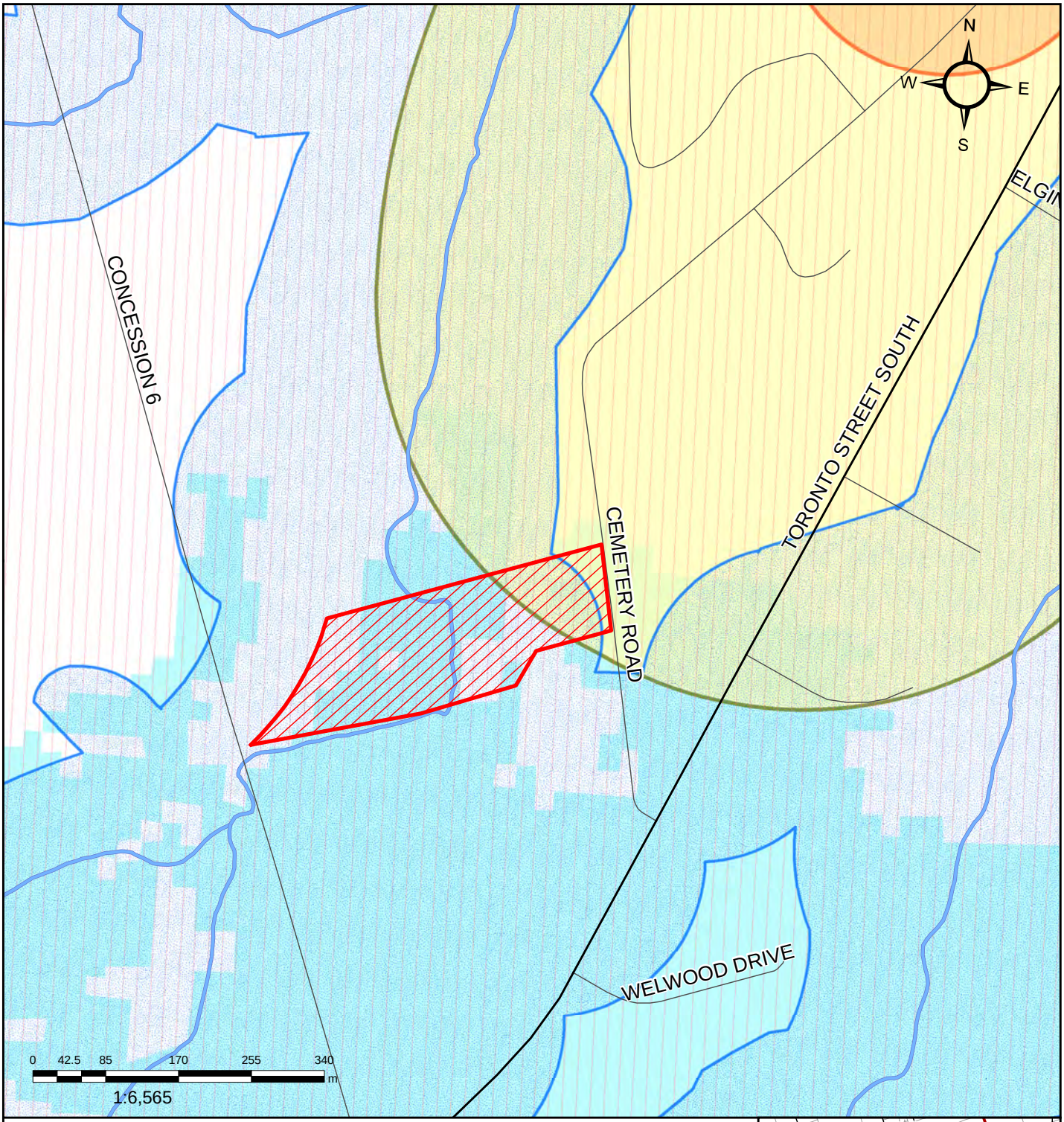
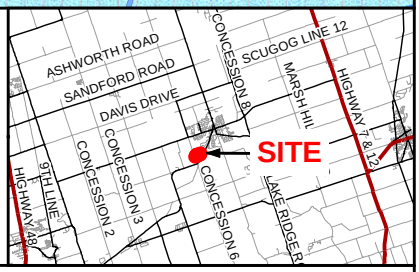
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE: Environmental Features - Natural Heritage Features		
LOCATION: 150 Cemetery Road, Uxbridge, Ontario		
PROJECT NO. 5431W-20-HB	DATE: February 2021	FIGURE NO. 2a



Legend

- Site Location
- Highway
- Arterial Road
- Local Road
- Watercourse
- Intake Protection Zone 3
- Highly Vulnerable Aquifer
- WHPA-C
- WHPA-D for Uxbridge-MW6
- Significant Groundwater Recharge Area



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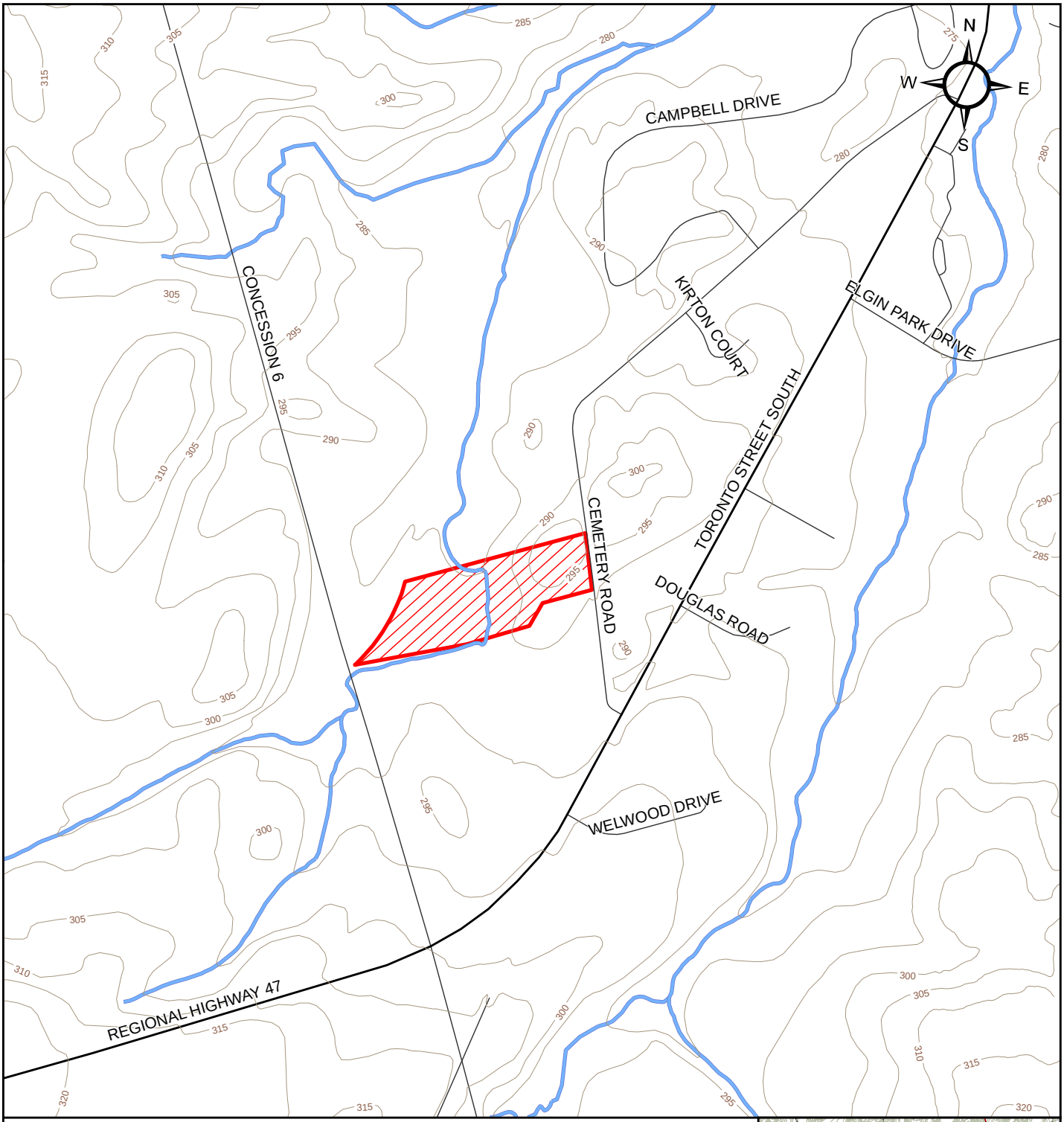
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Environmental Features - Source Water Protection
LOCATION:	150 Cemetery Road, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5431W-20-HB	February 2021	2b

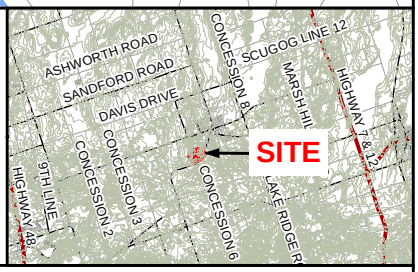


Legend

- Ground Surface Topography (5m Contour)
- Highway
- Arterial Road
- Local Road
- Watercourse
- Site Location

0 50 100 200 300 400 m

1:10,000

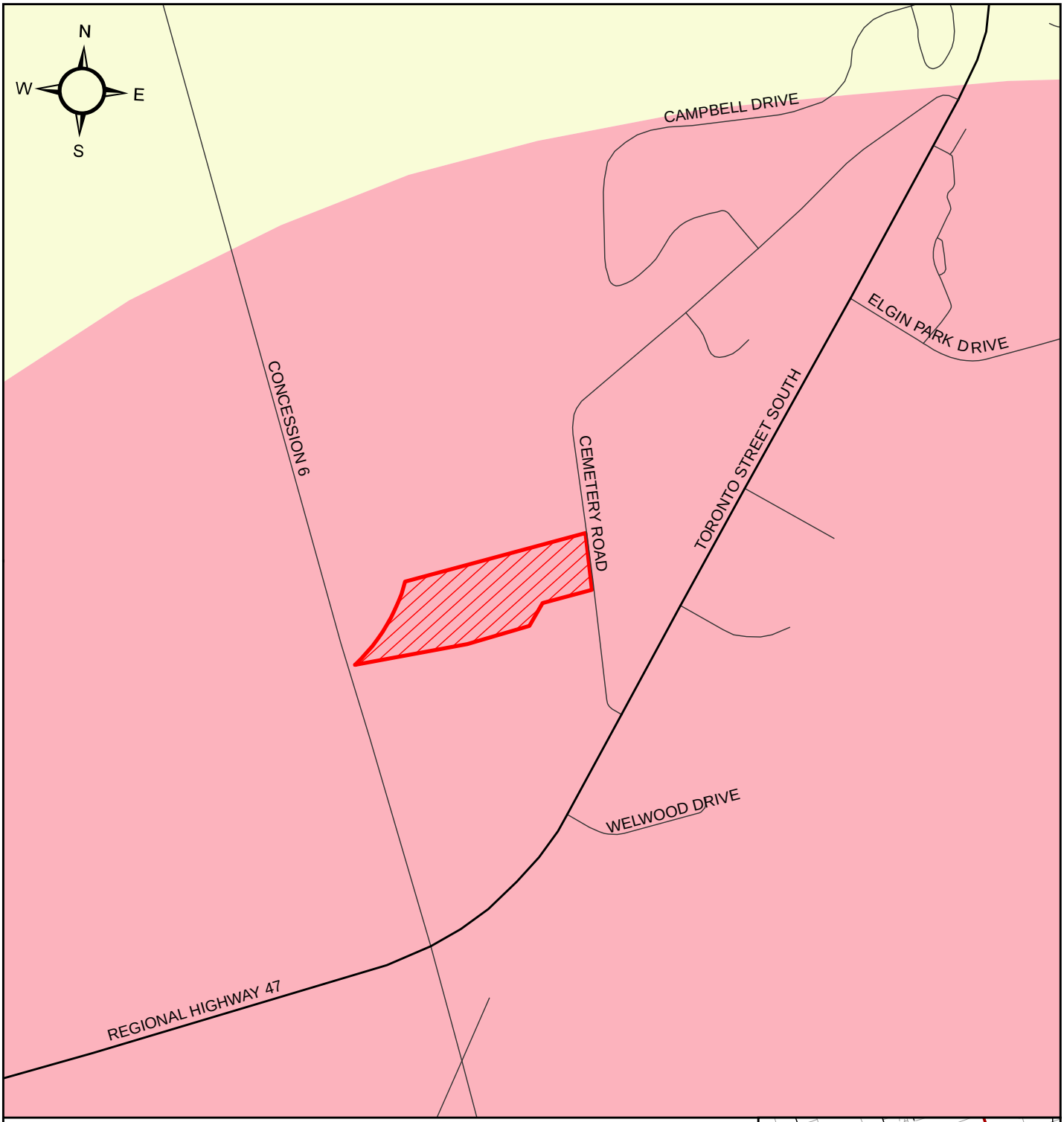


Toronto Inspection Ltd.
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Topography
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO.	5431W-20-HB
DATE:	February 2021
FIGURE NO.	3

REFERENCE
Service Layer Credits: Source: ESRI, DigitalGlobe, GeoEye, and Earthstar Geographics.



Legend

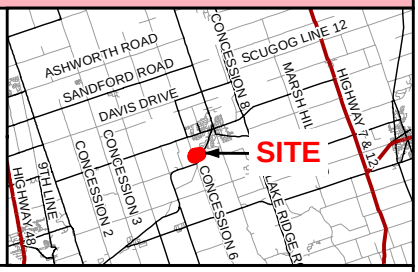
- Highway
- Arterial Road
- Local Road
- Site Location

Physiography

- Oak Ridges Moraine
- Peterborough Drumlin Field

0 50 100 200 300 400 m

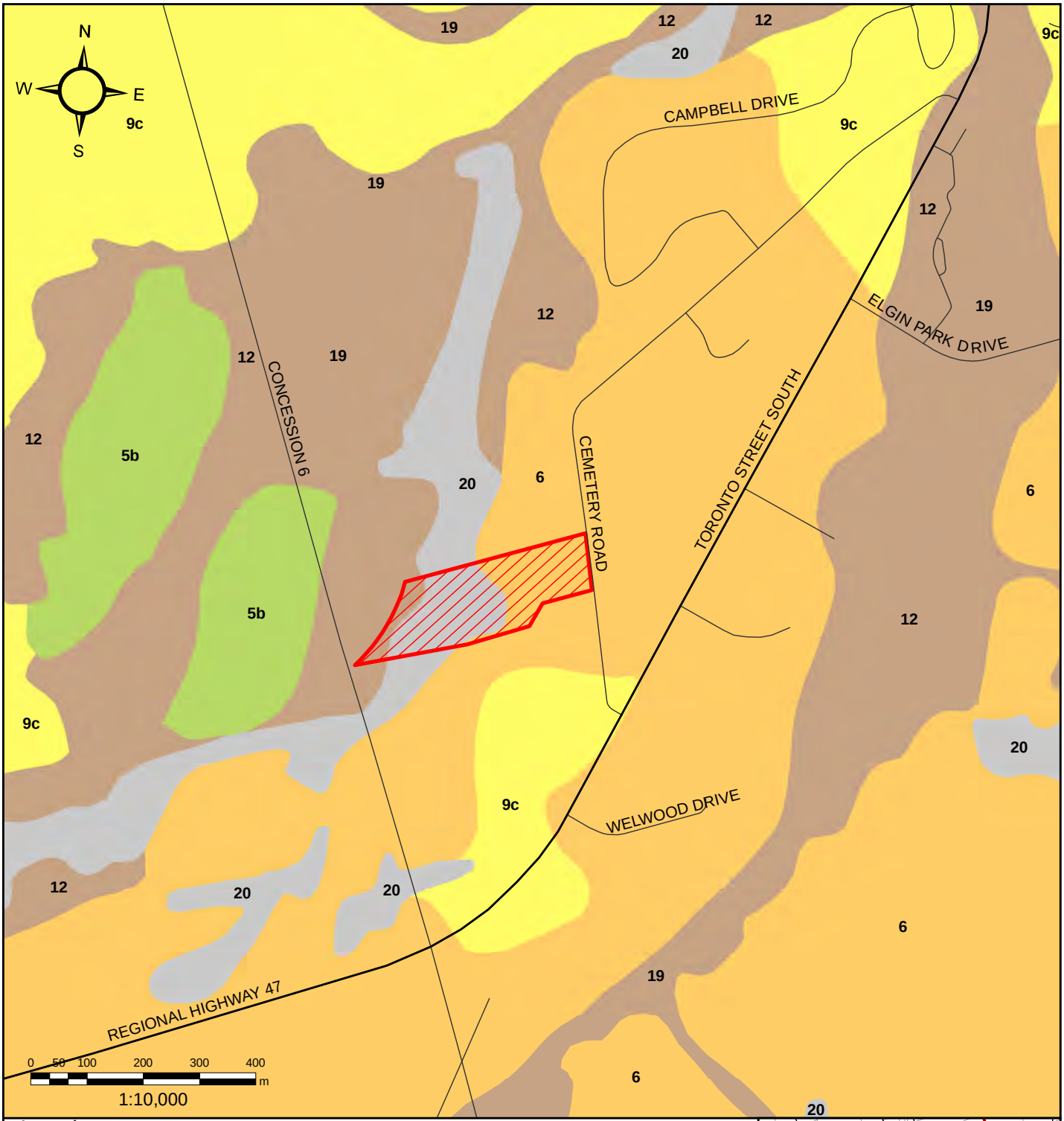
1:10,000



TorontoInspection Ltd
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

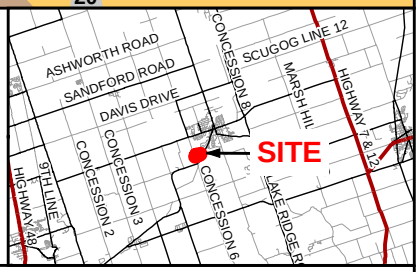
TITLE:	Physiography
LOCATION:	150 Cemetery Road, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5431W-20-HB	February 2021	4



Legend

- Highway
- Arterial Road
- Local Road
- Site Location
- 5b: Stone-poor, carbonate-derived silty to sandy till
- 6: Ice-contact stratified deposits
- 9c: Course-textured glaciolacustrine deposits (sand, gravel, minor silt and clay)
- 12: Older alluvial deposits
- 19: Modern alluvial deposits
- 20: Organic deposits



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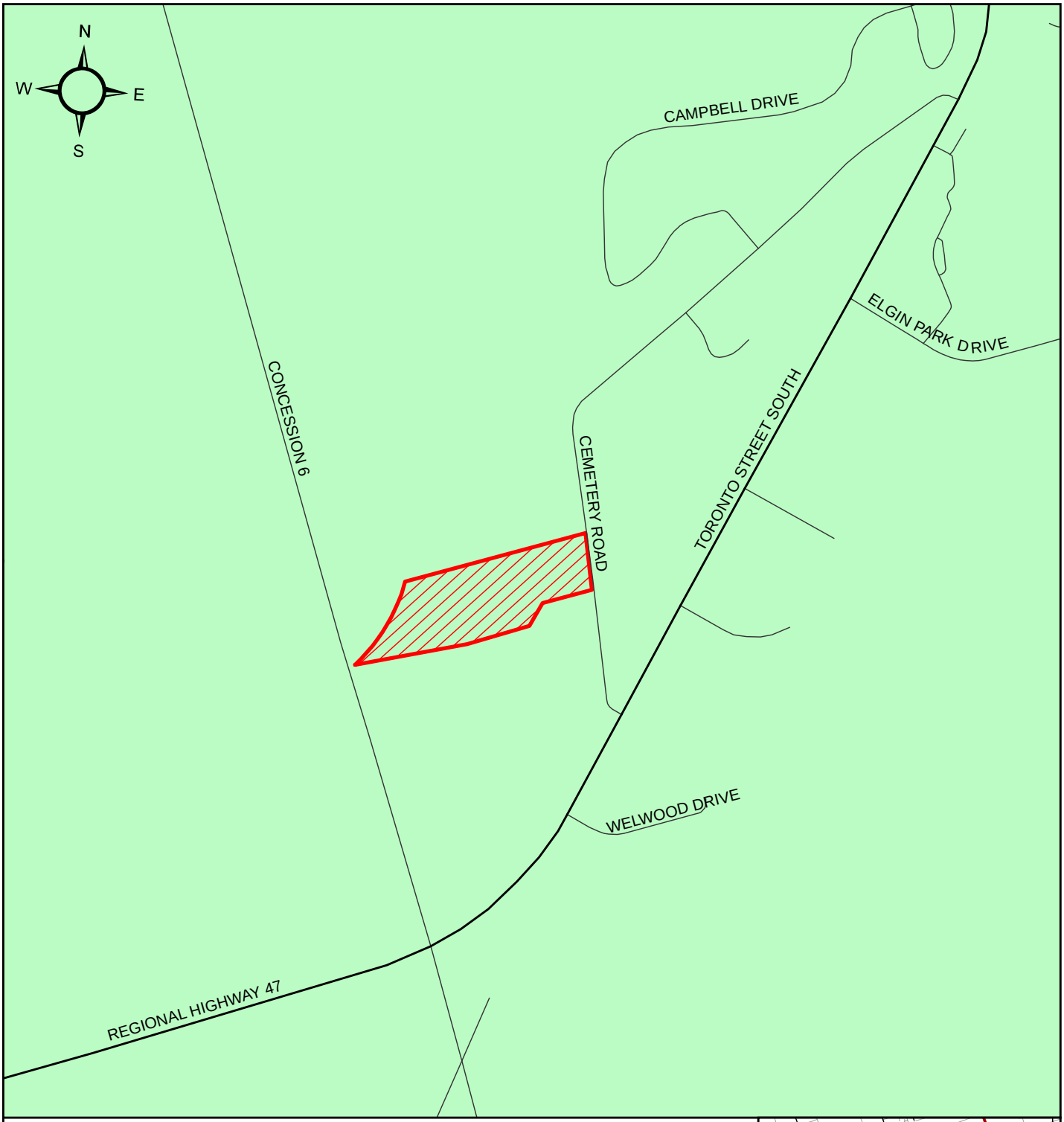
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Surficial Geology
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO.	5431W-20-HB
DATE:	February 2021
FIGURE NO.	5



Legend

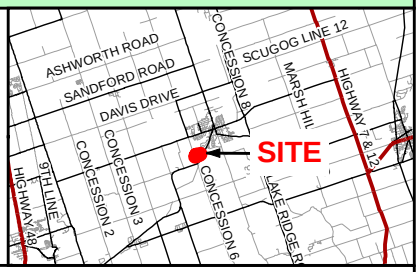
- Highway
- Arterial Road
- Local Road
- Site Location

Bedrock Geology

Georgian bay Fm.; Blue Mountain Fm.; Billings Fm.; Collingwood Mb.; Eastview Mb.

0 50 100 200 300 400 m

1:10,000



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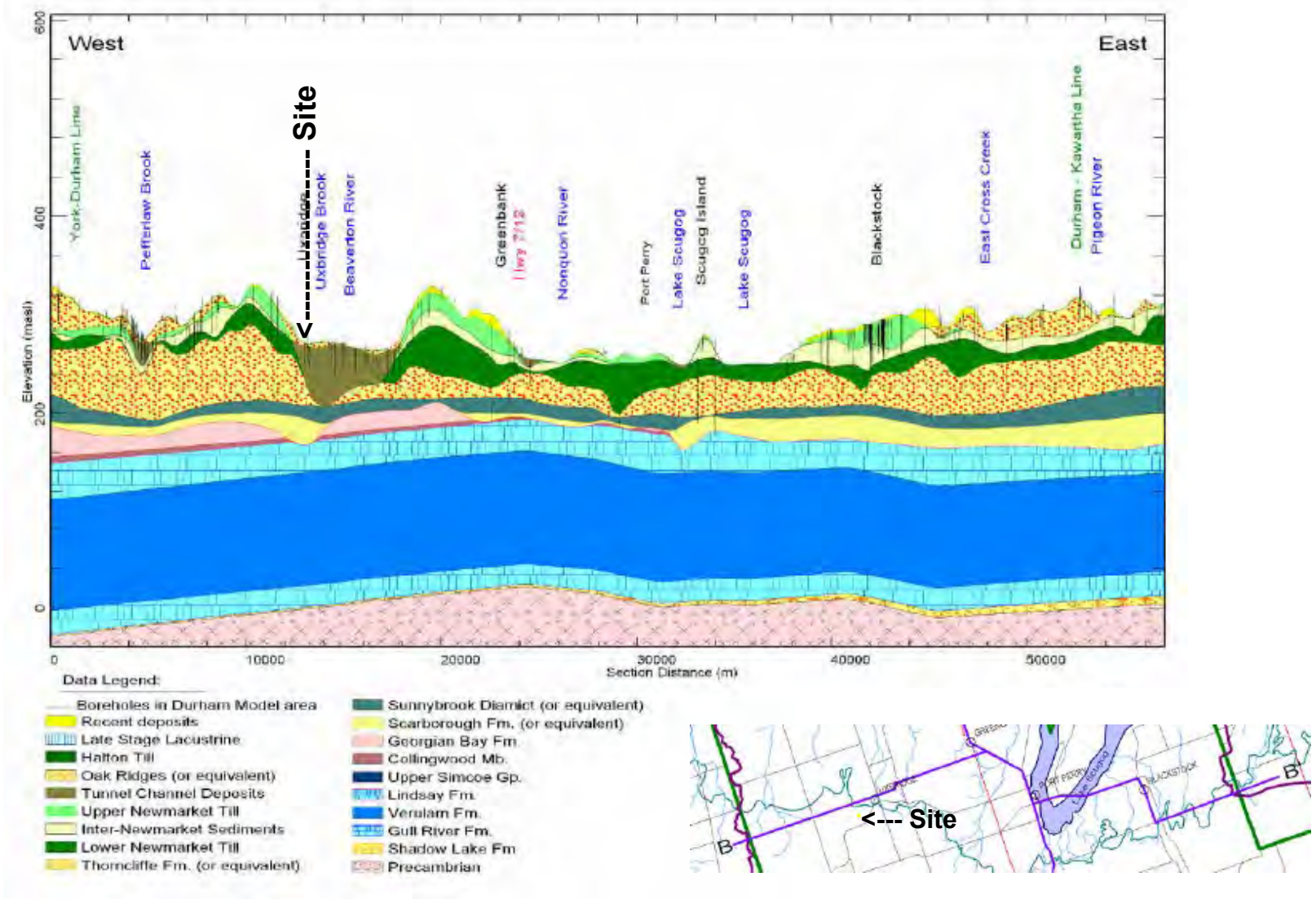
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Bedrock Geology
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO.	5431W-20-HB
DATE:	February 2021
FIGURE NO.	6



York, Peel, Durham, Toronto and The Conservation Authorities Moraine Coalition (YPDT-CAMC). 2006. Groundwater Modelling of the Oak Ridges Moraine Area. CAMC-YPDT Technical Report # 01-06. Prepared by Earthfx Inc.

TorontoInspection LTD
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16
Markham, Ontario
L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192 Email : TIL@torontoinspection.com

TITLE:	Regional Hydrostratigraphic Cross-Section		
LOCATION:	150 Cemetery Road, Uxbridge, ON		
PROJECT NO. 5431W-20-HB	DATE : February 2021	FIGURE NO : 7	

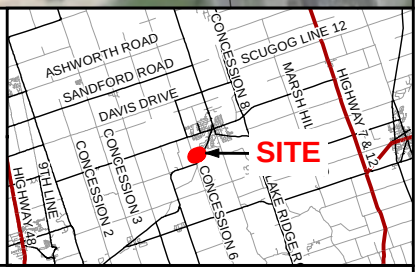
Legend

- Borehole
- Monitoring Well
- Highway
- Arterial Road
- Local Road
- Site Location

XXX.XX masl (Groundwater Elevation Measured on January 5, 2021)

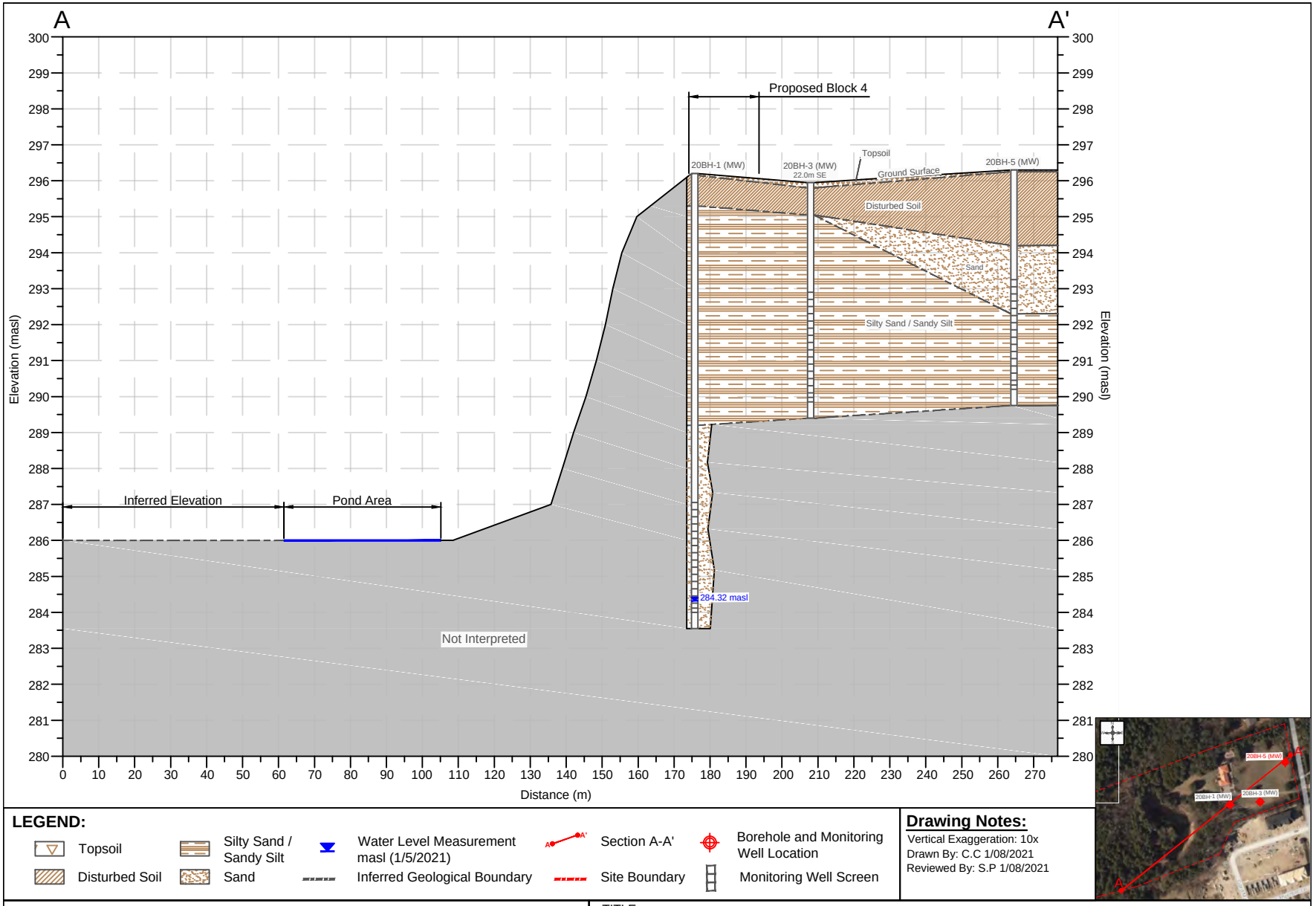
0 10 20 40 60 80 m

1:2,000



TorontoInspection LTD
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Boreholes and Monitoring Wells
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO.	5431W-20-HB
DATE:	February 2021
FIGURE NO.	8



LEGEND:

- Topsoil
- Disturbed Soil
- Silty Sand / Sandy Silt
- Sand
- Water Level Measurement masl (1/5/2021)
- Inferred Geological Boundary
- Section A-A'
- Site Boundary
- Borehole and Monitoring Well Location
- Monitoring Well Screen

Drawing Notes:

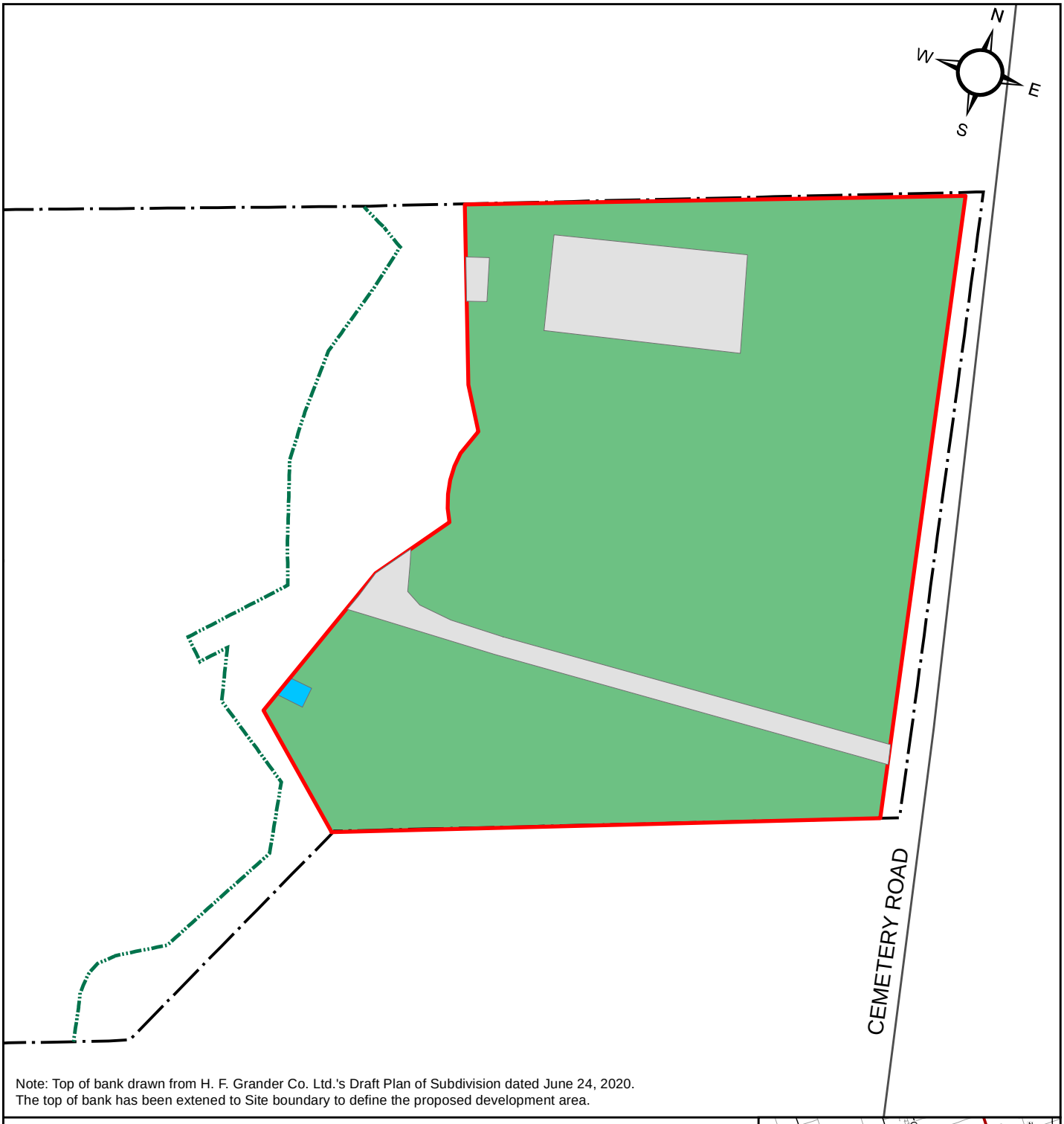
Vertical Exaggeration: 10x
Drawn By: C.C 1/08/2021
Reviewed By: S.P 1/08/2021

TorontoInspection LTD
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent,
Unit 16
Markham, Ontario
L3R 9X2

Tel: 905-940 8509 Fax: 905-940 8192 Email : TIL@torontoinspection.com

TITLE:	Local Geological Section A-A'
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO.	5431W-20-HB
DATE :	February 2021
FIGURE NO :	9



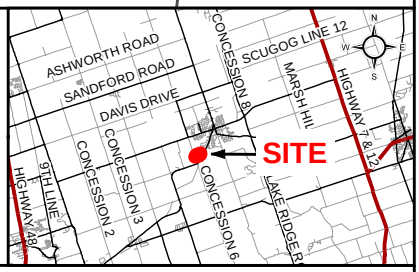
Note: Top of bank drawn from H. F. Grander Co. Ltd.'s Draft Plan of Subdivision dated June 24, 2020.
The top of bank has been extened to Site boundary to define the proposed development area.

Legend

- Top of Bank
- Road
- Site Location
- Property Boundary
- Pre-Development Paved Area
- Pre-Development Building Area
- Pre-Development Grass Area

0 5 10 20 30 40 m

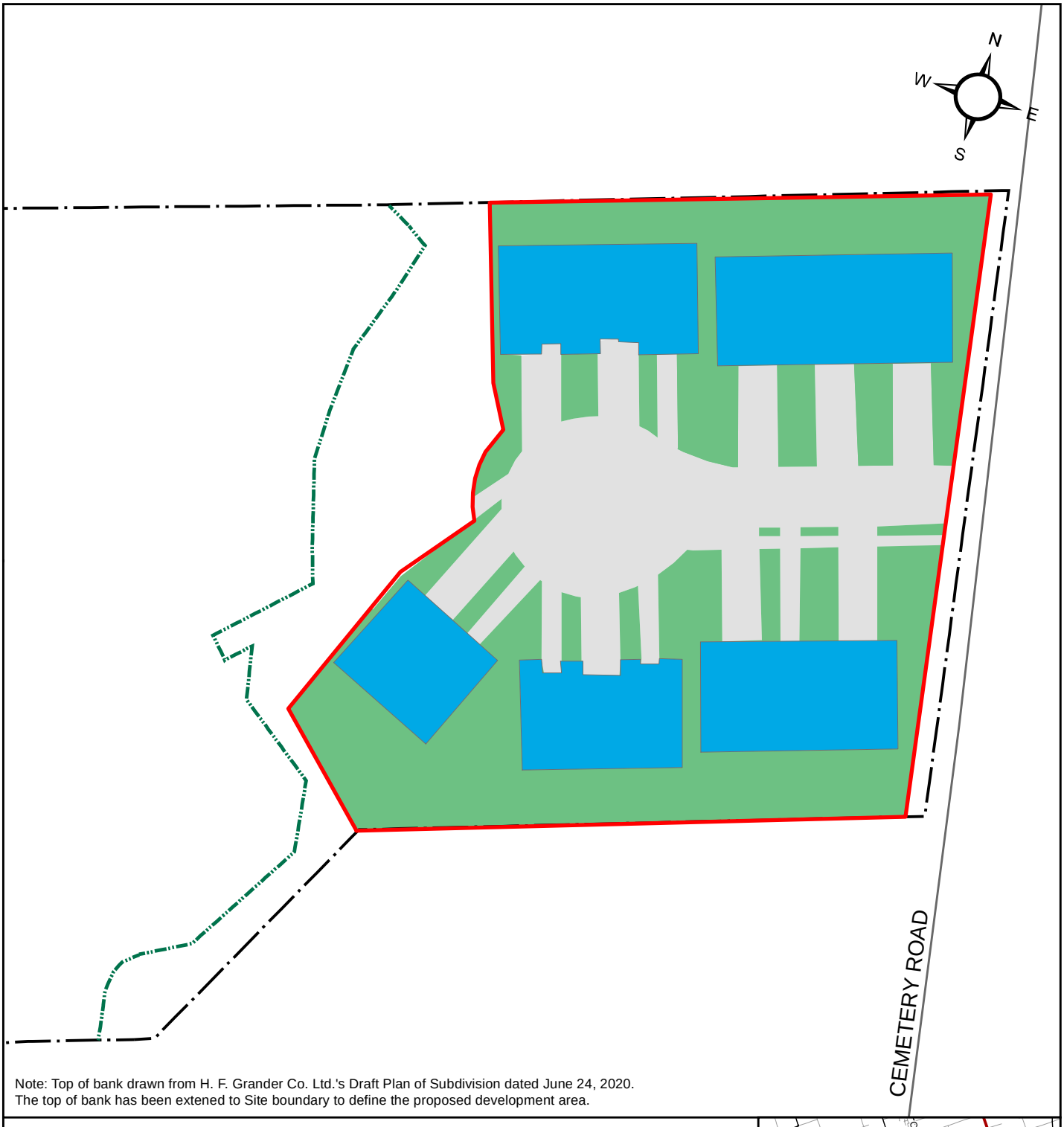
1:900



TorontoInspection Inc.
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Pre-Development Water Balance
LOCATION:	150 Cemetery Road, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5431W-20-HB	February 2021	10



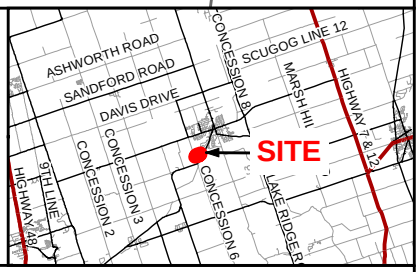
Note: Top of bank drawn from H. F. Grander Co. Ltd.'s Draft Plan of Subdivision dated June 24, 2020.
The top of bank has been extened to Site boundary to define the proposed development area.

Legend

- Top of Bank
- Road
- Site Location
- Property Boundary
- Post-Development Building Area
- Post-Development Grass Area
- Post-Development Paved Area

0 5 10 20 30 40 m

1:900



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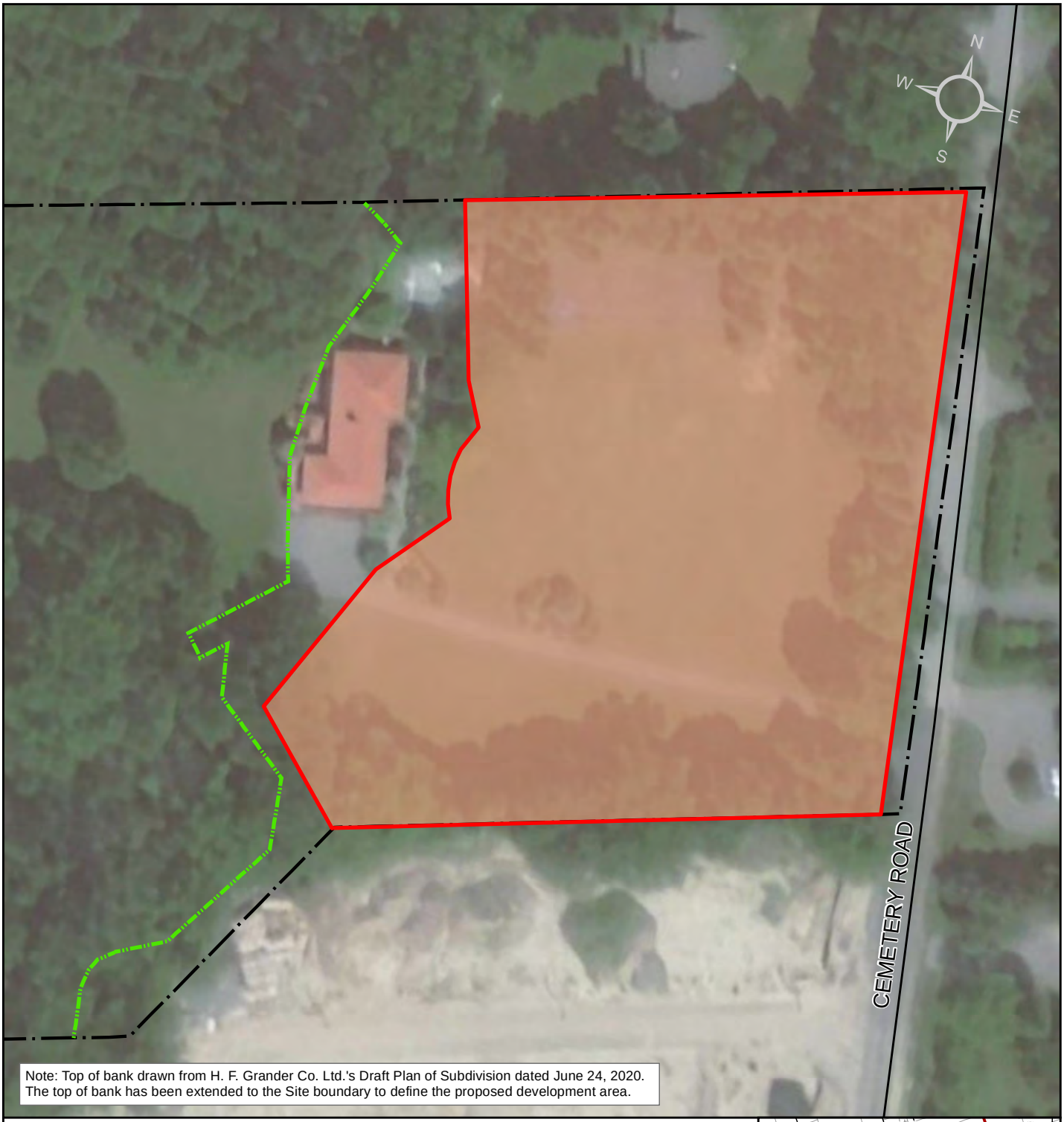
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Post-Development Water Balance
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO.	5431W-20-HB
DATE:	February 2021
FIGURE NO.	11



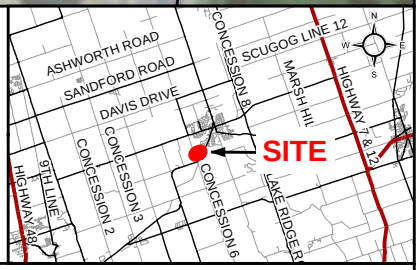
Note: Top of bank drawn from H. F. Grander Co. Ltd.'s Draft Plan of Subdivision dated June 24, 2020.
The top of bank has been extended to the Site boundary to define the proposed development area.

Legend

- Top of Bank
- Road
- Property Boundary
- Site Location
- Low Density Residential Area

0 5 10 20 30 40 m

1:900



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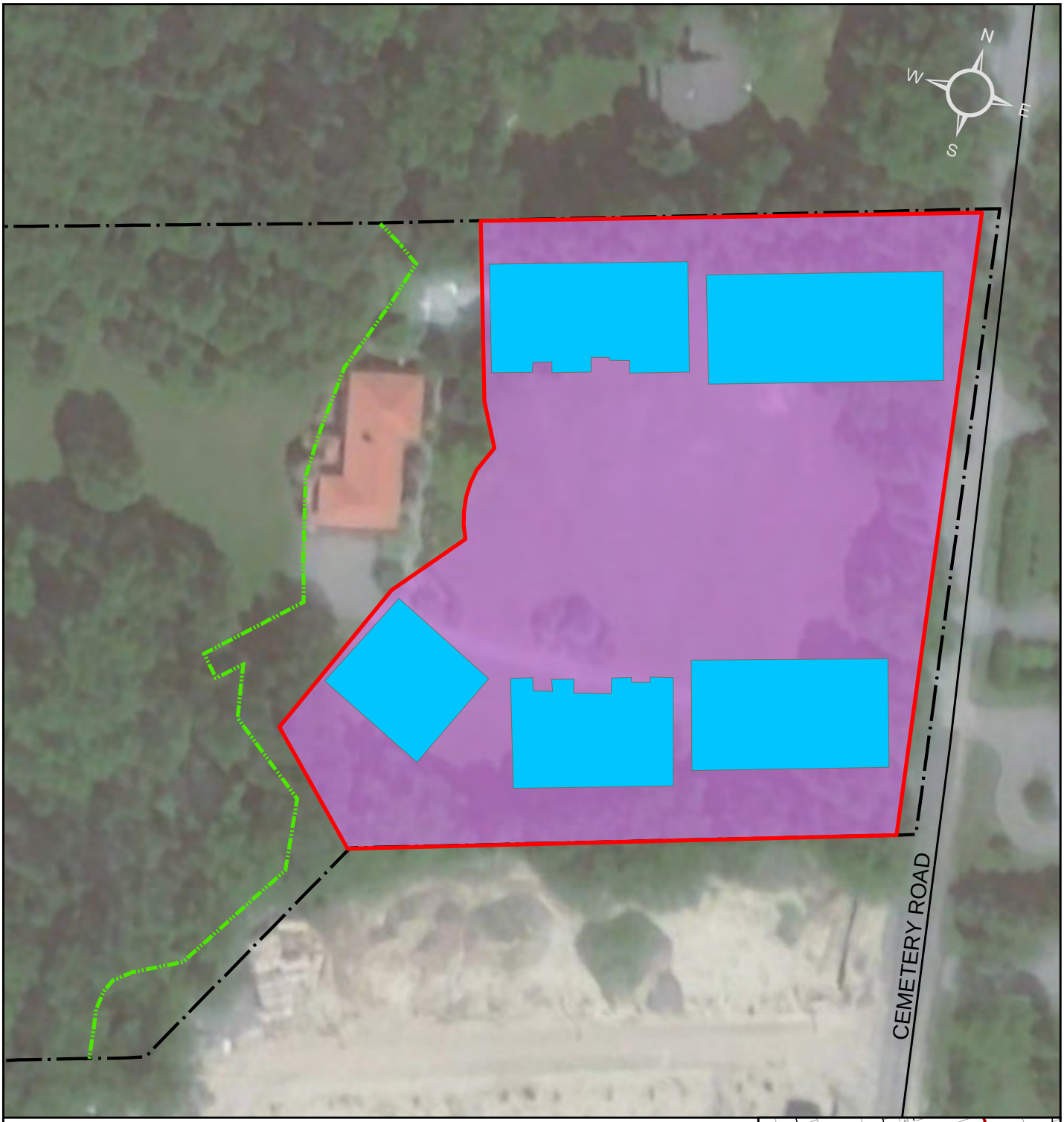
GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Pre-Development Phosphorus Balance
LOCATION:	150 Cemetery Road, Uxbridge, Ontario
PROJECT NO. 5431W-20-HB	DATE: February 2021
FIGURE NO. 12	

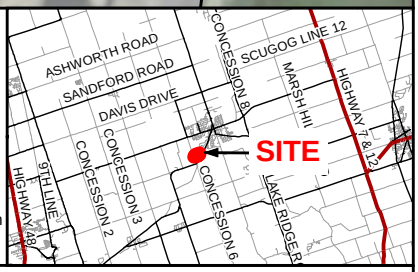


Legend

- Top of Bank
- Road
- Site Location
- Property Boundary
- Post-Development Building Area

0 5 10 20 30 40 m

1:900



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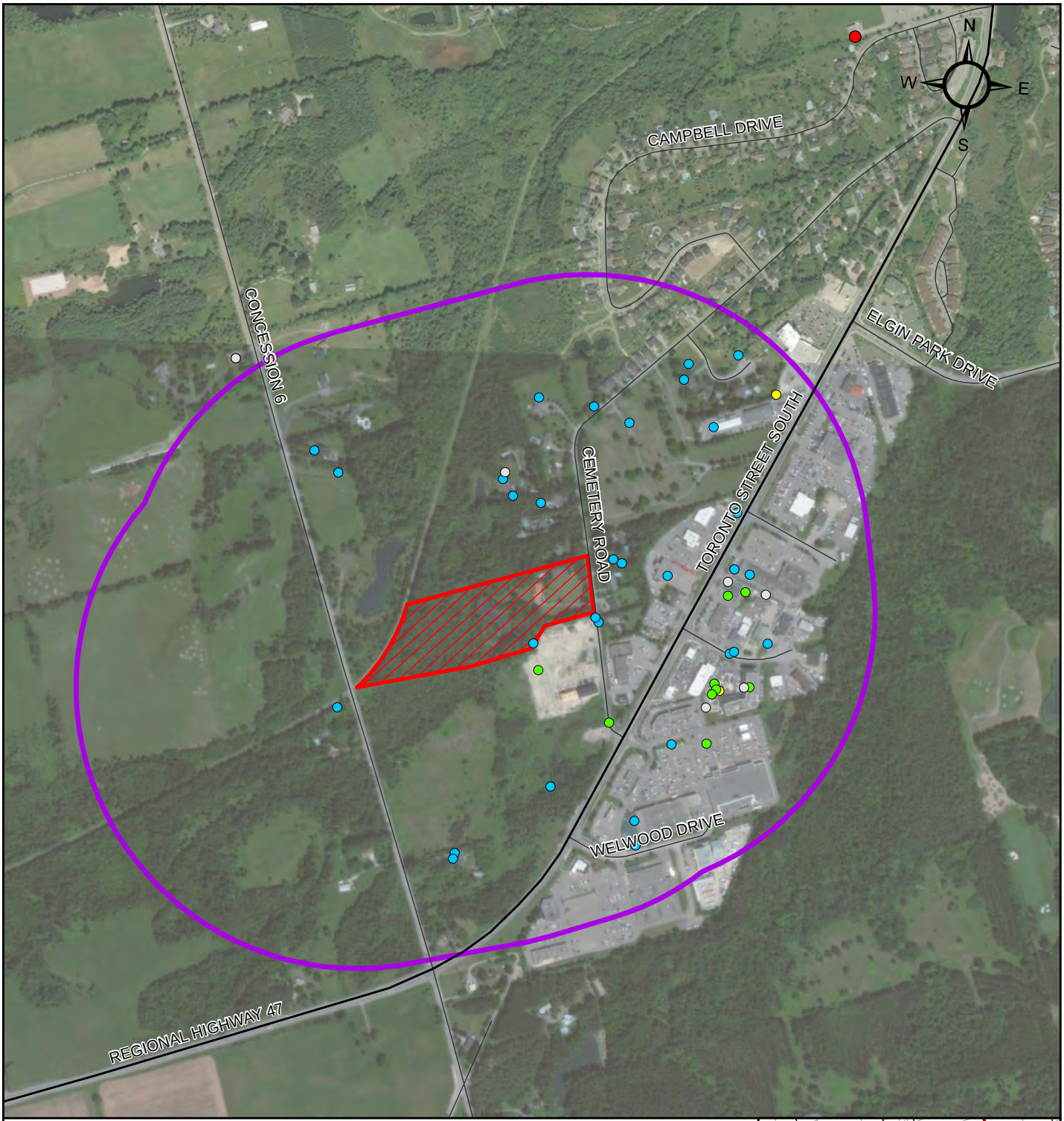
GEO-ENVIRONMENTAL CONSULTANTS

110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	Post-Development Phosphorus Balance
LOCATION:	150 Cemetery Road, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5431W-20-HB	February 2021	13



Legend

- Highway
- Arterial Road
- Local Road
- Permit to Take Water

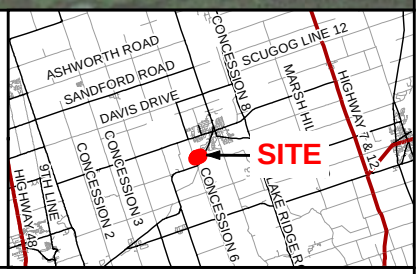
MECP Water Well

- Abandoned Well
- Monitoring Well
- Water Supply Well
- Unknown

- 500m Buffer of Site Location
- Site Location

0 50 100 200 300 400 m

1:10,000



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GEO-ENVIRONMENTAL CONSULTANTS
110 Konrad Crescent, Unit 16, Markham, On L3R 9X2
Tel: 905-940 8509 Fax: 905-940 8192

TITLE:	MECP Water Wells and Permits to Take Water
LOCATION:	150 Cemetery Road, Uxbridge, Ontario

PROJECT NO.	DATE:	FIGURE NO.
5431W-20-HB	February 2021	15

REFERENCE

APPENDIX A

Site Plan

KEY PLAN SCALE : NOT TO SCALE

DRAFT PLAN OF SUBDIVISION

OF PART OF LOT 27, CONCESSION 6,
GEOGRAPHIC TOWNSHIP OF UXBRIDGE,
NOW IN THE,

TOWNSHIP OF UXBRIDGE

REGIONAL MUNICIPALITY OF DURHAM
SCALE - 1 : 500 METRES

DISTANCES & COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

LAND USE SCHEDULE.

LOT 1 (SINGLE-FAMILY DWELLING HOUSE) (R2-_.)	**3.5502± Ha.**
- LOT 1 - LOT FRONTAGE = 15.00m (15.0 MIN)	
BLOCK 2 (ROW DWELLING HOUSE) (RM-_.)	**0.1626± Ha.**
- UNIT 1 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 2 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 3 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 4 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 5 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 6 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
BLOCK 3 (ROW DWELLING HOUSE) (RM-_.)	**0.1100± Ha.**
- UNIT 1 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 2 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 3 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 4 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 5 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
BLOCK 4 (ROW DWELLING HOUSE) (RM-_.)	**0.1008± Ha.**
- UNIT 1 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 2 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 3 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
BLOCK 5 (ROW DWELLING HOUSE) (RM-_.)	**0.1023± Ha.**
- UNIT 1 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 2 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 3 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 4 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
BLOCK 6 (ROW DWELLING HOUSE) (RM-_.)	**0.1403± Ha.**
- UNIT 1 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 2 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 3 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 4 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
- UNIT 5 - LOT FRONTAGE = 0.0m (0.0 MIN) - LOT AREA = 000 SQ.M. (000 SQ.M. MIN)	
BLOCK 7 (STREET WIDENING)	**0.0296± Ha.**
STREET 'A' - 58.5m LONG	**0.1810± Ha.**
TOTAL	4.3768± Ha.

INFORMATION REQUIRED AS REQUIRED UNDER SECTION 51(2) OF THE PLANNING ACT R.S.O. 1990 CHAP. P. 13.

A. AS SHOWN
B. AS SHOWN
C. AS SHOWN
D. AS SHOWN ON THE SCHEDULE OF LAND USE
E. AS SHOWN
F. AS SHOWN
G. AS SHOWN
H. MUNICIPAL WATER
I. SANDY TILL
J. AS SHOWN
K. MUNICIPAL SANITARY AND STORM SEWERS
L. AS SHOWN

SURVEYOR'S CERTIFICATE.

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

JUNE 24, 2020 — DATE
RALPH F. GRANDER — ONTARIO LAND SURVEYOR

OWNER'S CERTIFICATE.

I, THE REGISTERED OWNERS OF THE SUBJECT LANDS, HEREBY AUTHORIZE H. F. GRANDER Co. Ltd. TO PREPARE A DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

JUNE 24, 2020 — DATE

REGION OF DURHAM FILE: S-U-2020-_.

CADDFILE: 8052-MOP_1.DPD
PROJECT No. 8052-MOP

H. F. GRANDER Co. Ltd.
ONTARIO LAND SURVEYOR
1575 HIGHWAY 7A WEST, UNIT 2A
POST OFFICE BOX 616
PORT PERRY, ONTARIO
L9L 1A6
TEL. (905) 985-3500
FAX. (905) 985-2347

APPENDIX B

Borehole Logs

Project No. 5431W-20-GA

Log of Borehole 20BH-1 (MW)

Dwg No. 2

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 150 Cemetery Road, Uxbridge, Ontario

Date Drilled: 12/1/20

Drill Type: Truck Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		Ground Surface	296.20	0
		MULCH - 25mm of mulch over 50mm of topsoil	296.17 296.15	
		DISTURBED SOIL - brown silty sand - some gravel - loose - moist to wet	295.30	1
		SILTY SAND - compact to very dense - brown silty fine sand - occasional seams of silt - stratified - moist to very moist		2 3 4 5 6
			289.20	7
		SAND - very dense, compact below 11.5m - brown fine sand, grey below 11.5m - some silt - a layer of sand and silt at 9.0m - moist to very moist, wet below 11.5m		8 9 10 11
			284.28	12
			283.55	
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - water level at 12.0m - open		

N Value: 20 40 60 80
Shear Strength: 100 200 kPa

Headspace Reading (ppm): 100 200 300
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

Natural Unit Weight kN/m3

4
18
31
80
86
76
64
83/290mm
70
59
19

LGBE3 5431W-20-GA.GPJ 1/12/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
December 7, 2020	11.92m	

Project No. 5431W-20-GA

Log of Borehole 20BH-2

Dwg No. 3

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 150 Cemetery Road, Uxbridge, Ontario

Date Drilled: 12/1/20

Drill Type: Truck Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		Ground Surface	297.10	0
		ASPHALT PAVEMENT - 75mm of asphalt over 150mm granular base	297.03 296.95	
		DISTURBED SOIL - brown silty sand - some gravelly sand - loose - moist	296.20	1
		SILTY SAND - loose to compact at the top, very dense below 2.2m - brown silty fine sand - seams of sandy silt till at 4.5m - occasional seams of silt - moist to very moist		2 3 4 5 6 7 8
			288.40	
		SAND - dense to very dense - brown fine sand - some silt - moist to very moist		9 10 11 12
			284.45	
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - borehole open and dry		

N Value: 20 40 60 80
Shear Strength: 100 200 kPa

Headspace Reading (ppm): 100 200 300
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30

Natural Unit Weight kN/m3

N Value: 5, 9, 14, 57, 60, 56, 57, 52, 66, 57, 48

LGBE3 5431W-20-GA.GPJ 1/12/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)

Project No. 5431W-20-GA

Log of Borehole 20BH-3 (MW)

Dwg No. 4

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 150 Cemetery Road, Uxbridge, Ontario

Date Drilled: 12/4/20

Drill Type: Truck Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer

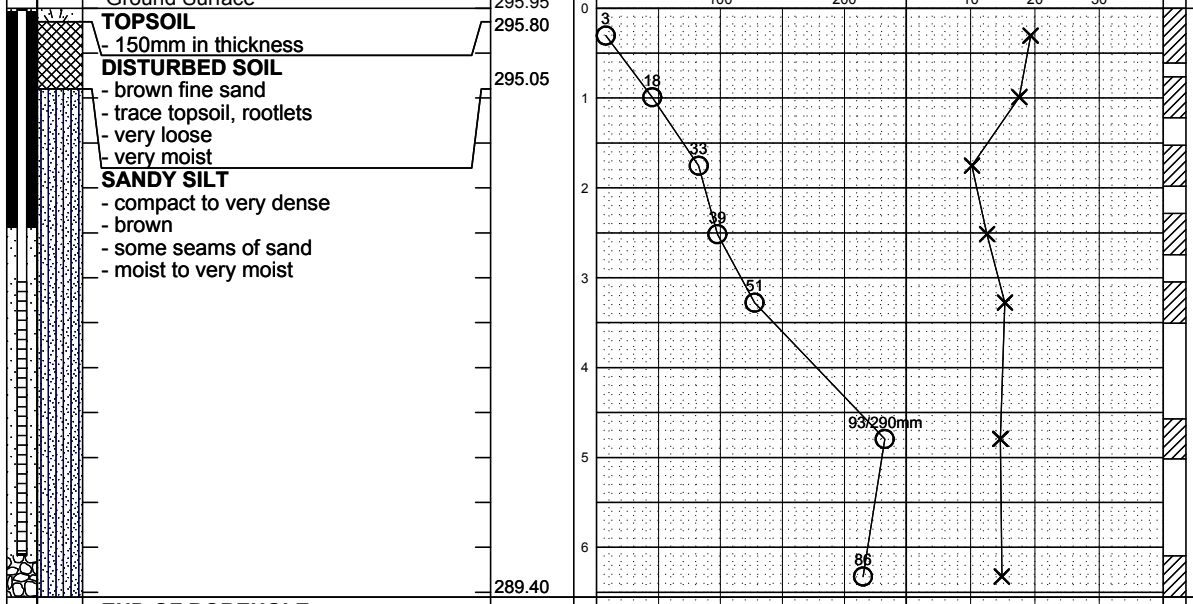
GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	295.95
		TOPSOIL - 150mm in thickness	295.80
		DISTURBED SOIL - brown fine sand - trace topsoil, rootlets - very loose - very moist	295.05
		SANDY SILT - compact to very dense - brown - some seams of sand - moist to very moist	
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - borehole open and dry	289.40

DEPTH

N Value: 20 40 60 80
Shear Strength: 100 200 kPa

Headspace Reading (ppm): 100 200 300
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30

Natural Unit Weight kN/m3



LGBE3 5431W-20-GA.GPJ 1/12/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
December 7, 2020	Dry	

Project No. 5431W-20-GA

Log of Borehole 20BH-4 (MW)

Dwg No. 5

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 150 Cemetery Road, Uxbridge, Ontario

Date Drilled: 12/4/20

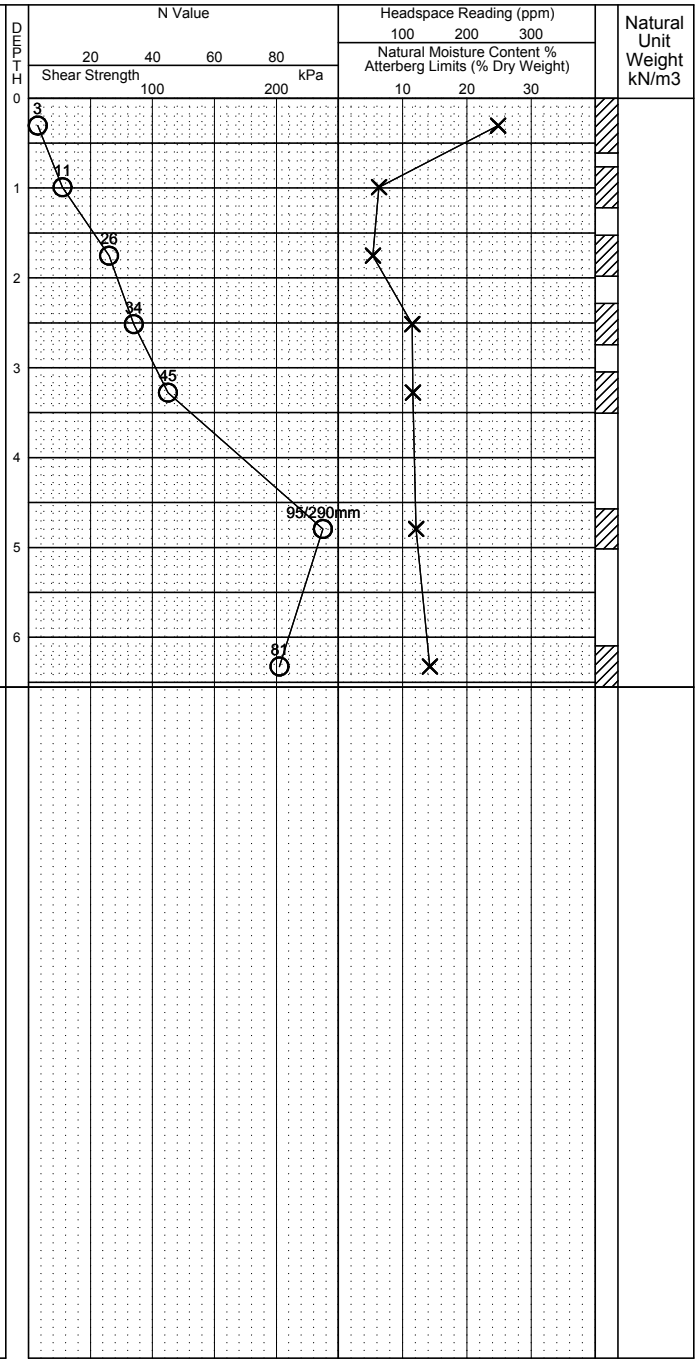
Drill Type: Truck Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	299.00
		TOPSOIL - 150mm in thickness	298.85
		DISTURBED SOIL - brown to black fine sand and topsoil - trace silt - very loose - wet	298.10
		SAND - compact to dense - brown fine sand - moist	296.10
		SANDY SILT TILL - dense to very dense, brown - trace to some gravel - some seams of fine sand - trace clayey silt - moist	293.50
		SILTY SAND - very dense - brown silty fine sand - very moist	292.45
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - borehole open and dry	



Natural Unit Weight kN/m3

LGBE3 5431W-20-GA.GPJ 1/12/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
December 7, 2020	Dry	

Project No. 5431W-20-GA

Log of Borehole 20BH-5 (MW)

Dwg No. 6

Project: Geotechnical Investigation

Sheet No. 1 of 1

Location: 150 Cemetery Road, Uxbridge, Ontario

Date Drilled: 12/4/20

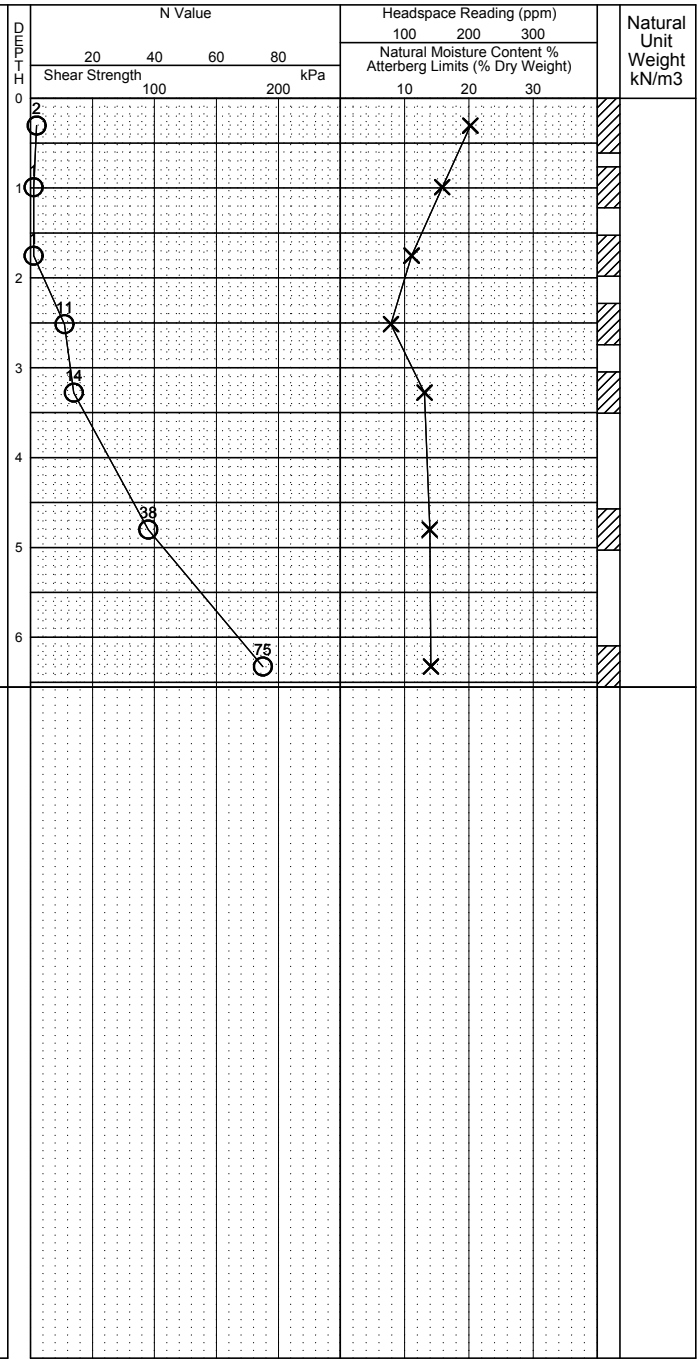
Drill Type: Truck Mounted Drill Rig

Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test (S)

Headspace Reading (ppm)
Natural Moisture
Plastic and Liquid Limit
Unconfined Compression
% Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		Ground Surface	296.30
		TOPSOIL - 50mm in thickness	296.25
		DISTURBED SOIL - brown to greyish brown fine sand - some silt and topsoil - very loose - moist to very moist	294.20
		SAND - compact - brown fine sand - some seams of silt - moist	292.30
		SILTY SAND - dense to very dense - brown silty fine sand - very moist	289.75
		END OF BOREHOLE **NOTE:** Upon completion of drilling: - borehole open and dry	



LGBE3 5431W-20-GA.GPJ 1/12/21

NOTE: THE BOREHOLE DATA NEEDS INTERPRETATION ASSISTANCE BY TORONTO INSPECTION LTD. BEFORE USE BY OTHERS

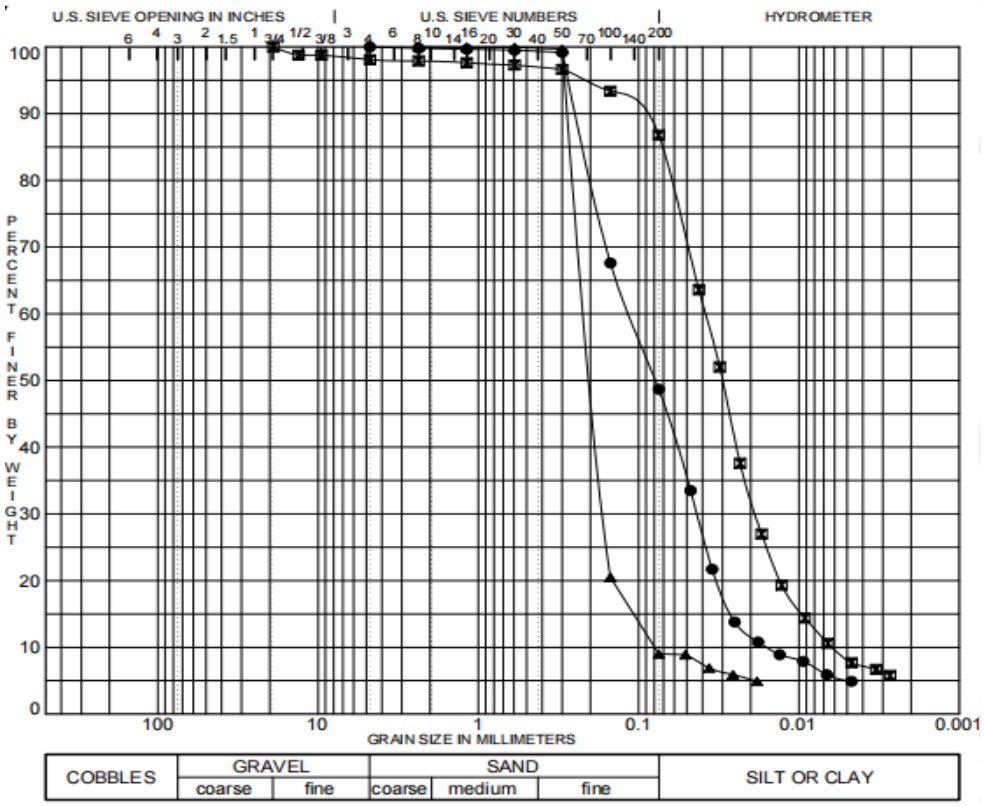
Toronto Inspection Ltd.

Time	Water Level (m)	Depth to Cave (m)
December 7, 2020	Dry	

APPENDIX C

Hydraulic Conductivity Analysis

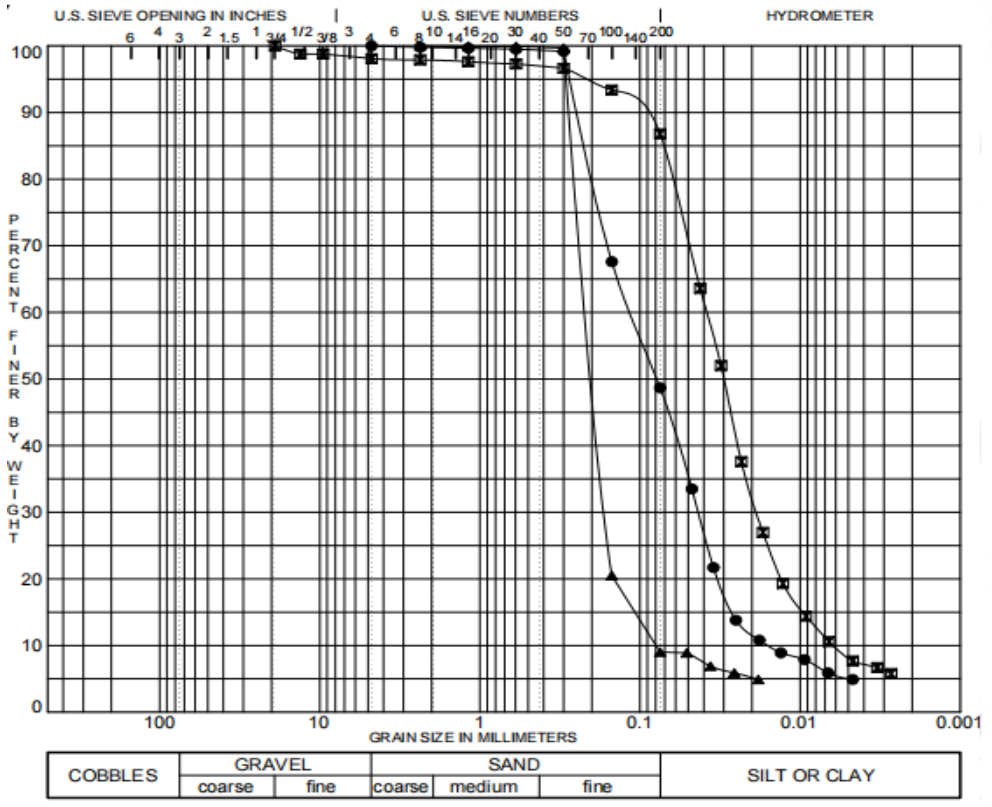
Grainsize Analyses:	**20BH-1**
Company:	Toronto Inspection Ltd.
Client:	Coral Creek Homes
Project:	5431W-20-HB
Location:	150 Cemetery Road, Uxbridge, ON
Test Well:	20BH-1
Test Date:	23-Oct-20
Test Conducted By:	JC



Legend: ● 20BH-1

Sampled Unit:	Sand and Silt	**Sampled Depth (mbgs):**	9.1
% Gravel	0.0	**D100:**	4.7500
% Sand	51.3	**D60**	0.1100
% Silt	43.6	**D30:**	0.0430
% Clay	5.1	**D10:**	0.0158
K (m/s)	2.9E-06	**Temperature (°C):**	10

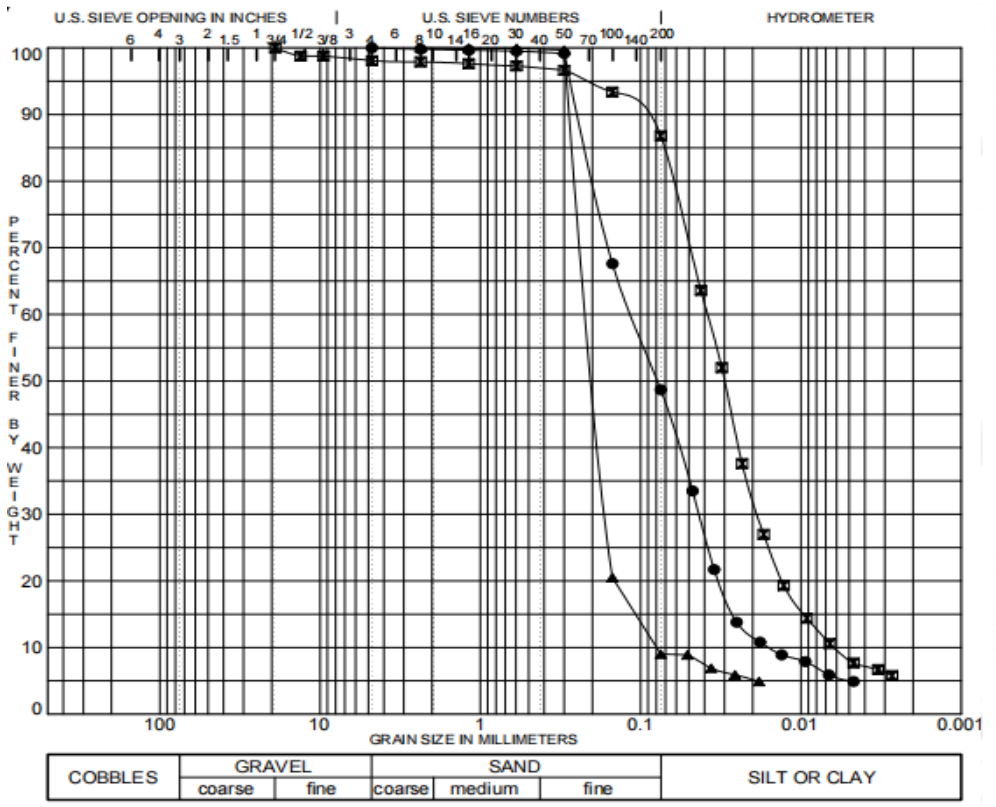
Grainsize Analyses:	**20BH-3**
Company:	Toronto Inspection Ltd.
Client:	Coral Creek Homes
Project:	5431W-20-HB
Location:	150 Cemetery Road, Uxbridge, ON
Test Well:	20BH-3
Test Date:	23-Oct-20
Test Conducted By:	JC



Legend: 20BH-3

Sampled Unit:	Silt	**Sampled Depth (mbgs):**	1.5
% Gravel	1.9	**D100:**	19.0000
% Sand	11.3	**D60**	0.0400
% Silt	78.6	**D30:**	0.0190
% Clay	8.2	**D10:**	0.0062
K (m/s)	4.4E-07	**Temperature (°C):**	10

Grainsize Analyses:	**20BH-5**
Company:	Toronto Inspection Ltd.
Client:	Coral Creek Homes
Project:	5431W-20-HB
Location:	150 Cemetery Road, Uxbridge, ON
Test Well:	20BH-5
Test Date:	23-Oct-20
Test Conducted By:	JC



Legend: ▲ 20BH-5

Sampled Unit:	Sandy Silt	**Sampled Depth (mbgs):**	2.3
% Gravel	1.0	**D100:**	
% Sand	38.3	**D60**	0.0700
% Silt	53.6	**D30:**	0.0310
% Clay	7.0	**D10:**	0.0077
K (m/s)	6.8E-07	**Temperature (°C):**	10

APPENDIX D

Groundwater Quality Certificate of Analysis

PRELIMINARY REPORT

CA14049-JAN21 R1

Prepared for

Toronto Inspection Ltd.

PRELIMINARY REPORT

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Toronto Inspection Ltd.	Project Specialist	Jill Campbell, B.Sc.,GISAS
		Laboratory	SGS Canada Inc.
Address	110 Konrad Crescent, Unit 16 Markham, ON L3R 9X2. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Simran Panesar	Telephone	2165
Telephone	416-996-3214	Facsimile	705-652-6365
Facsimile	905 940 8192	Email	jill.campbell@sgs.com
Email	lab@torontoinspection.com;simran@torontoinspection.com	SGS Reference	CA14049-JAN21
Project		Received	01/05/2021
Order Number		Approved	01/01/1970
Samples	Ground Water (4)	Report Number	CA14049-JAN21 R1
		Date Reported	02/03/2021

COMMENTS

RL - SGS Reporting Limit

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

Total PAH is the sum of anthracene, benzo(a)pyrene, benzo(a)anthracene, benzo(e)pyrene, benzo(b,j)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, dibenzo(a,i)pyrene, dibenzo(a,j)acridine, 7H-dibenzo(c,g)carbazole, fluoranthene, indeno(1,2,3-c,d)pyrene, perylene, phenanthrene and pyrene..

Temperature of Sample upon Receipt: 4 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:019826

SIGNATORIES

The signatories will be applied on the final report.

Jill Campbell, B.Sc.,GISAS

TABLE OF CONTENTS

Client: Toronto Inspection Ltd.
Project:
Project Manager: Simran Panesar
Samplers: Peining Guan

PACKAGE: **SANSEW - General Chemistry**
(WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Sample Number 9	Sample Number 10	Sample Number 11
					Sample Name: 20BH-1(MW) Jan 12	Sample Name: 20BH-1(MW) Jan 15	Sample Name: 20BH-1(MW) Jan 29
					Sample Matrix: Ground Water	Sample Matrix: Ground Water	Sample Matrix: Ground Water
					Sample Date: 12/01/2021	Sample Date: 15/01/2021	Sample Date: 29/01/2021
General Chemistry							
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15		< 4↑	
Biochemical Oxygen Demand (BOD5)	mg/L	2	300	15			4
Total Suspended Solids	mg/L	2	350	15		616	
Total Kjeldahl Nitrogen	as N mg/L	0.5	100	1	2.5		

PACKAGE: **SANSEW - Metals and Inorganics**
(WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Sample Number 8	
					Sample Name: 20BH-1(MW)	
					Sample Matrix: Ground Water	
					Sample Date: 05/01/2021	
Metals and Inorganics						
Sulphate	mg/L	2	1500		5	
Cyanide (total)	mg/L	0.01	2	0.02	< 0.01	
Fluoride	mg/L	0.06	10		< 0.06	
Aluminum (total)	mg/L	0.001	50		10.9	
Antimony (total)	mg/L	0.0009	5		< 0.0009	
Arsenic (total)	mg/L	0.0002	1	0.02	0.0036	
Cadmium (total)	mg/L	0.000003	0.7	0.008	0.000135	
Chromium (total)	mg/L	0.00008	2	0.08	0.0210	

Client: Toronto Inspection Ltd.
Project:
Project Manager: Simran Panesar
Samplers: Peining Guan

PACKAGE: **SANSEW - Metals and Inorganics**
(WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number	8
Sample Name	20BH-1(MW)
Sample Matrix	Ground Water
Sample Date	05/01/2021

Parameter	Units	RL	L1	L2	Result
Metals and Inorganics (continued)					
Cobalt (total)	mg/L	0.000004	5		0.00913
Copper (total)	mg/L	0.0002	3	0.05	0.0236
Lead (total)	mg/L	0.00001	1	0.12	0.0113
Manganese (total)	mg/L	0.00001	5	0.15	0.954
Molybdenum (total)	mg/L	0.00004	5		0.00320
Nickel (total)	mg/L	0.0001	2	0.08	0.0196
Phosphorus (total)	mg/L	0.003	10	0.4	0.613
Selenium (total)	mg/L	0.00004	1	0.02	0.00013
Silver (total)	mg/L	0.00005	5	0.12	< 0.00005
Tin (total)	mg/L	0.00006	5		0.0102
Titanium (total)	mg/L	0.00005	5		0.476
Zinc (total)	mg/L	0.002	2	0.04	0.055

Client: Toronto Inspection Ltd.
Project:
Project Manager: Simran Panesar
Samplers: Peining Guan

PACKAGE: **SANSEW - Microbiology** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Sample Number 9
					Sample Name 20BH-1(MW) Jan 12
					Sample Matrix Ground Water
					Sample Date 12/01/2021
Microbiology					
E. Coli	cfu/100mL	-		200	0

PACKAGE: **SANSEW - Other (ORP)** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Sample Number 8	10
					Sample Name 20BH-1(MW)	20BH-1(MW) Jan 15
					Sample Matrix Ground Water	Ground Water
					Sample Date 05/01/2021	15/01/2021
					Result	Result
Other (ORP)						
pH	No unit	0.05	10.5	9		7.37
Mercury (total)	mg/L	0.00001	0.01	0.004	< 0.00001	

PACKAGE: **SANSEW - Phenols** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013
L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Parameter	Units	RL	L1	L2	Sample Number 9
					Sample Name 20BH-1(MW) Jan 12
					Sample Matrix Ground Water
					Sample Date 12/01/2021
Phenols					
4AAP-Phenolics	mg/L	0.002	1	0.008	< 0.002

PACKAGE: **SANSEW - VOCs** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

Sample Number 8
Sample Name 20BH-1(MW)
Sample Matrix Ground Water

Client: Toronto Inspection Ltd.
Project:
Project Manager: Simran Panesar
Samplers: Peining Guan

PACKAGE: **SANSEW - VOCs** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number	8
Sample Name	20BH-1(MW)
Sample Matrix	Ground Water
Sample Date	05/01/2021

VOCs

Parameter	Units	RL	L1	L2	Result
Chloroform	mg/L	0.0005	0.04	0.002	< 0.0005
1,2-Dichlorobenzene	mg/L	0.0005	0.05	0.0056	< 0.0005
1,4-Dichlorobenzene	mg/L	0.0005	0.08	0.0068	< 0.0005
cis-1,2-Dichloroethene	mg/L	0.0005	4	0.0056	< 0.0005
trans-1,3-Dichloropropene	mg/L	0.0005	0.14	0.0056	< 0.0005
Methylene Chloride	mg/L	0.0005	2	0.0052	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.0005	1.4	0.017	< 0.0005
Tetrachloroethylene (perchloroethylene)	mg/L	0.0005	1	0.0044	< 0.0005
Trichloroethylene	mg/L	0.0005	0.4	0.008	< 0.0005
Methyl ethyl ketone	mg/L	0.02	8		< 0.02
Styrene	mg/L	0.0005	0.2		< 0.0005

Client: Toronto Inspection Ltd.
Project:
Project Manager: Simran Panesar
Samplers: Peining Guan

PACKAGE: **SANSEW - VOCs - BTEX** (WATER)

L1 = SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013

L2 = SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013

Sample Number	8
Sample Name	20BH-1(MW)
Sample Matrix	Ground Water
Sample Date	05/01/2021

VOCs - BTEX

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

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	SANSEW / WATER / - - Durham Table 1 - Sanitary Sewer Discharge - BL_55_2013 L1	SANSEW / WATER / - - Durham Table 2 - Storm Sewer Discharge - BL_55_2013 L2
20BH-1(MW)					
Manganese	SM 3030/EPA 200.8	mg/L	0.954		0.15
Phosphorus	SM 3030/EPA 200.8	mg/L	0.613		0.4
Zinc	SM 3030/EPA 200.8	mg/L	0.055		0.04
20BH-1(MW) Jan 12					
Total Kjeldahl Nitrogen	SM 4500-N C/4500-NO3- F	mg/L	2.5		1
20BH-1(MW) Jan 15					
Total Suspended Solids	SM 2540D	mg/L	616	350	15

QC SUMMARY

Anions by discrete analyzer

Method: US EPA 375.4 | 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
Sulphate	DIO5006-JAN21	mg/L	2	<2	ND	20	103	80	120	103	75	125
Sulphate	DIO5009-JAN21	mg/L	2	<2	1	20	100	80	120	96	75	125

Biochemical Oxygen Demand

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0027-JAN21	mg/L	2	< 2	2	30	82	70	130	NV	70	130
Biochemical Oxygen Demand (BOD5)	BOD0054-JAN21	mg/L	2	< 2	15	30	93	70	130	87	70	130

QC SUMMARY

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)	SKA0055-JAN21	mg/L	0.01	<0.01	ND	10	98	90	110	102	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	EWL0082-JAN21	mg/L	0.06	<0.06	ND	10	95	90	110	92	75	125

Mercury by CVAAS

Method: EPA 7471A/SM 3112B I Internal ref.: ME-CA-IENVISPE-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)	EHG0006-JAN21	mg/L	0.00001	< 0.00001	ND	20	95	80	120	104	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)	EMS0027-JAN21	mg/L	0.00005	<0.00005	ND	20	101	90	110	84	70	130
Aluminum (total)	EMS0027-JAN21	mg/L	0.001	<0.001	3	20	96	90	110	117	70	130
Arsenic (total)	EMS0027-JAN21	mg/L	0.0002	<0.0002	3	20	100	90	110	91	70	130
Cadmium (total)	EMS0027-JAN21	mg/L	0.000003	<0.000003	15	20	100	90	110	93	70	130
Cobalt (total)	EMS0027-JAN21	mg/L	0.000004	<0.000004	4	20	100	90	110	86	70	130
Chromium (total)	EMS0027-JAN21	mg/L	0.00008	<0.00008	13	20	99	90	110	96	70	130
Copper (total)	EMS0027-JAN21	mg/L	0.0002	<0.0002	2	20	101	90	110	110	70	130
Manganese (total)	EMS0027-JAN21	mg/L	0.00001	<0.00001	1	20	100	90	110	97	70	130
Molybdenum (total)	EMS0027-JAN21	mg/L	0.00004	<0.00004	3	20	102	90	110	89	70	130
Nickel (total)	EMS0027-JAN21	mg/L	0.0001	<0.0001	ND	20	103	90	110	82	70	130
Lead (total)	EMS0027-JAN21	mg/L	0.00001	<0.00001	3	20	91	90	110	95	70	130
Phosphorus (total)	EMS0027-JAN21	mg/L	0.003	<0.003	ND	20	100	90	110	NV	70	130
Antimony (total)	EMS0027-JAN21	mg/L	0.0009	<0.0009	ND	20	100	90	110	119	70	130
Selenium (total)	EMS0027-JAN21	mg/L	0.00004	<0.00004	ND	20	94	90	110	93	70	130
Tin (total)	EMS0027-JAN21	mg/L	0.00006	<0.00006	14	20	98	90	110	NV	70	130
Titanium (total)	EMS0027-JAN21	mg/L	0.00005	<0.00005	7	20	97	90	110	NV	70	130
Zinc (total)	EMS0027-JAN21	mg/L	0.002	<0.002	2	20	100	90	110	100	70	130

QC SUMMARY

Microbiology

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
E. Coli	BAC9169-JAN21	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	EWL0221-JAN21	No unit	0.05	NA	0		100			NA		

Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0114-JAN21	mg/L	0.002	<0.002	ND	10	103	80	120	98	75	125

QC SUMMARY

Suspended Solids

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0219-JAN21	mg/L	2	< 2	8	10	101	90	110	NA		

Total Nitrogen

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen	SKA0110-JAN21	as N mg/L	0.5	<0.5	0	10	102	90	110	97	75	125

QC SUMMARY

Volatile Organics

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

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
1,1,2,2-Tetrachloroethane	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	101	60	130	104	50	140
1,2-Dichlorobenzene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	102	60	130	101	50	140
1,4-Dichlorobenzene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	100	60	130	100	50	140
Benzene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	103	60	130	101	50	140
Chloroform	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	103	60	130	101	50	140
cis-1,2-Dichloroethene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	103	60	130	103	50	140
Ethylbenzene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	102	60	130	98	50	140
m-p-xylene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	101	60	130	97	50	140
Methyl ethyl ketone	GCM0072-JAN21	mg/L	0.02	<0.02	ND	30	99	50	140	107	50	140
Methylene Chloride	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	105	60	130	103	50	140
o-xylene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	102	60	130	99	50	140
Styrene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	101	60	130	100	50	140
Tetrachloroethylene (perchloroethylene)	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	102	60	130	99	50	140
Toluene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	103	60	130	99	50	140
trans-1,3-Dichloropropene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	102	60	130	110	50	140
Trichloroethylene	GCM0072-JAN21	mg/L	0.0005	<0.0005	ND	30	102	60	130	98	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

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

SGS

Request for Laboratory Services and CHAIN OF CUSTODY

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

No: 020483

Page 1 of 1

Laboratory Information Section - Lab use only

Received By: B Cameron
Received Date: 01/15/21 (mm/dd/yy)
Received Time: 17:30 (hr : min)
Received By (signature):
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☐ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: ICE
Temperature Upon Receipt (°C) 3.
LAB LIMS #:

REPORT INFORMATION

Company: TL
Contact: Simran
Address: Unit 16, 110 Konrad Crescent, Markham
Phone: 905-940-8849
Fax:
Email: lab@torontoinspection.com

INVOICE INFORMATION

☐ (same as Report Information)
Company:
Contact: Shannon
Address:
Phone:
Email: shannon@torontoinspection.com

Quotation #:
Project #: 5431W
P.O. #:
Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☑ Regular TAT (5-7days)

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

RUSH TAT (Additional Charges May Apply): ☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

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

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19

☐ Table 1 ☐ Res/Park Soil Texture:
☐ Table 2 ☐ Ind/Com ☐ Coarse
☐ Table 3 ☐ Agri/Other ☐ Medium/Fine
☐ Table ____

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: Durham

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,	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)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)	TCLP: Specify TCLP tests ☐ M&I ☐ VOC ☐ PCB ☐ B(a)P ☐ ABN ☐ Ignit.
1	20BH-1 (MW)	01/15/21	15:00	2	GW	N																			
2																									
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Appendix 2: 406/19 Leachate Screening Levels Table: Sewer Use: Storm & Sanitary
Water Characterization Pkg ☐ General ☐ Extended

COMMENTS:
TSS & General collected.
Please append it to CA14049-JAN21

Observations/Comments/Special Instructions

Sampled By (NAME): Reinhold Braun
Signature:
Relinquished by (NAME): Reinhold Braun
Signature:
Date: 01/15/21 (mm/dd/yy)
Date: 01/15/21 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

APPENDIX E

Water Balance Analysis

TABLE 1: CLIMATE NORMALS 1981-2010 STATION DATA

Month	Daily Average (°C)	Heat Index	Potential Evapotranspiration (mm)	Daylight Correction Factor	Adjusted PET (mm)	Total Precipitation (mm)	Surplus (mm)	Deficit (mm)
Jan	-7.00	0.00	0.00	0.80	0.00	64.90	64.90	0.00
Feb	-6.60	0.00	0.00	0.81	0.00	45.90	45.90	0.00
Mar	-1.30	0.00	0.00	1.03	0.00	53.10	53.10	0.00
Apr	5.70	1.22	26.28	1.13	29.57	67.90	38.33	0.00
May	12.20	3.86	59.13	1.27	75.38	82.10	6.72	0.00
Jun	18.00	6.95	89.51	1.29	115.69	106.60	0.00	9.09
Jul	19.90	8.10	99.62	1.31	130.36	86.40	0.00	43.96
Aug	19.30	7.73	96.42	1.21	116.38	73.90	0.00	42.48
Sep	15.10	5.33	74.23	1.05	77.77	87.30	9.53	0.00
Oct	8.60	2.27	40.74	0.94	38.48	74.90	36.42	0.00
Nov	2.40	0.33	10.45	0.80	8.39	83.20	74.81	0.00
Dec	-4.00	0.00	0.00	0.77	0.00	60.00	60.00	0.00
TOTALS		**36**	**496**		**592**	**886**	**390**	**96**

Climate Station ID: 6119055

Latitude: 43.862222

Total Differential Surplus (mm): **294**

Assumptions

L (average day length)	12
N (days in the month)	30
a (Daylight Correction)	1.06591083

$$PET\ (mm) = 16\ (\frac{L}{12})(\frac{N}{30})(\frac{10T_a}{I})^{\alpha}$$

Table of monthly reduction factor values for different latitudes

	North						South				
Latitude	**0**	**10**	**20**	**30**	**40**	**50**	**10**	**20**	**30**	**40**	**50**
Jan	1.04	1	0.95	0.9	0.84	0.74	1.08	1.14	1.2	1.27	1.37
Feb	0.94	0.91	0.9	0.87	0.83	0.78	0.97	1	1.03	1.06	1.12
Mar	1.04	1.03	1.03	1.03	1.03	1.02	1.05	1.05	1.06	1.07	1.08
Apr	1.01	1.03	1.05	1.08	1.11	1.15	0.99	0.97	0.95	0.93	0.89
May	1.04	1.08	1.13	1.18	1.24	1.33	1.01	0.96	0.92	0.86	0.77
Jun	1.01	1.06	1.11	1.17	1.25	1.36	0.96	0.91	0.85	0.78	0.67
Jul	1.04	1.08	1.14	1.2	1.27	1.37	1	0.95	0.9	0.84	0.74
Aug	1.04	1.07	1.11	1.14	1.18	1.25	1.01	0.99	0.96	0.92	0.88
Sep	1.01	1.02	1.02	1.03	1.04	1.06	1	1	1	1	0.99
Oct	1.04	1.02	1	0.98	0.96	0.92	1.06	1.08	1.12	1.15	1.19
Nov	1.01	0.98	0.93	0.89	0.83	0.76	1.05	1.09	1.14	1.2	1.29
Dec	1.04	0.99	0.94	0.88	0.81	0.7	1.1	1.15	1.21	1.29	1.41

TABLE 2: PRE-DEVELOPMENT WATER BALANCE

Catchment Designation	Site		
	S1 - Grass Area	S2 - Impervious Area	Total
Area (m^2)	7118	852	**7970**
Pervious Area (m^2)	7118	0	**7118**
Impervious Area (m^2)	0	852	**852**
Infiltration Factors			
Topography Infiltration Factor[1]	0.1	0	-
Soil Infiltration Factor[2]	0.3	0	
Land Cover Infiltration Factor[3]	0.1	0	
MOE Infiltration Factor	0.5	0	
Run-Off Coefficient	0.5	0	
Runoff from Impervious Surfaces*	0.9	0.9	
Inputs (per Unit Area)			
Precipitation (mm/yr)	**886**	**886**	**886**
Run-On (mm/yr)	0	0	**0**
Other Inputs (mm/yr)	0	0	**0**
Total Inputs (mm/yr)	**886**	**886**	**886**
Outputs (per Unit Area)			
Precipitation Surplus (mm/yr)	**294**	**798**	**348**
Evapotranspiration (mm/yr)	**592**	**89**	**538**
Infiltration (mm/yr)	**147**	**0**	**131**
Runoff Pervious Areas	147	0	**131**
Runoff Impervious Areas	0	798	**85**
Total Runoff (mm/yr)	**147**	**798**	**217**
Total Outputs (mm/yr)	**886**	**886**	**886**
Difference (Inputs - Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	6308	755	**7063**
Run-On (m^3/yr)	0	0	**0**
Other Inputs (m^3/yr)	0	0	**0**
Total Inputs (m^3/yr)	**6308**	**755**	**7063**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	2094	680	**2773**
Evapotranspiration (m^3/yr)	**4214**	**76**	**4290**
Infiltration (m^3/yr)	**1047**	**0**	**1047**
Runoff Pervious Areas	1047	0	**1047**
Runoff Impervious Areas	0	680	**680**
Total Runoff (m^3/yr)	**1047**	**680**	**1726**
Total Outputs (m^3/yr)	**6308**	**755**	**7063**
Difference (Inputs - Outputs)	**0**	**0**	**0**

*Evaporation from impervious areas was assumed to be: 10% of precipitation

[1] Measured grade in the pre-construction condtions for Site assumed to have the same infiltration factor as hilly land.

[2] Overburden in Site in the pre-construction conditions is mainly silty sand, sandy silt, sandy silt till and sand, assumed to have an infiltration factor between medium combinations of clay and loam and open sandy loam.

[3] Grass area, assumed to have the same infiltration factor as cultivated land

TABLE 3: POST-DEVELOPMENT WATER BALANCE

Catchment Designation	Site			
	S1 - Grass Area	S2 - Pavement	S3 - Building	Total
Area (m^2)	3155	2290	2525	**7970**
% Change from Pre-Development	-60.41%	NA	NA	-
Pervious Area (m^2)	3155	0	0	**3155**
Impervious Area (m^2)	0	2290	2525	**4815**
Infiltration Factors				
Topography Infiltration Factor[1]	0.2	0	0	-
Soil Infiltration Factor[2]	0.3	0	0	
Land Cover Infiltration Factor[3]	0.1	0	0	
MOE Infiltration Factor	0.6	0	0	
Run-Off Coefficient	0.4	0	0	
Runoff from Impervious Surfaces*	0.9	0.9	0.9	
Inputs (per Unit Area)				
Precipitation (mm/yr)	886	886	886	**886**
Run-On (mm/yr)	0	0	0	**0**
Other Inputs (mm/yr)	0	0	0	**0**
Total Inputs (mm/yr)	**886**	**886**	**886**	**886**
Outputs (per Unit Area)				
Precipitation Surplus (mm/yr)	294	798	798	**598**
Evapotranspiration (mm/yr)	**592**	**89**	**89**	**288**
Infiltration (mm/yr)	**177**	**0**	**0**	**70**
Runoff Pervious Areas	118	0	0	**47**
Runoff Impervious Areas	0	798	798	**482**
Total Runoff (mm/yr)	**118**	**798**	**798**	**528**
Total Outputs (mm/yr)	**886**	**886**	**886**	**886**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**
Inputs (Volumes)				
Precipitation (m^3/yr)	2796	2029	2238	**7063**
Run-On (m^3/yr)	0	0	0	**0**
Other Inputs (m^3/yr)	0	0	0	**0**
Total Inputs (m^3/yr)	2796	2029	2238	**7063**
Outputs (Volumes)				
Precipitation Surplus (m^3/yr)	928	1826	2014	**4768**
Evapotranspiration (m^3/yr)	**1868**	**203**	**224**	**2295**
Infiltration (m^3/yr)	**557**	**0**	**0**	**557**
Runoff Pervious Areas	371	0	0	**371**
Runoff Impervious Areas	0	1826	2014	**3840**
Total Runoff (m^3/yr)	**371**	**1826**	**2014**	**4212**
Total Outputs (m^3/yr)	**2796**	**2029**	**2238**	**7063**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**

*Evaporation from impervious areas was assumed to be: 10% of precipitation

[1] Measured grade in the post-construction condtions for Site assumed to have the same infiltration factor as rolling land.

[2] Overburden in Site in the post-construction phase is assumed to be comprised of compacted fill with infiltration factor between medium combinations of clay and loam and open sandy loam.

[3] Grass area, assumed to have the same infiltration factor as cultivated land.

TABLE 4: WATER BALANCE SUMMARY

Measurement	Pre-Development	Post-Development	Overall Change (Pre- to Post-) (m^3/yr)	Percentage Change (Pre- to Post-)
Inputs (Volumes)				
Precipitation (m^3/yr)	7063	7063	0	0%
Run-On (m^3/yr)	0	0	0	0%
Other Inputs (m^3/yr)	0	0	0	0%
Total Inputs (m^3/yr)	**7063**	**7063**	**0**	**0%**
Outputs (Volumes)				
Precipitation Surplus (m^3/yr)	2773	4768	1995	72%
Evapotranspiration (m^3/yr)	**4290**	**2295**	**-1995**	**-47%**
Infiltration (m^3/yr)	1047	557	**-490**	**-47%**
Runoff Pervious Areas	1047	371	-676	-65%
Runoff Impervious Areas	680	3840	3161	NA
Total Runoff (m^3/yr)	**1726**	**4212**	**2485**	**144%**
Infiltration from LIDs (m^3/yr)	**NA**	**NA**	**NA**	**NA**
Total Infiltration (m^3/yr)	**1047**	**557**	**-490**	**-47%**
Total Outputs (m^3/yr)	**7063**	**7063**	**0**	**0%**

Effect of Development on Hydrologic Input and Output Characteristics of the Site

Category	Pre-Development	Post-Development
	Percentage of Rain	Percentage of Rain
Total Evapotranspiration	**61%**	**32%**
Total Runoff	**24%**	**60%**
Total Infiltration	**15%**	**8%**

APPENDIX F

Phosphorus Balance Analysis

Ontario

MINISTRY OF THE ENVIRONMENT

Database Version: **V 2.0 Release Update**
Update Date: **30-Mar-12**

Project DEVELOPMENT Summary

DEVELOPMENT: **Residential Subdivision 150 Cemetery Road, Uxbridge, ON**
Subwatershed: **Pefferlaw-Uxbridge Brook**

Total Pre-Development Area (ha):	**0.797**	Total Pre-Development Phosphorus Load (kg/yr):	**0.10**

Pre-Development Land Use	Area (ha)	P coeff. (kg/ha)	P Load (kg/yr)
Low Intensity Development	0.797	0.13	0.10

POST-DEVELOPMENT LOAD

Post-Development Land Use	Area (ha)	P coeff. (kg/ha)	Best Management Practice applied with P Removal Efficiency		P Load (kg/yr)
High Intensity - Residential	0.797	1.32	NONE	0%	1.05

High density residential subdivision consisting of 23 townhouse units, paved areas, and lanscaped areas.

Post-Development Area Altered: **0.80**

Total Pre-Development Area: **0.80**

Unaffected Area: **0**

	P Load (kg/yr)
Pre-Development:	**0.10**
Post-Development:	**1.05**
Change (Pre - Post):	**-0.95**
915% Net Increase in Load	
Post-Development (with BMPs):	**1.05**
Change (Pre - Post):	**-0.95**
915.38% Net Increase in Load	

February 9, 2021

APPENDIX G

Water Well Records

Water Well Records

Wednesday, January 13, 2021

5:23:14 PM

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
UXBRIDGE TOWN	17 649653 4883715 W	2007/07 7215	2		///:	MN		7052036 (Z63051) A055284	
UXBRIDGE TOWN	17 649637 4883883 W	2007/12 6607	2.31	FR		MT		7101756 (M00752) A062351	BRWN SAND SILT 0005 BRWN SAND SILT 0019 GREY SAND 0020
UXBRIDGE TOWN	17 649731 4884280 W	2007/12 7230	1.97			NU	0015 10	7101858 (Z70160) A	BRWN SAND SILT LOOS 0015 BRWN SAND SILT DNSE 0026
UXBRIDGE TOWN	17 649740 4884286 W	2008/02 5459	2	FR 0087	///:	NU		7103265 (Z75624) A063140	BRWN FSND PCKD 0080 BRWN MSND FSND LOOS 0087 GREY CLAY STNS HARD 0088
UXBRIDGE TOWN	17 649733 4884271 W	2008/02 5459	0.79		///:			7103266 (Z75648) A063131 A	
UXBRIDGE TOWN	17 649606 4883875 W	2008/03 6607	2.00			TH		7105650 (Z60543) A059249	BRWN MSND SILT DNSE 0020 GREY MSND DNSE 0027
UXBRIDGE TOWN	17 649276 4883726 W	2008/06 6809	2 2			MO		7111145 (M02929) A073759	BRWN LOAM 0000 GREY FSND SLTY 0020 GREY SAND WBRG 0030 GREY SILT TILL 0032 GREY SILT SAND FGRD 0038 GREY SILT TILL 0042
UXBRIDGE TOWN	17 649577 4883675 W	2008/10 6607						7115824 (M03954) A062351 A	
UXBRIDGE TOWN	17 649715 4884203 W	2009/04 6370		FR 0010		NU		7123913 (Z48973) A043801	BRWN SAND SAND 0026
UXBRIDGE TOWN 001	17 649508 4884255 W	2007/08 6170	6.21		20/25/4/1:0	DO		7050048 (Z72383) A045672	
UXBRIDGE TOWNSHIP (U	17 649704 4884197 W	2013/11 7383	2			MO	0018 10	7214688 (Z166147) A151275	
UXBRIDGE TOWNSHIP (U	17 649582 4883611 W	2015/10 7241	2			MT	0008 10	7253397 (Z217842) A179476	BRWN SAND ROCK LOOS 0008 BRWN SAND LOOS 0014 GREY SILT SAND WBRG 0018
UXBRIDGE TOWNSHIP (U	17 649587 4883699 W	2015/10 7241	2			MT	0008 10	7253396 (Z217841) A188685	BRWN SAND ROCK LOOS 0008 BRWN SAND LOOS 0014 GREY SILT SAND WBRG 0018

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
UXBRIDGE TOWNSHIP (U	17 649594 4883708 W	2015/10 7241	2			MT	0008 10	7253395 (Z217840) A186411	BRWN SAND ROCK LOOS 0008 BRWN SAND LOOS 0014 GREY SILT SAND WBRG 0018
UXBRIDGE TOWNSHIP (U	17 649969 4884276 W	2011/08 7247	2	UT		MT	0018 5	7173093 (Z136620) A119021	BLCK PEAT WDFR LOOS 0012 BRWN SAND SILT LOOS 0017 GREY SILT CLAY DNSE 0022 GREY SILT SAND DNSE 0025
UXBRIDGE TOWNSHIP (U	17 649730 4884191 W	2013/11 7383	2	0023		MO	0018 10	7214687 (Z166149) A151272	
UXBRIDGE TOWNSHIP (U	17 649693 4884234 W	2013/11 7383	2			MO MO	0018 10	7214689 (Z166148) A151144	
UXBRIDGE TOWNSHIP (U	17 649673 4884237 W	2013/11 7383	2	0018			0017 10	7219037 (Z185300) A151226	BLCK 0000 BRWN SAND 0027
UXBRIDGE TOWNSHIP (U	17 649777 4884009 W	2014/06 6946						7237175 (C23647) A159021 P	
UXBRIDGE TOWNSHIP (U	17 649590 4883718 W	2015/02 7247	2	UT 0012		MT	0010 10	7249703 (Z208465) A174069	BRWN GRVL FILL 0005 BRWN CLAY FILL GRVL 0007 BRWN SAND SLTY LOOS 0020
UXBRIDGE TOWNSHIP (U	17 649643 4883714 W	2015/04 7523	2			MO		7240446 (Z201053) A174069 A	
UXBRIDGE TOWNSHIP (U	17 649673 4883881 W	2012/12 5459						7195860 (Z159493) A	
UXBRIDGE TOWNSHIP (U 06 029	17 649705 4884041 W	2007/10 5459	6		///:			7052120 (Z61039) A064976 A	
UXBRIDGE TOWNSHIP (U CON 06 026	17 649815 4883773 W	1978/05 4743	6	FR 0048	12/46/8/2:0	DO	0050 4	1905027 ()	BRWN SAND CLAY LOOS 0017 YLLW CLAY SNDY 0035 BRWN FSND 0054
UXBRIDGE TOWNSHIP (U CON 06 026	17 649715 4883773 W	1980/11 4743	6 5	FR 0044 FR 0048	15/43/8/3:0	CO	0044 4	1905922 ()	WHIT SAND CLAY 0016 BRWN CLAY SAND 0030 BRWN SAND 0048 BRWN SAND CLAY LYRD 0063
UXBRIDGE TOWNSHIP (U CON 06 026	17 649461 4883467 W	1975/11 1413	5	FR 0085	28/60/9/2:0	ST DO	0076 8	4606378 ()	RED SAND 0030 BRWN SAND SILT 0078 GREY FSND 0085
UXBRIDGE TOWNSHIP (U CON 06 026	17 649742 4883791 W	1982/05 4743	6 5	FR 0014	10/44/5/2:30	CO	0040 4	1906401 ()	SAND CLAY LOOS 0014 BRWN SAND LOOS 0044 GREY CLAY SILT 0054
UXBRIDGE TOWNSHIP (U CON 06 026	17 649465 4883423 W	1977/09 4743	6	UK 0055	15/35/15/2:0	IN DO	0057 8	1904819 ()	YLLW SAND FILL 0004 BRWN SAND GRVL LOOS 0020 BRWN SAND CLAY DRTY 0055 GREY SAND CLN 0065
UXBRIDGE TOWNSHIP (U CON 06 026	17 649600 4883706 W	2015/03 7147	1.25	FR 0010			0005 10	7238869 (Z203275) A175800	GREY BRWN SAND

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
UXBRIDGE TOWNSHIP (U CON 06 026	17 649407 4883639 W	2010/11 7247	2	UT 0011		MO	0008 5	7157160 (Z109741) A110459	BRWN SILT SAND LOOS 0007 BRWN FSND PCKD 0013
UXBRIDGE TOWNSHIP (U CON 06 026	17 649520 4883606 W	1974/04 1413	5	FR 0058	18/23/9/2:0	DO	0050 8	4605834 ()	BLCK LOAM 0003 BRWN SAND 0033 BRWN FSND 0044 RED SAND 0058
UXBRIDGE TOWNSHIP (U CON 06 026	17 649615 4883773 W	1980/07 4743	6	FR 0042 FR 0056	12/28/20/3:0	CO	0044 12	1905749 ()	YLLW SAND CLAY LOAM 0030 BRWN SAND CLAY 0042 BRWN FSND 0056 BRWN CLAY SAND 0068 GREY CLAY STNS HPAN 0070
UXBRIDGE TOWNSHIP (U CON 06 027	17 649265 4884023 W	1982/04 1413	6	FR 0090	47/76/5/3:0	DO	0082 8	1906343 ()	BRWN SAND DRY 0014 BRWN CLAY PCKD 0048 BRWN FSND 0081 BRWN SAND LOOS 0090
UXBRIDGE TOWNSHIP (U CON 06 027	17 649715 4883823 W	1983/10 1413	5	FR 0059	15/50/4/1:30	IN	0055 4	1906752 ()	BRWN SAND PCKD 0008 GREY SAND PCKD 0050 BRWN MSND LOOS 0059
UXBRIDGE TOWNSHIP (U CON 06 027	17 649373 4883824 W	1987/07 4743	6	FR 0058	35/60/6/2:30	DO	0065 4	1908514 (06475)	BRWN SAND LOOS 0042 BRWN SAND LOOS 0048 BRWN SAND WBRG PCKD 0058 BRWN SAND CLN 0069
UXBRIDGE TOWNSHIP (U CON 06 027	17 649615 4883923 W	1980/09 4743	6 5	FR 0042	21/30/20/2:0	CO	0042 11	1905867 ()	YLLW SAND CLAY 0020 BRWN SAND PCKD 0042 BRWN FSND 0053 BLUE CLAY SILT SOFT 0065 GREY CLAY 0066
UXBRIDGE TOWNSHIP (U CON 06 027	17 649615 4884023 W	1980/07 4743	6 5	FR 0032 FR 0048	17/24/25/6:0	CO	0032 16	1905747 ()	WHIT SAND CLAY LYRD 0018 BRWN CLAY SAND 0032 BRWN FSND 0040 GREY FSND 0048 GREY CLAY SAND DRTY 0061 GREY CLAY 0065
UXBRIDGE TOWNSHIP (U CON 06 027	17 649622 4883776 W	1985/10 1413	5	FR 0045	10/30/6/1:30	DO	0041 4	1907511 ()	BRWN SAND SILT LOOS 0036 GREY CLAY SILT SOFT 0037 RED SAND LOOS 0045
UXBRIDGE TOWNSHIP (U CON 06 027	17 649906 4884065 L	1985/11 1672	6	FR 0060	18/44/10/0:0	DO	0053 4	1907592 ()	LOAM 0002 SAND GRVL 0010 SAND 0056 SAND FGVL 0060
UXBRIDGE TOWNSHIP (U CON 06 027	17 649681 4883794 W	1985/12 1672	6	FR 0055	18/49/5/2:0	DO	0048 4	1907599 ()	LOAM 0001 SAND GRVL 0014 CLAY 0036 SAND FGVL 0055
UXBRIDGE TOWNSHIP (U CON 06 027	17 649379 4883816 W	1986/07 4743	6 5 5	FR 0046	21/55/6/2:30	DO	0046 8	1907891 (NA)	YLLW CLAY SAND 0016 BRWN SAND LOOS 0046 BRWN SAND DKCL 0050 BLUE CLAY 0055 GREY SAND FSND 0059 GREY SILT CLAY 0064
UXBRIDGE TOWNSHIP (U CON 06 027	17 649399 4883929 W	1986/10 0001	6 5	FR 0072	45/60/10/2:30	DO	0073 4	1907940 (NA)	BRWN SAND 0004 BLCK BLDR HARD 0007 BRWN SAND LOOS 0072 GREY SAND FSND 0078 GREY SAND CLAY MUCK 0081
UXBRIDGE TOWNSHIP (U CON 06 027	17 649265 4883773 W	1985/04 1413	5	FR 0050	15/42/4/2:0	DO	0046 4	1907292 ()	BRWN SAND LOOS 0010 BRWN CLAY SAND SOFT 0018 BRWN GRVL SAND LOOS 0020 BRWN CLAY SOFT 0035 BRWN FSND 0050
UXBRIDGE TOWNSHIP (U CON 06 027	17 649415 4883923 W	1977/06 4743	6	FR 0055	17/42/20/2:30	DO	0058 12	1904795 ()	BRWN SAND FILL 0008 BRWN SAND LOOS 0016 BRWN GRVL SAND 0019 BRWN SAND DRY 0055 BRWN SAND PCKD 0062 GREY FSND 0070
UXBRIDGE TOWNSHIP (U CON 06 027	17 649821 4884000 W	2014/08 1413	6.25	FR 0051	12/40/15/1:	IN	0046 5	7229505 (Z180161) A156474	BRWN SAND PCKD 0038 GREY SAND FSND 0051

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
UXBRIDGE TOWNSHIP (U CON 06 027	17 649739 4883944 W	2017/08 7241	2			TH MO	0007 10	7295897 (Z268111) A221813	BLCK 0003 BRWN SAND 0017
UXBRIDGE TOWNSHIP (U CON 06 027	17 649733 4883943 W	2017/08 7241	2			TH MO	0010 10	7295898 (Z268110) A208702	BLCK 0003 BRWN SAND 0020
UXBRIDGE TOWNSHIP (U CON 06 027	17 649735 4883951 W	2017/08 7241	2			TH MO	0010 10	7295899 (Z268109) A233972	BLCK 0003 BRWN SAND 0020
UXBRIDGE TOWNSHIP (U CON 06 027	17 649669 4883988 W	2017/08 7241	2			TH MO	0017 10	7295900 (Z268105) A233903	BLCK 0003 BRWN SAND 0027
UXBRIDGE TOWNSHIP (U CON 06 027	17 649706 4883868 W	2017/08 7241	2			TH MO	0010 10	7295901 (Z268108) A217557	BLCK 0003 BRWN SAND GRVL 0020
UXBRIDGE TOWNSHIP (U CON 06 027	17 649622 4883908 W	2017/08 7241	2			TH MO	0017 10	7295903 (Z268106) A208827	BLCK 0003 BRWN SAND 0027
UXBRIDGE TOWNSHIP (U CON 06 027	17 649647 4883897 W	2017/08 7241	2			TH MO	0015 10	7295902 (Z268107) A233912	BLCK 0003 BRWN SAND 0025
UXBRIDGE TOWNSHIP (U CON 06 027	17 649497 4883905 W	1991/05 3903	6 6	FR 0316	25/113/6/8:0	CO	0308 8	1911176 (104177)	BRWN FSND LOOS 0006 BRWN CLAY STNS HARD 0012 BRWN FSND LYRD 0069 BRWN GRVL CLAY LYRD 0071 BRWN GRVL CLAY LYRD 0074 BRWN FSND LOOS 0085 GREY CLAY SAND LYRD 0106 GREY CLAY GRVL LYRD 0117 GREY CLAY SAND LYRD 0308 GREY FSND GRVL LYRD 0316 GREY CLAY SNDS LYRD 0365 BRWN CLAY SHLE LYRD 0375
UXBRIDGE TOWNSHIP (U CON 06 027	17 649643 4883915 W	1974/04 1413	5	FR 0054	17/23/12/1:0	DO	0046 8	4605940 ()	BLCK LOAM 0002 BRWN SAND 0039 RED SAND 0054
UXBRIDGE TOWNSHIP (U CON 06 027	17 649309 4883520 W	1961/08 3414	4	SA 0105	40///:	DO		4602987 ()	LOAM 0001 CLAY MSND 0047 SILT 0105 GREY CLAY GRVL 0380 BLCK SHLE 0450
UXBRIDGE TOWNSHIP (U CON 06 027	17 649905 4884065 L	2000/04 1413	6	FR 0102	30/92/10/1:	DO	0094 8	1914533 (214724)	BRWN SAND PCKD 0027 BRWN SAND CLAY SOFT 0050 BRWN FSND 0075 GREY FSND 0102
UXBRIDGE TOWNSHIP (U CON 06 028	17 649415 4884173 W	1984/05 1413	6	FR 0052	15/33/8/1:30	DO	0045 7	1906959 ()	BRWN SAND PCKD 0012 BRWN CLAY DNSE 0043 BRWN SAND LOOS 0052
UXBRIDGE TOWNSHIP (U CON 06 028	17 649804 4884140 W	2006/06 5459	6					1918347 (Z35910) A016067 A	
UXBRIDGE TOWNSHIP (U CON 06 028	17 649565 4884173 W	1980/10 2407	6	FR 0074	25/64/9/2:0	DO	0074 3	1905951 ()	BLUE LOAM 0001 BLUE CLAY SAND 0032 BLUE CLAY 0074 BLUE SAND 0077
UXBRIDGE TOWNSHIP (U CON 06 028	17 649515 4884283 W	1976/01 1413	6	FR 0091	26/60/10/2:30	DO	0083 8	4606427 ()	BRWN SAND CLAY SILT 0077 RED FSND LOOS 0091

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
UXBRIDGE TOWNSHIP (U CON 06 028	17 649351 4884199 W	1994/11 5459	6	FR 0126	50/120/2/2:30	DO	0129 6	1912216 (141549)	BRWN SAND 0030 BRWN CLAY SOFT 0047 GREY CLAY SILT 0062 GREY CLAY SAND HARD 0118 GREY CLAY HARD 0126 GREY SAND SILT 0135
UXBRIDGE TOWNSHIP (U CON 06 028	17 649252 4884210 W	1989/03 4743	6	FR 0081	18//5/2:0	DO	0081 5	1909796 (54744)	BRWN LOAM WTHD 0002 BRWN SAND LOOS 0039 GREY CLAY GRVL HARD 0054 BRWN SAND SOFT 0056 GREY CLAY GRVL HARD 0081 BLCK SAND HARD 0087
UXBRIDGE TOWNSHIP (U CON 06 028	17 649815 4884223 W	1983/04 4738	6	FR 0040	10/41/12/3:0	CO	0059 3	1906661 ()	BRWN SAND LOOS 0040 GREY FSND VERY 0056 GREY FSND 0062
UXBRIDGE TOWNSHIP (U CON 06 029	17 649735 4884259 W	2004/05 7154	6.21 0.27	FR 0080 UK 0090 FR 0280		MN	0080 10	1917061 (Z06854) A006823	BRWN MSND 0089 GREY MSND 0105 GREY CLAY SLTY STNS 0212 GREY CLAY STNS SLTY 0300
UXBRIDGE TOWNSHIP (U CON 06 029	17 649605 4883900 W	1996/04 1413	6			CO		1912825 (166554) A	

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		