15450 Woodbine Avenue, Stouffville, Ontario

Hydrogeological Investigation and Water Balance Assessment

Client:
Galatia Lane Estates Inc.
c/o Treasure Hill
1681 Langstaff Road, Unit 1
Vaughan, Ontario
L4K 5T3

Attention: Mr. Hesham Mohamed

Type of Document:
FINAL Updated Report

Project Name:
15450 Woodbine Avenue, Stouffville, Ontario

Project Number:
GTR-21010864-C2

Date Submitted:
2026-03-09

1595 Clark Boulevard | Brampton, ON, L6T 4V1 | Brampton
t : 905.793.9800 | f: 905.793.0641 | exp.com

Table of Contents

List of Figures

List of Appendices

1 Introduction

1.1 Project Description

EXP Services Inc. (EXP) was retained by Galatia Lane Estates Inc. c/o Treasure Hill to prepare an Hydrogeological Investigation and Water Balance Assessment Report associated with the proposed development located at 15450 Woodbine Avenue, Stouffville, Ontario (hereinafter referred to as the 'Site').

The Site is rectangular land parcel in shape extending between the Highway 404 limits to the west and Woodbine Avenue to the east. It is located in a rural and industrial land use setting where the Site is currently a combination of open spaces and industrial development within western portion of the Site (Block 1).

The draft plan of subdivision provided (MGP dated April 22, 2024) indicates that the Site development consists of nine blocks (Blocks 1 through 9) with Blocks 1 to 7 to be developed for industrial use, Block 8 assigned as a landscape buffer between access road along northern portion of the Site, and Block 9 designated as Natural Heritage System. The subdivision to be provided with access roads (Streets A and B). It is EXP understanding that the proposed development for Block 1 includes construction of a two (2) storey slab-on-grade industrial building with associated sewer servicing, paved parking, and loading areas as well as an outdoor storage yard. An access road (Street A) is situated along the north end of the Site connecting the industrial building in Block 1 with Woodbine Avenue to the east. The Site location plan is shown in Figure 1. The proposed development will be provided with private services including water supply (groundwater-based water supply well) and a septic system.

EXP previously conducted a Preliminary Geotechnical Investigation for this and the adjacent property at 15374 Woodbine Avenue and a hydrogeological assessment of the Block 1 component of the subdivision. This report was updated with additional information to address the pre-consultation requirements (dated June 24, 2025) for a draft plan of subdivision application for the entire property located at 15450 Woodbine Avenue. The pertinent information gathered from the noted investigations is utilized for this report.

1.2 Project Objectives

The main objectives of the Hydrogeological Investigation and Water Balance Assessment are as follows:

- Establish the local hydrogeological settings within the Site;
- Provide recommendations on construction and long-term dewatering;
- Conduct a door-to-door baseline well survey;
- Conduct water supply feasibility study including assessment of aquifer parameters and water supply source availability (drilling test well and conduct 24-hour pumping test);
- Assess groundwater quality;
- Conduct nitrate impact assessment study;
- Develop a site-specific water balance for pre- and post-development conditions using a Thornthwaite-Mather water balance approach and provide water balance deficits between pre- and post-development conditions (desktop); and
- Prepare an Hydrogeological Investigation and Water Balance Assessment Report.

1.3 Scope of Work

To achieve the investigation objectives, EXP has completed the following scope of work:

- Reviewed available geological and hydrogeological information for the Site;
- Conducted baseline door-to-door well survey to confirm water well users in the area within 500 m of the property;
- Drilled and installed a total of twenty (20) 50 mm diameter monitoring wells for the proposed development varying in depths between 3 and 7.5 meters below ground surface (mbgs);
- Developed and conducted Single Well Response Tests (SWRT) on five (5) selected monitoring wells to evaluate hydraulic properties of the saturated soils at the Site;
- Completed twenty one (21) rounds of groundwater level measurements in all available monitoring wells;
- Equipped five (5) selected monitoring wells with data loggers for continuous groundwater monitoring;
- Drilled and install one (1) 150 mm diameter (6'') pumping well (PW) to 83.52 mbgs and two (2) 50 mm observation wells (OW1 and OW2) up to the same depth as pumping well (up to 85 mbgs each);
- Developed one (1) PW and two (2) OWs and conducted two (2) Mogg-type step drawdown tests on PW;
- Prepared pumping test design report and obtained the MECP water taking permit for pumping test (EASR);
- Instrumented PW and two (2) OWs with data loggers (total of 3) to establish baseline water levels and to complete continuous pumping test monitoring and to evaluate deep-water bearing zones connections;
- Conducted 24-hour constant rate pumping test to assess aquifer parameters at PW;
- Collected total of five (5) groundwater samples, as follows:
    - one (1) groundwater sample for laboratory testing of the Town of Whitchurch-Stouffville and Region of York Sanitary and Storm Sewer By-Law parameters;
    - one (1) groundwater sample from a pumping well (PW) was collected at the end of well development test for disposal options and to assess the suitability of groundwater for discharge into the environment during pumping test;
    - three (3) groundwater samples from a pumping well (PW) for laboratory testing for Ontario Drinking Water Standards (ODWS) including bacteriological analyses (Escherichia coli (E-coli) and Total Coliforms), Nitrite and Nitrate and general chemistry water sample (RCAP);
- Conducted two (2) in-situ infiltration tests on the two (2) shallow monitoring wells installed in the area of the proposed leaching beds of the septic system at the Site;
- Evaluated the information collected during the field investigation program, including borehole geological information, Water Well Records (WWR), SWRT results, groundwater level measurements and groundwater water quality;
- Prepared site plans, cross sections, geological mapping and groundwater contour mapping for the Site;
- Provided preliminary recommendations on the requirements for short term construction dewatering;
- Provided recommendations on the Ministry of Environment, Conservation and Parks (MECP) Water Taking Permits and Region of York Sewer Discharge Agreements (SDA) for the construction and post-construction phases;
- Mapped existing areas in accordance with topography, soil cover, shallow soil types (desk-top);
- Conducted a Site specific pre- and post-development water balance assessment (desk top study) utilizing a Thornthwaite and Mather method based on 30 years of climatic data;

- Estimated deficits between pre and post development conditions, and identified areas where mitigation measures can be implemented;
- Provided recommendations on mitigation measures and preliminary sizing of Low Impact Development measures (LIDs);
- Conducted water supply feasibility study as per D-5-5 Private Wells: Water Supply Assessment technical guideline requirements;
- Completed septic system feasibility and nitrate impact evaluation as per D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment guidelines; and,
- Prepared a Hydrogeological Investigation and Water Balance Assessment Report.

The Hydrogeological Investigation and Water Balance Assessment was prepared in accordance with the Ontario Water Resources Act, and Ontario Regulation 387/04, D-5-5 Private Wells: Water Supply Assessment technical guideline requirements and D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment technical guideline requirements. The report generally complies with Conservation Authority Guidelines for Hydrogeological Assessments (2013), based on the current proposed development, potable groundwater quality, and impact assessments.

1.4 Review of Previous Reports

The following reports were reviewed as part of this Hydrogeological Investigation and Water Balance Assessment:

- EXP Services Inc. (2025-01-31). Hydrogeological Investigation and Water Balance Assessment, Proposed Development, 15450 Woodbine Avenue, Stouffville, Ontario
- EXP Services Inc. (2021-06-17). Preliminary Geotechnical Investigation, Proposed Residential Development, 15374 and 15450 Woodbine Avenue, Gormley, Ontario.
- EXP Services Inc. (2021-06-17). Phase II Environmental Site Assessment, 15374 and 15450 Woodbine Avenue, Gormley, Ontario.

Any past and/or future geotechnical, hydrogeological, environmental and risk assessments, and updated development/architectural plans should be provided to update/include in the hydrogeological report which will be used for submission of permits and approvals by the municipalities and agencies.

2 Hydrogeological Setting

2.1 Regional Setting

2.1.1 Regional Physiography

The Site is within a physiographic region known as the Oak Ridges Moraine (Chapman & Putnam, 2007), Figure 2A. The Site is located within physiographic form called kame morains (Figure 2B). The Oak Ridges Moraine is characterized as rolling sandy hills, hummocky topography and closed depressions that form the source of the headwaters to major streams (primarily consisting of surficial sand and gravel deposits).

2.1.2 Regional Geology and Hydrogeology

Regionally, the Site is located in a region where the surficial geology comprises of stone-poor, carbonate-derived silty to sandy till and coarse textured (Foreshore-basinal) glaciolacustrine deposits (Ministry of Northern Development and Mines, 2012 from ORMGP, 2022). The surficial geology of the Site and surrounding areas is shown on Figure 2C.

Based on the available regional geology maps, the subsurface stratigraphy of the Site from top to bottom is summarized in Table 2-1 (Oak Ridge Moraine Groundwater Program (ORMGP, 2022). The overburden thickness is approximately 149 to 156 m (ORMGP, 2022). Bedrock geology is shown on Figure 2D. The surface elevation at the Site is ranging from 291.57 to 309.44 metres above sea level (masl) from the borehole logs.

Table 2-1: Summary of Subsurface Stratigraphy

Stratigraphic Unit	General Description	Top Elevation of Stratigraphic Unit
Halton Till or Equivalent (Aquitard)	This lithologic unit typically consists of sandy silt to clayey silt till interbedded with silt, clay, sand and gravel.	306 to 307 masl
Oak Ridges Moraine or Equivalent (Aquifer)	This geology unit mainly consists of interbedded fine-grained sand and silt deposits where coarse-grained sand and gravel along with clay laminae are locally reported.	Not mapped
Newmarket Till (Aquitard)	This lithologic unit mainly consists of a massive and dense silty sand unit.	300 to 305 masl
Thorncliffe Formation (Aquifer)	This geology formation generally consists of glaciofluvial (sand, silty sand) or glaciolacustrine deposits (silt, sand, pebbly silt and clay).	253 to 255 masl
Sunnybrook Formation (Aquitard)	This lithologic unit was deposited near an ice sheet. It predominately consists of silt and clay.	192 to 194 masl
Scarborough Formation (Aquifer)	This geology unit is interpreted as deposits of a fluvial-deltaic system fed by large, braided melt-water rivers draining from an ice sheet. It consists of peat and sand overlaying silt and clay deposits.	178 to 180 masl
Blue Mountain Formation	Bedrock primarily consists of dark-grey to black shale with thin interbeds of limestone and calcareous siltstone. It belongs to the Ordovician Age, (Ministry of Northern Development and Mines, 2012).	152 to 154 masl

Regional groundwater across the area typically flows north, towards a tributary of Bogart Creek and the Holland River (East Branch), which eventually flows north towards Lake Simcoe. Local deviation from the regional groundwater flow pattern may occur in response to changes in topography and/or soils, as well as the presence of surface water features existing subsurface infrastructure or dewatering activities.

2.1.3 Existing Water Well Survey

Water Well Records (WWRs) were compiled from the database maintained by the Ministry of the Environment, Conservation and Parks (MECP) and reviewed to determine the number of water wells documented within a 500-m radius Study Area of the Site boundaries. The locations of the MECP WWRs within 500 m of the Site are shown on Figure 3. A summary of the WWR is included in Appendix A.

The MECP WWR database search indicates a total of sixty-eight (68) well records that are reportedly located within a 500 m radius from the Site boundaries. These include twenty (20) on-site WWRs and forty-eight (48) off-site WWRs. All records indicate that there are twenty-one (21) water supply wells, thirty-six (36) monitoring and observation wells or test holes, six (6) (9) abandoned wells and five (5) wells listed with unknown use records. The database indicated that there are reportedly twenty (20) well records within the Site perimeter. All twenty (20) wells are reportedly monitoring and observation wells or test holes. The database further indicates that all offsite water supply well records are reportedly at an approximate distance of 99 m or greater from the Site boundary (Figure 3).

The water was found reportedly at depths ranging from 0.6 meters to 84.1 meters below ground surface (mbgs).

It is unlikely that the zone of influence from the shallow construction dewatering activities at the Site will affect the water takings in the surrounding area. The locations of the MECP WWRs within 500 m of the Site are shown on Figure 3. A summary of the available MECP WWRs is included in Appendix A.

2.1.4 Door to Door Well Condition Survey

As part of this Hydrogeological Investigation and Water Balance Assessment and to verify results of the MECP WWR searches, a baseline residential (door-to-door) water well survey was completed within 500 m of the Block 1 Site on April 4 of 2024.

In accordance with the MECP requirements, the well survey questionnaire was completed and documented prior to the construction of the development. The baseline residential well survey was done following the procedures and protocols established by the MECP.

Before the scheduled door-to-door survey, notice of private well survey letters including water well survey forms were prepared and distributed to residences within 500 m of the Site on April 4, 2043. Each letter explained the purpose of the study and requested the participation of the residents in a survey program. The water well survey form included questions about the wells (e.g. type of well, location, age, depth, etc.), the quantity of water (water levels, usage) and quality of water (clarity, odour, treatment types, etc.). Appendix B includes the well survey package distributed to all properties within 500 m zone of the Site.

All properties within 500 m zone of the Site were visited during the door-to-door survey on April 4, 2024. During a door-to-door well survey, a total of eleven (11) letters were distributed. Based on survey results, one (1) survey letter was partially completed during the door-to-door survey representing approximately 9 % of all locations visited. The results of completed door-to-door well surveys presented in Appendix B.

The property owner of a well at 15517 Woodbine Avenue agreed to participate in a water sampling. To establish groundwater baseline conditions, one (1) water sample was collected from the domestic well (raw water) on April 4 of 2024.

During the collection of samples, the tap at the property was allowed to run for 10-15 minutes before sampling to flush the waterline and obtain fresh water from the well. The samples were unfiltered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test-group specific preservatives, as required. Dedicated nitrile gloves were used during each sampling event and sample handling.

All samples were submitted for analysis to Bureau Veritas Laboratory, a CALA certified independent lab in Mississauga, Ontario for parameters listed in Ontario Drinking Water Standards (ODWS) including bacteriological analyses (Escherichia coli (E-coli) and

Total Coliforms), Nitrite and Nitrate and general chemistry water sample (RCAP). Analytical results indicate that all parameters analyzed meet ODWS.

2.2 Source Protection Areas (SPA)

The Site was evaluated for groundwater source protection, well head protection, and aquifer vulnerability from MECP Ontario Source Protection Information Atlas (MECP, 2025).

The Site is entirely located within the Lake Simcoe and Couchiching/Black River Source Protection Area (SPA). The Site is located in the area administered by the Lake Simcoe Region Conservation Authority (LSRCA) along with its neighboring Conservation Authorities, are committed to preventing initial contamination of upstream source water including streams, lakes or underground aquifers from contaminating land use activities and de-icing activities. Reducing these activities would result in reduced downstream treatment requirements.

2.2.1 Wellhead Protection Areas (WHPA) and Intake Protection Zones (IPZ)

Well Head Protection Areas (WHPA) are areas that are identified as under the influence of significant groundwater use for drinking water supplies and where potential for influence from surface activities may directly impact the groundwater quality and quantity.

Although being outside of any WHPA areas for municipal water supply wells, the Site is located within the WHPA Q1/Q2 with moderate intrinsic vulnerability score. Therefore, policy LUP-12 of the South Georgian Bay Lake Simcoe Source Protection Plan is applicable.

The Site is outside of any Highly Vulnerable Aquifers (HVA) areas as identified in the MECP Ontario Source Protection Information Atlas or any Groundwater Under Direct Influence (GUDI) areas (Appendix C).

Based on Schedule “I” of the Official Plan from the Town of Whitchurch-Stouffville, the Site is located outside of any identified areas of high or low aquifer vulnerability (Appendix C).

The Site is predominantly outside of any areas of identified surface water vulnerability. However, the eastern fringes of the Site are located within Intake Protection Zone (IPZ) 3 (Appendix C). This area is designated as natural heritage system in proposed draft plan of subdivision and will be preserved in its undisturbed state in post-development conditions.

2.2.2 Significant Groundwater Recharge Area (SGRA)

The Site is located within a Significant Groundwater Recharge Area (SGRA) at the south and central portions of the Site, with low vulnerability score of 2 (Appendix C). The groundwater in this area and its discharge supports cold water streams and wetlands that feed ecological features. Management of groundwater in this area is considered paramount to the health of ecosystems. Management of surface activities that would minimize impacts on surface runoff and shallow groundwater would be an asset to the site development.

2.2.3 Ecologically Significant Groundwater Recharge Area (ESGRA)

Approximately half of the property is located within an Ecologically Significant Groundwater Recharge Area (ESGRA) where the land is responsible for supporting groundwater systems that sustain sensitive features like cold water streams and wetlands. Figure 10 shows the ESGRA map of the entire Site.

As the site is partially mapped within a Significant Groundwater Recharge Area (SGRA) and an Ecologically Significant Groundwater Recharge Area (ESGRA), Lake Simcoe Protection Policy 6.40-DP would be applicable. Pre-development recharge must be maintained on-site within ESGRA areas.

2.3 Site Setting

2.3.1 Climate and Precipitation

The subject Site is within the Simcoe and Kawartha Lakes climatic region of Southern Ontario (Brown et al, 1980). Climatic data for the study area including average monthly precipitation and average temperatures were obtained from the National Climate Data and Information Archive (Environment Canada) for the King Smoke Tree station (Station ID No.6154142). The King Smoke Tree climate station is considered to be representative and is located approximately 9 km northwest from the Site.

Based on data from King Smoke Tree climate station (29 years from 1975 to 2003), the historical average annual precipitation for the area is approximately 851.2 mm. Commonly, July and August are the wettest months and January, and February are the driest.

2.3.2 Site Topography

The Site is in a rural land use setting. The topography is gradually sloping to the south towards Lake Ontario.

As indicated on the borehole logs included in Appendix D, the surface elevation of the Site ranges between approximately 291.57 to 309.44 masl from the borehole logs.

2.3.3 Local Surface Water Features

The Site is within the East Holland River watershed. The nearest surface water feature is a tributary of East Holland River, which flows across the most eastern portions of the property.

2.3.4 Local Geology and Hydrogeology

A summary of subsurface soil stratigraphy is provided in the following paragraphs. The soi descriptions are summarized for the hydrogeological interpretations. As such, the information provided in this section shall not be used for construction design purposes.

The detailed soil profiles encountered in each borehole and the results of moisture content determinations are presented on the attached borehole logs (Appendix D). The soil boundaries indicated on the borehole logs are inferred from non-continuous sampling and observations during drilling. These boundaries are intended to reflect approximate transition zones for the Hydrogeological Investigation and Water Balance Assessment and shall not be interpreted as exact planes of geological change.

The "Notes on Sample Description" preceding the borehole logs form an integral part of and should be read in conjunction with this report. The following is a brief description of the soil conditions encountered during the investigation.

Based on the results of the geotechnical investigation, the general subsurface soil stratigraphy consists of the following units from top to bottom:

FILL

Fill was encountered surficially in in all boreholes. The fill generally comprised of sandy silt to silt materials, with trace to some clay and intermittent sand seams. Trace organics and rootlets were encountered in the fill materials, and it was noted to be dark brown and in a moist condition. The fill extended from surface to depths of up to 5.4 mbgs.

SAND

Sand was encountered beneath the fill at boreholes BH210 and BH211 to depths of 3.8 to 4.4 mbgs (termination depth of BH211). The sand layer was generally found to be brown and in a moist condition.

SILTY SAND

A silty sand layer was encountered beneath the fill in borehole BH208 to a depth of 1.5 mbgs. The silty sand was found to be brown and in a moist condition.

CLAYEY SILT

A clayey silt layer was encountered beneath the fill in boreholes BH201, BH204 and BH207 to depths in the range of 3.0 to 6.1 mbgs. The clayey silt included occasional sand pockets and was found to be in saturated condition.

SILT

A silt layer was encountered in all boreholes (except borehole BH211), either beneath the fill layer (in boreholes BH202, BH203, BH205, BH206), beneath the silty sand (in borehole BH208) or below the clayey silt (in boreholes BH201, BH204 and BH207) to terminations depths in the range of 4.4 to 8.3 mbgs. Trace to some clay, and trace sand and gravel were occasionally encountered in the silt layer. The silt was brown to grey in colour, with grey soils encountered at depths of approximately 4.5 to 6.2 mbgs.

The borehole and monitoring well locations are shown on Figure 4. Geological cross-sections were generated based on the available borehole logs completed as part of the previous and current investigations and shown on Figures 5A to 5C (cross section A-A', cross section B-B' and cross section C-C'). Cross sections show a simplified representation of soil conditions and soil deposits may be interconnected differently than represented. Borehole logs used to generate all three cross-sections are provided in Appendix D.

3 Results

3.1 Well Details

The monitoring, pumping test and observation wells network was installed as part of the previous and current geotechnical, environmental and hydrogeological investigations at the Site. Total of twenty (20) monitoring wells, one (1) pumping well and two (2) observation wells were installed by EXP between May 25 of 2021 and December 5 of 2024. The on-site well network consists of the following:

- Six (6) overburden monitoring wells (BH6, BH11, BH18, BH103, BH106 and BH108) varying in depths from 6.0 and 7.5 mbgs were installed for preliminary geotechnical and environmental investigations;
- Nine (9) overburden monitoring wells (i.e., BH201 to BH209) were installed to depths ranging from 6.1 to 7.6 mbgs;
- Two (2) shallow wells (i.e., BH210 and BH211) for in-situ infiltration testing were installed to a depth of 3.9 mbgs.
- The diameter of all monitoring wells is 50 mm.
- All wells were installed with an above grade protective casings.
- Each monitoring well was instrumented with 3 m long well screens with the exception of BH210 and BH211 which were instrumented with 1.5 m screens.

Three (3) additional wells were installed between April 25 and May 17 of 2024 by Constable Water Wells Inc. drillers in support of the private water supply feasibility study (Refer to Section 5 for details). These included:

- One (1) 150 mm diameter steel pumping well (PW), domestic water supply well MECP Well Tag A387542, to a depth of approximately 83.52 m, completed as natural pack with telescopic 30 slot stainless steel screen installed between 80.52 and 83.52 m.
- Two (2) 50 mm diameter PVC observation wells (OW1 and OW2) were installed to the approximate depth as pumping well (to 83.57 m), with three (3) m long screens.

Three (3) additional wells were installed on December 5 of 2024 in support of the proposed septic system assessment. These included:

- Three (3) shallow infiltration test wells (i.e., INF 304, INF 306 and INF 307) for *in situ* infiltration testing installed to depths varying from 4.47 to 4.58 mbgs.
- The diameter of these three (3) monitoring wells is 50 mm.
- The shallow infiltration test monitoring wells were instrumented with 1 m well screens and above ground protective casings.

The boreholes, infiltration tests locations, monitoring wells, pumping well and observation well locations are shown on Figure 4. Borehole logs and well installation details are provided in Appendix D. MECP well records included in Appendix A.

3.2 Water Level Monitoring

As part of the Hydrogeological Investigation and Water Balance Assessment, static water levels in all available wells installed on Site were monitored on twenty one (21) monitoring events between May 26 of 2021 and August 15 of 2025. This included five (5) water level measurements collected for a water supply feasibility study between May 10 and October 1 of 2024. The groundwater monitoring program was terminated after majority of monitoring wells were decommissioned. Additional round of water level measurements was collected at all available monitoring wells on August 15, 2025. A summary of all static water level data as it relates to the elevation survey is given in Appendix E in Table E-1.

The groundwater elevations recorded in the monitoring wells with groundwater data ranged from 296.92 masl (3.81 mbgs at BH209 on February 28, 2023) to 305.93 masl (3.51 mbgs at BH204 on March 29, 2023). The highest groundwater levels were

recorded on March 29, 2023 for monitoring wells BH201, BH204, BH205, and BH208. Monitoring wells BH202 and BH207 had their highest groundwater levels recorded on May 29, 2023. BH209 had its highest groundwater level recorded on April 26, 2023. The water levels then generally declined to the summer measurement date of July 26, 2023. These results confirm that the highest groundwater levels for all wells were recorded during the spring season.

The recorded data from borehole BH208 indicates the water level was similar to the previous month while the groundwater levels in all other monitoring wells with detectable groundwater levels were generally declining as compared to the previous months data.

High groundwater conditions in each monitoring well appears to occur from March to May 2023 monitoring periods. It is interpreted that seasonal high-water levels were recorded on March 29 of 2023 monitoring event.

Boreholes BH210 and BH211, installed in the area of the proposed septic tile bed, have been "Dry" during all site visits. Monitoring wells (BH203 and BH206) installed to depths of 7.6 mbgs (elevations of 299.88 masl and 301.16 masl, respectively) still remain "Dry". In late August 2023, earthworks began on the Site which destroyed all monitoring wells with the exception of BH205. BH205 was subsequently decommissioned / destroyed and was not available for monitoring during the 2024 monitoring period.

The dataloggers were installed in five (5) monitoring wells (BH201, BH202, BH205, BH208 and BH209) and their locations are included in the attached Borehole Location Plan. The resulting hydrographs recorded were overlaid with the manual monthly water level monitoring data and included in Hydrographs Appendix E.

Based on seasonal water level monitoring completed, it is interpreted that the March 29 of 2023 monitoring event represents the seasonal high-water levels for the shallow water bearing.

As indicated in the hydrographs, water levels were generally increasing during the month of March, which peaked in late March or early April for all monitoring wells observed. For monitoring wells BH201 and BH205, groundwater levels decreased from April through June. For monitoring wells BH202, BH208, and BH209, groundwater levels generally decreased into mid-April, which was then followed by small fluctuations through to June.

As indicated in the Hydrographs, there was steady decline of water levels from the end of the High-Water Level (HWL) season. The maximum high-water level was encountered on March 29, 2023, at BH204 at a depth of 3.51 mbgs (305.93 masl).

Three (3) groundwater contour maps were created for the Site to show the shallow groundwater contours of the water levels recorded during seasonal high conditions (Figures 6A and 6B,as measured on March 2 and 29, 2023, respectively) and during the August 15 of 2025 monitoring event (Figure 6C). It should be noted that a groundwater divide exists at the eastern boundary of the Block 1 area, where groundwater east of the Block 1 boundary flows towards the east and groundwater within Block 1 limits flows south to southwest. Based on August 15 of 2025 monitoring event, it is interpreted that shallow groundwater flows in south easterly direction towards Holland River tributaries. It should be noted that BH205 was not considered for the shallow groundwater contour mapping (Figure 6B) since it is partially screened in fill material and therefore does not represent the water table conditions from a water bearing zone originated in native soils.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. This may also affect the direction and rate of groundwater flow.

In addition, for a water supply feasibility study (Section 5 of this report), water levels at PW, OW1 and OW2 were monitored between May 22 and October 3 of 2024. Table 3-1 below provides a summary of static water level data for pumping well and observation wells as it relates to the elevation survey. Also, all static water level data is included in Appendix E (Table E-1).

Table 3-1: Summary of Measured Groundwater Elevations for PW and OWs

Well ID	Ground Surface Elevation (masl)	Approximate Full Well Depth (mbgs)	Depth	10-May-24	22-May-24	24-May-24	18-Sep-24	1-Oct-24
PW	304.75	84.25	mbgs	NM	43.52	43.56	45.97	45.66
			masl	-	261.23	261.19	258.78	259.09
OW1	303.97	83.72	mbgs	43.54	43.18	43.24	46.30	45.99
			masl	260.43	260.79	260.73	257.67	257.98
OW2	304.86	84.63	mbgs	NM	43.53	43.56	45.87	45.59
			masl	-	261.33	261.30	258.99	259.27

Notes: mbgs - meters below ground surface
masl - meters above mean sea level
NM- not measured

Groundwater elevations in wells installed within the newly proposed septic system area varied between dry at INF 304 on December 9, 2024 to 302.38 masl (2.58 mbgs) at INF 306 on December 9, 2024. These water levels are interpreted to represent perched water table conditions. Table 3-2 shows the summary of measured Groundwater Elevations for INF 304, 306 and 307 wells.

Table 3-2: Summary of Measured Groundwater Elevations for Infiltration Test Monitoring Wells

Well ID	Ground Surface Elevation (masl)	Approximate Full Well Depth (mbgs)	Depth	5-Dec-24*	09-Dec-24	10-Dec-24
INF 304	304.78	4.54	mbgs	Dry	Dry	3.68
			masl	-	-	301.10
INF 306	304.96	4.47	mbgs	Dry	2.58	2.83
			masl	-	302.38	302.13
INF 307	305.09	4.58	mbgs	3.97	2.78	2.76
			masl	302.10	302.31	302.33

Notes: mbgs - meters below ground surface
masl - meters above mean sea level
* - measured after completion of drilling

It should be noted that water levels observed on December 10 of 2024 (Table 3-2) might be under influence following 24-hour pre-soaking event, as required for conducting the in-situ infiltration tests during this time of the year (CVC – TRCA (2010) Low Impact Development (LID) Stormwater Management Planning and Design Guide).

The groundwater levels recorded in BH 6, BH11 and BH18 varied between 0.56 mbgs (Elev. 291.01) at BH18 to 3.41 (Elev. 300.07) at BH11, as measured on June 7 of 2021 and 2.24 mbgs (Elev 289.33) at BH18 to 6.64 (Elev. 294.79) at BH6, as measured on August 15 of, 2025. Groundwater elevations and well details are summarized in Table 3-3. Monitoring well locations can be found on Figure 4.

Table 3-3: Summary of Measured Groundwater Elevations – August 15, 2025

Well ID	Ground Surface Elevation (masl)	Approximate Full Well Depth (mbgs)	Depth	August 15, 2025
BH/MW 6	301.43	6.75	mbgs	6.64
			masl	294.79
BH/MW 11	303.48	7.66	mbgs	5.00
			masl	298.48

Well ID	Ground Surface Elevation (masl)	Approximate Full Well Depth (mbgs)	Depth	August 15, 2025
BH/MW 18	291.57	7.34	mbgs	2.24
			masl	289.33

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

Appendix E (Table E-1) provides the combined summary of measured groundwater elevations at all wells across the Site for all monitoring events. As previously indicated, it is interpreted that the March 29 of 2023 monitoring event represents the seasonal high-water levels for the shallow water bearing zone.

3.3 Hydraulic Conductivity Testing

Single Well Response Tests (SWRT's) were completed on two (2) monitoring wells BH202 and BH208 on February 7, 2023, and on three (3) monitoring wells, BH201, BH205 and BH209 on March 2, 2023. The tests were completed to estimate the saturated hydraulic conductivity (K) of the soils at the well screen depths.

The static water level within each monitoring well was measured prior to the start of testing. In advance of performing SWRTs, each monitoring well underwent development to remove fines introduced into the screens following construction. The development process involved purging monitoring wells to induce the flow of fresh formation water through the screen. Each monitoring well was permitted to fully recover prior to performing SWRTs.

Hydraulic conductivity values were calculated from the SWRT and constant rate test data as per Hvorslev's solution included in the Aqtesolv Pro. V.4.5 software package. The semi-log plots for normalized drawdown versus time are included in Appendix F.

A summary of the hydraulic conductivities (K-values) estimated from the SWRTs are provided in Table 3-4.

Table 3-4: Summary of Hydraulic Conductivity Testing

Monitoring Well	Well Depth (mbgs)	Screen Interval (mbgs)		Soil Formation Screened	Estimated Hydraulic Conductivity (m/s)
		from	to		
BH201	6.1	3.1	6.1	Silt	$3.1x10^{-7}$
BH202	6.1	3.1	6.1	Fill/Silt	$1.6x10^{-6}$
BH205	6.1	3.1	6.1	Fill/Silt	$6.6x10^{-8}$
BH208	6.1	3.1	6.1	Silt	$3.2x10^{-7}$
BH209	6.1	3.1	6.1	Sandy Silt Till	$7.5x10^{-9}$
				Highest K value	$1.6x10^{-6}$
				Geometric mean K Value	$3.2x10^{-7*}$

Notes:

1) '*' – The geometric mean value excludes BH209 as it is located outside the building footprint. However, the value is provided for information purposes.

SWRTs provide K-estimates of the geological formation surrounding the well screens and may not be representative of bulk formation hydraulic conductivity. As shown in Table 3-4, the highest K-value of the tested water-bearing zone is $1.6x10^{-6}$ m/s at BH202, and the geometric mean of the overburden K-values is $3.2x10^{-7}$ m/s.

3.4 Pumping Test

One (1) pumping well (PW1) of approximately 150 mm diameter to an approximate depth of 83.52 mbgs and two (2) observation wells (OW1 and OW2) of 50 mm diameter were installed by Constable Water Wells Inc between April 25 and May 17 of 2024. A mud rotary drilling method was utilized for drilling test boreholes. A three (3) meter 30 slot stainless steel screen was installed at PW, and a six (6)-meter length screens were installed for OW1 and OW2. Observation wells were located approximately 5 m south (OW2) and 10 m northeast (OW1) of PW respectively.

A constant rate pumping test at test well (PW) was conducted between October 1 and October 2 of 2024. The constant rate pumping phase was followed by a recovery period which concluded on October 3, 2024. The purpose of the pumping test was to determine the hydraulic properties of the confined aquifer, as well as the hydraulic and lithologic barriers within and/or near to the Site boundaries. The locations of the pumping well, observation wells and the monitoring wells are presented in Figure 4. The results of pumping test included in Appendix G. and details for a pumping test completed provided in Section 5 Water Supply Feasibility Study of this report.

3.5 Groundwater Quality

To assess the suitability for discharging pumped groundwater during construction dewatering into the sewers owned by the Region of York during dewatering activities, one (1) groundwater sample was collected from the monitoring wells in Borehole BH202 on February 28, 2023, using a peristaltic pump. The sample was labelled BH202. Prior to collecting the noted water sample, approximately three (3) standing well volumes of groundwater were purged from the referred well. The samples were collected unfiltered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted for analysis of parameters listed in York Region Sanitary and Storm Sewer Use by law and Provincial Water Quality Objectives (PWQO) to Bureau Veritas Laboratory (BV), a CALA certified independent laboratory in Mississauga, Ontario. Analytical results are provided in Appendix H.

Table 3-5 summarizes exceedance(s) of the Sanitary and Storm Sewer Use By-Law parameters and the PWQO.

Table 3-5: Summary of Analytical Results from Monitoring Well (BH202)

Parameter	Units	Region of York Sanitary Sewer Discharge Limit	Region of York Storm Sewer Discharge Limit	PWQO	Concentration BH202 28-Feb-2023
Total Kjeldahl Nitrogen (TKN)	mg/L	100	1	-	**3.8**
Nonylphenol (Total)	mg/L	0.02	-	0.00004	*<0.001*
Bis(2-ethylhexyl) phthalate	ug/L	12	8.8	0.6	*<2.0*
Total PCB	ug/L	1	0.4	0.001	*<0.05*
Total Phosphorus (P)	ug/L	10,000	400	10	*<100*

Bold – Exceeds the Region of York Storm Sewer Discharge Limit.
Italics and underlined – Reporting detection Limit – (RDL) exceeds PWQO.

For short term construction dewatering, when comparing the analytical results of the collected groundwater sample to the Region of York Sanitary Sewer discharge parameters there were no parameter exceedances.

When comparing the analytical results of the collected groundwater sample to the Region of York Storm Sewer discharge parameters, the following parameters were reported with an exceedance: Total Kjeldahl Nitrogen (TKN).

The reporting detection limits (RDL) for the parameters tested were below the Sewer Use By-Law parameter criteria for Region of York Sanitary and Storm Sewer discharge.

When comparing the analytical results of the collected groundwater sample to the PWQO the following parameters were reported with an exceedance attributed to RDL exceeding in the criteria: Total Nonylphenols, Bis(2-ethylhexylphthalate), Total PCBs and Total Phosphorus. It should be noted, the sample collected was for York Region Sewer discharge purposes, and is compared to PWQO as a preliminary assessment, however sample collection method and laboratory analyses may differ to meet PWQO objectives.

For the short-term dewatering system (construction phase), it is anticipated that TSS levels in the pumped groundwater may become elevated and exceed both, Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment/dewatering contractor/process engineer.

An approval to discharge construction dewatering effluent to the environment will be required from the Town of Whitchurch-Stouffville and MECP.

3.6 Infiltration Testing

EXP completed five (5) in situ infiltration tests within the previously and newly proposed raised septic bed locations on February 7, 2023 (IT210, IT211) and on December 10, 2024 (INF 304, INF 306 and INF 307). Infiltration test locations are shown on Figure 4. In accordance with design details provided, infiltration tests (IT and INF) were performed at a depth of approximately 3.80 mbgs for IT210 and IT211 and at 4.47 to 4.58 mbgs for INF 304, INF 306 and INF 307. It should be noted that INF 304, INF 306 and INF 307 were presoaked with water for 24-hour period on December 9 prior to conducting the infiltrations tests on December 10, 2024, as per the Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010 requirements.

The stratigraphy of the shallow subsurface where the monitoring wells were screened for the infiltrating testing, comprised of sand in IT210; of silty fill materials in IT211; of silt in INF 304 and INF 307; and, of clayey silt till in INF 306. Table 3-6 below summarizes the field saturated hydraulic conductivities (K-values) and design infiltration rates, as per the Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010. The estimated field saturated K-values were correlated to infiltration rates based on the relationship provided in Table C2 (Appendix C) of the guideline.

Table 3-6: Summary of In-Situ Infiltration Test Results

Infiltration Test Location ID	Depth of Hole (mbgs)	Formation tested	Hydraulic Conductivity, K_{fs} (cm/s)	Measured Infiltration Rates (mm/hr)	Design Infiltration Rates* (mm/hr)	Percolation Time (min/cm)
IT210	3.80	Sand	6.0×10^{-4}	75	30	20
IT211	3.80	Fill	4.8×10^{-4}	70	28	21
INF 304	4.54	Silt	4.5×10^{-5}	37	15	40
INF 306	4.47	Clayey silt	3.5×10^{-5}	35	14	43
INF 307	4.58	Silt	2.6×10^{-5}	32	13	46

Infiltration Test Location ID	Depth of Hole (mbgs)	Formation tested	Hydraulic Conductivity, K_{fs} (cm/s)	Measured Infiltration Rates (mm/hr)	Design Infiltration Rates* (mm/hr)	Percolation Time (min/cm)
		Geometric Mean	**1.0×10^{-4}**	**47**	**19**	**32**

Notes: *Safety Factor (SF) of 2.5 was applied to calculate the design infiltration rate (Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010).

The geometric mean design infiltration rate for the infiltration test holes in the overburden is 19 mm/hr, with a corresponding percolation time of 32 min/cm. The results of infiltration tests completed are presented in Appendix I and Appendix J-5.

3.7 Grain Size Analysis

In addition to in-situ infiltration testing completed, three (3) selected soil samples from screened intervals of INF 304, INF 306 and INF 307 were analyzed for the grain size distribution. The results of grain size distribution analysis on these soils samples were utilized to calculate the hydraulic conductivities (ks). Based on the results of the hydrometer analysis, D10 (grain size at which point 10% of the soil passes the sieve (mm) was not reached for either of soil samples of INF 304, INF 306, or INF 307. Accordingly, the effective grain diameter of d10 and d60 of each of the selected soil samples were incorporated into the Kozeny-Carman and Kaubisch empirical models to estimate the Ks values of each selected soil sample. A summary of the hydraulic conductivity (Ks) estimates using soil grain size analysis is presented in Table 3-7 below.

Table 3-7: Summary of Hydraulic Conductivity Calculations Based on Grain Size Distribution (Kozeny-Carman and Kaubisch Methods)

Infiltration Test ID / Soil Sample ID	Ground Surface Elevation (masl)	Approximate Full Infiltration Test Well Depth (mbgs)	Borehole Bottom Elevation (masl)	Sample Depth (m)	Soil Description	Estimated Hydraulic Conductivity (Kozeny-Carman) (cm/sec)	Estimated Hydraulic Conductivity (Kaubisch) (cm/sec)
INF 304 / SS6	304.78	4.54	300.24	3.8-4.4	Clayey Silt, trace sand	1.4×10^{-7}	3.3×10^{-9}
INF 306 / SS6	304.96	4.47	300.49	3.8-4.4	Silt, some clay, trace sand and gravel	2.7×10^{-7}	4.0×10^{-9}
INF 307 / SS6	305.09	4.58	300.51	3.8-4.4	Silt. some clay, trace sand and gravel	2.0×10^{-7}	2.8×10^{-9}

Results of grain size distribution analyses are presented in Appendix D. Based on these results, the Ks values calculated using the grain size distribution are significantly lower (two to four orders of magnitude) than those measured in the field during the infiltration testing. This might be contributable to secondary hydraulic conductivity influence of underlain soils.

4 Water Balance Assessment (Site Specific)

4.1 Methodology

The Thornthwaite water balance (Thornthwaite, 1948; Mather, 1978; 1979) is an accounting type method used to analyze the allocation of water among various components of the hydrologic cycle. This methodology was used to complete the pre-construction (existing conditions) and post development water balance. The model inputs include monthly mean temperature, total precipitation, runoff factor, soil-moisture storage capacity, rain temperature threshold, snow temperature threshold, maximum melt rate and the latitude of the Site. The model outputs include monthly potential and actual evapotranspiration, soil moisture storage, soil moisture storage change, surplus, infiltration, and runoff.

When precipitation (P) occurs, it can either runoff (R) through the surface water system, infiltrate (I) to the water table including an interflow component, or evapotranspiration (ET) from the earth's surface and vegetation. The difference between total precipitation (P) and the total of evaporation and evapotranspiration (ET) is defined to be the water surplus (S) which is available for both infiltration (recharge to the groundwater system including interflow) and for run-off. When long-term averages of P, R, I, and ET are used, there is no net change in groundwater storage (ST). Annually, however, there is a potential for small changes in ST.

The annual water budget can be stated as follows:

$$P = ET + R + I + ST$$

Where:

P =	precipitation
ET =	evapotranspiration
R =	surface water run-off
I =	Infiltration
ST =	change in groundwater storage

For this assessment, the Thornthwaite and Mather method was used to estimate average infiltration rates. Based on the site conditions, as no recharge/infiltration to deep aquifer occurs, the component for infiltration in the Thornthwaite and Mater model was used to estimate infiltration, which corresponds to lateral movement of water in the unsaturated zone in the shallow sub-surface (first few meters) which discharges to surface water features.

Infiltration is governed by the surficial soil types, topography and land cover (Figures 2C, 7, 8 and 9). Areas where shallow water table as measured in shallow monitoring wells, is at or above ground surface, then the percolation rate of precipitation into the shallow soils is considered negligible. No such conditions were encountered on Site.

For ease of calculation, a spreadsheet model was used for the computation. The Thornthwaite and Mather Model was based on the United Stated Geological Survey (USGS) graphical user interface (Thornthwaite Monthly Water-Balance program, 2007).

4.2 Meteorological Data

Meteorological data including average monthly precipitation and average temperatures were obtained from the National Climate Data and Information Archive (Environment Canada) for the King Smoke Tree (Station ID No.6154142) climatic station (Elevation 352.00 m).

Meteorological data for 29 years from 1975 to 2003 was utilized for the assessment. Summary of input data is provided in Appendix J-1.

4.3 Pre- and Post-Development Site Characteristics

4.3.1 Pre-Development Site Characteristics

The property occupies an area of approximately 16.59 hectares (40.99 acres). The Site is located in an industrial land use setting where it has been identified as combination of agricultural area, woodlot area, unpaved road and exiting building area (demolished).

A summary of the existing (pre-development) features is provided in Table 4-1 below.

Table 4-1: Pre-Development (Existing) Land Use

Description	Impervious Areas (Buildings, Roads) m^2	Pervious Areas (Open Space) m^2	Total Areas Pre-Development m^2	Percentage %
Existing Buildings (Barn, Dwelling)	5,900	0	5,900	4%
Existing Gravel Drive	0	3,200	3,200	2%
Open Space (Farmland)	0	156,800	156,800	94%
TOTALS	**5,900**	**160,000**	**165,900**	**100%**

It should be noted that the areas provided in Table 4-1 above were determined based on a review of existing background information available and these estimates are considered appropriate for the purpose of estimating the water balance.

As evident from the information provided in Table 4-1, under pre-development conditions, approximately 160,000 m^2 or 96% of the Site area is pervious and available for groundwater infiltration (Figure 7).

4.3.2 Post-Development Site Characteristics

Based on draft plan of subdivision included in Appendix L, the Site will be developed for industrial use with BLOCKs 1 to 7 utilized for development, BLOCK 8 being a landscape buffer along access roads (Streets A and B) and BLOCK 9 a natural heritage system.

Table 4-2 provides the summary of post development characteristics assumptions for the entire Site including BLOCK 1 through BLOCK 9. Post-development land uses are indicated on Figure 8.

Table 4-2: Post Development Site Characteristics (Entire Site)

BLOCK ID	Description	Impervious Areas (Buildings, Roads) m^2	Pervious Areas (Lawns, Gardens, Landscape) m^2	Total Areas Post - Development (Proposed) m^2	Percentage %
BLOCK 1 Industrial	Building and Roads	44,887	0	44,887	27%
	Landscaped Areas, MTO buffer, Open spaces	0	13,513	11,547	8%
	Subtotal BLOCK 1	**44,887**	**13,513**	**58,400**	**35%**
BLOCK 2 Industrial	Building and Roads	8,300	0	8,300	5%
	Landscaped Areas	0	2,100	2,100	1%
	Subtotal BLOCK 2	**8,300**	**2,100**	**10,400**	**6%**
BLOCK 3 Industrial	Building and Roads	8,300	0	8,300	5%
	Landscaped Areas	0	2,100	2,100	1%
	Subtotal BLOCK 3	**8,300**	**2,100**	**10,400**	**6%**
BLOCK 4 Industrial	Building and Roads	8,400		8,400	5%
	Landscaped Areas		2,100	2,100	1%
	Subtotal BLOCK 4	**8,400**	**2,100**	**10,500**	**6%**
BLOCK 5 Industrial	Building and Roads	6,880	0	6,880	4%
	Landscaped Areas	0	1,720	1,720	1%
	Subtotal BLOCK 5	**6,880**	**1,720**	**8,600**	**5%**
BLOCK 6 Industrial	Building and Roads	7,280	0	7,280	4%
	Landscaped Areas	0	1,820	1,820	1%
	Subtotal BLOCK 6	**7,280**	**1,820**	**9,100**	**5%**
BLOCK 7	Building and Roads	17,920	0	17,920	11%

BLOCK ID	Description	Impervious Areas (Buildings, Roads) m^2	Pervious Areas (Lawns, Gardens, Landscape) m^2	Total Areas Post - Development (Proposed) m^2	Percentage %
Industrial	Landscaped Areas	0	4,480	4,480	3%
	Subtotal BLOCK 7	**17,920**	**4,480**	**22,400**	**14%**
BLOCK 8	Landscaped Areas **Landscape Buffer**	0	3,000	3,000	2%
	Subtotal BLOCK 8	**0**	**3,000**	**3,000**	**2%**
BLOCK 9	Undisturbed Open Space **Natural Heritage System**	0	14,400	14,400	9%
	Subtotal BLOCK 9	**0**	**14,400**	**14,400**	**9%**
Street A and Street B	Paved Surface (Roads sidewalk) **Industrial Road**	18,700	0	18,700	11%
	Subtotal Steet A + Street B	**18,700**	**0**	**18,700**	**11%**
TOTALS Entire Site		**120,657**	**45,243**	**165,900**	**100%**

Based on assumptions provided in Table 4-2 under post-development conditions, the total pervious area for the entire Site is reduced to 45,243 m^2 or approximately 27% of the total Site area (69% reduction in open spaces compared to pre-development conditions). Appendix L provides a draft plan of subdivision. Figure 8 presents the proposed land use map.

The distribution details for the post development characteristics for BLOCK 1 provided in Table 4-3 below. Post-development land uses are indicated on Figure 8.

Table 4-3: Detailed Post Development Site Characteristics (BLOCK 1)

Description	Impervious Areas (Buildings, Roads) m^2	Pervious Areas (Lawns, Gardens, Landscape) m^2	Total Areas Post -Development (Proposed) m^2	Percentage %
Building	11,272	0	11,272	19%
Landscaped Areas	0	10,828	10,828	18%
Open Space (Undisturbed MTO Buffer)	0	2,685	2,685	5%

Description	Impervious Areas (Buildings, Roads) m^2	Pervious Areas (Lawns, Gardens, Landscape) m^2	Total Areas Post -Development (Proposed) m^2	Percentage %
Paved Surface (Roads sidewalk)	33,615	0	33,615	58%
Totals BLOCK 1	**44,887**	**13,513**	**58,400**	**100.0%**

4.4 Pre-Development Water Balance Estimates

4.4.1 Climate Data Analysis

The mean annual water surplus was calculated using the Thornthwaite and Mather (1955) method. Monthly average precipitation values were obtained for 29 years from 1975 to 2003.

Soil moisture storage of 200 mm/yr was assumed for soils and considered representative of the preconstruction site conditions. The closest Latitude to the Site is 44°, which was used in the USGS model (2007).

Table 4-4 provides a summary of the climatic water balance analysis. Appendix J-1 provides a summary of model input. Appendix J-2 provides a summary of the model output.

Table 4-4: Summary of Climatic Water Balance Analysis in Pre-Development Conditions

Soil Moisture Storage (mm/yr)	Precipitation (mm/yr)	Potential ET (mm/yr)	Actual ET (mm/yr)	Surplus (mm/yr)
200 mm/yr 19% Stone-poor, Carbonate-derived silty to sandy till; 48% Coarse-textured (Foreshore-Basinal) Glaciolacustrine deposits 33% Fine-textured glaciolacustrine deposits	851.2	563.6	549.9	299.1

Note: ET = Evapotranspiration

The results of climatic water balance analysis for the Site indicates that a surplus of approximately 299.1 mm/year of water is available for surface run-off and infiltration.

4.4.2 Infiltration

The infiltration is expected to be controlled by soil type, topography, and soil cover type. Surplus water is portioned between run-off and infiltration based on the controlling factors provided by MOE (1995). It is noted that the controlling factors provided by the MOE for estimating infiltration were used to estimate the controlling factors for infiltration.

Using this method, a total infiltration factor for the Site was estimated using the individual sub-factors representative of the topography, soil type and land cover conditions (Figures 2C, 7, 8 and 9).

Appendix J-3 provides a summary of the average infiltration rate assumptions made for the Site, as well as the estimated sub factors and total factor based on the Site conditions. It is noted that existing slope was assessed utilizing weighted score factors and considered to be representing of existing topography, as calculated.

The estimated pre-development total infiltration factor of 0.41 represents the fraction of the water surplus available for infiltration. Therefore, the fraction of the available water surplus for run-off is 0.59.

The infiltration factor is utilized to calculate the amount of infiltration (in units of m^3/yr) at the Site by multiplying it by the average yearly water surplus estimate by the site area available for infiltration.

Using the infiltration factor of 0.41, a water surplus of 299.1 mm/yr, the pre-development infiltration rate for the entire Site is estimated to be approximately 122.02 mm/yr.

Infiltration sub-factors were determined for the purpose of estimating predevelopment infiltration rates.

4.4.3 Pre-Development Water Balance Analysis

The water balance analysis is based on available information on a regional scale and considered consistent for the Site.

Table 4-5 provides a summary of pre-development water balance analysis for the Site.

Table 4-5: Summary of Overall Pre-Development Water Balance Results

Location	Total Site Area (m^2)	Area Available for Infiltration (m^2)	Precipitation (m^3/yr)	Actual Evapo-transpiration (m^3/yr)	Run-off (m^3/yr)	Infiltration (m^3/yr)
Entire Site	165,900	160,000	141,207	90,175	31,508	19,524
Percentage of Total Precipitation			100.0%	63.9%	22.3%	13.8%

The total Site area was used to estimate the total volume of annual precipitation for the Site. As summarized in Table 4-5, the pre-development water balance is as follows: approximately 63.9% of the total precipitation will be subjected to evapotranspiration, 22.3% to run-off and 13.8% to infiltration (Appendix J-4).

The predevelopment water balance on a weighted average depth basis (in mm) can be expressed as follows:

$$P\ (851.2) = ET\ (543.5) + R\ (189.9) + I\ (117.7) + ST\ (0)$$

4.5 Post-Development Water Balance Estimates

Based on the proposed development statistics, the total area of impervious surfaces under the post-development conditions is approximately 120,657 m^2 representing approximately 73% of the entire Site area (total area: 165,900 m^2), (Table 4-2). The remaining 45,243 m^2 are available to contribute to infiltration during post-development stage (27% of the total land area), not considering areas of shallow water table.

Lot level post development infiltration sub-factors were determined based on the method recommended by MOE (1995), similar to the method used for estimating infiltration sub-factors for pre-development site conditions (Appendix J-3). The estimated post-development total infiltration factor of 0.41 (or 41%).

Table 4-6 presents a summary of the overall post-development water balance assessment.

Table 4-6: Summary of Overall Post-Development Water Balance Forecast (Unmitigated)

Location	Total Site Area (m^2)	Area Available for Infiltration (m^2)	Precipitation (m^3/yr)	Actual Evapo-transpiration (m^3/yr)	Run-off (m^3/yr)	Infiltration (m^3/yr)
Entire Site	165,900	45,243	141,207	25,493	110,194	5,520
Percentage of Total Precipitation			100.0%	18.1%	78.0%	3.9%

The total Site area was used to estimate the total volume of annual precipitation for the Site. As summarized in Table 4-6, the post-development water balance is as follows: approximately 18% of the total precipitation will be subjected to evapotranspiration, 78% to run-off and 3.9% to infiltration (Appendix J-4).

The post-development unmitigated water balance on a weighted average depth basis (in mm) can be expressed as follows:

$$P\ (851.2) = ET\ (153.7) + R\ (664.2) + I\ (33.3) + ST\ (0)$$

4.6 *In-Situ* Infiltration

As indicated in Section 3.6, five (5) in-situ infiltration tests were conducted on site.

The infiltration testing results are based on TRCA infiltration practice guideline performed at each borehole and provided in Appendix I and summarized in Appendix J-5.

Based on the in-situ infiltration testing results, measured infiltration rates very between 32 and 75 mm/hr. The mean measured infiltration rate for the tested soil layer at subsurface is calculated as 47 mm/hr. Using the geometric mean infiltration rate and a safety factor 2.5 (Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010), the design infiltration rate was calculated to vary between 13 (min) and 30 (max) mm/hr for the entire Site. The estimated geometric mean design infiltration rate based on in-situ infiltration testing for the Site is 19 mm/hr.

4.7 Impact Assessment and Proposed Mitigation Measures

If no remedial measures are implemented to maintain infiltration, it is expected that infiltration will be reduced from approximately 19,524 m^3/year to 5,520 m^3/year in post development scenario, resulting a deficit of approximately 14,004 m^3/year (Appendix J-4).

Infiltration deficits based on pre- and post-development Site conditions can be utilized to guide mitigation measures under idealized soil and groundwater conditions. If suitable mitigation measures are implemented, it is expected that the unmitigated infiltration deficit of 14,004 m^3/year can be maintained under the post-development Site conditions. Reasonable mitigation measures onsite are therefore recommended, there feasible, to maintain the pre-development infiltration under post-development Site conditions (Appendix J-4). To offset the noted deficit, approximately 39% from the available runoff from buildings' roof-top water of 35,547 m^3/year (in 8 months) would need be infiltrated.

Under post-development conditions, a reduction in infiltration versus pre-development conditions may occur. As a result of this, contribution from infiltration to downgradient surface water features would decrease.

In order to maintain the estimated pre-development infiltration rate of 19,524 m^3/year, mitigation measures should be implemented to maintain these infiltration levels. These mitigation measures can include but not be limited to roof water collection and directing to open spaces, infiltration galleries, infiltration trenches and other feasible LID measures.

Figures 6A to 6C show the groundwater contour plans based on water levels measured on Site on March 2 of 2023, March 29 of 2023 and August 15 of 2025. Based on available water level monitoring data collected, it is interpreted that there is at least 1.90 to 6.64 m of unsaturated soil available for implementing Low Impact Development (LID) measures at the Site. It is recommended that feasible LIDs to be designed to mimic the pre-development natural outlets across the Site.

As per the CA and MECP guidelines, the invert of the infiltration system needs to be 1.0 m above the highest water level or top of bedrock measured at location of the infiltration system, as a minimum.

Consideration should be given to assess the extent of potential mounding and the potential interference of the proposed infiltration system/s with proposed underground structures and infrastructures (i.e. underground servicing, septic system, etc.).

The following mitigation measures were assessed to maintain the pre-development infiltration rates during the post-development phase:

- **Infiltration Gallery /Infiltration Trench**

To balance the infiltration deficit in 8 months per year a LID system (i.e. infiltration gallery, infiltration trench) with a total area of approximately 980 m^2 in size would be required. The LID area is based on the measured design infiltration rate of 19 mm/hr (Appendix J-5) and on the assumption that precipitation is evenly distributed during the year over two-week intervals, and bi-weekly volumes from roof will be infiltrated in 48 hours. The infiltration system will need to have a minimum storage of 875 m^3 to store two weeks of precipitation to meet the pre-development infiltration levels (Appendix J-6).

As per regulatory requirements, the invert of the infiltration system needs to be 1.0 m above the highest water level measured at the location of the proposed infiltration system, as a minimum.

Consideration should be given to assess the extent of potential mounding and on the potential interference of the proposed infiltration system/s with proposed underground structure and infrastructures (ex: underground servicing, septic system, etc.).

Based on site servicing information and proposed LID measures details provided for BLOCK 1, it is noted that volume of the proposed infiltration tank (cultec chamber) is 966 m^3. As such, the proposed LID will have sufficient capacity to mitigate infiltration deficit in post development. Also, consideration was given for the location of infiltration tank to meet 1 meter separation between the seasonal high water level elevations and bottom of the tank.

- **Enhanced Grass Swales and Rain Gardens**

To increase the post-development infiltration onsite, enhanced grass swales and / or rain gardens are also recommended where feasible.

These facilities are recommended to be designed to mimic current shallow groundwater (interflow). Where possible, selected areas can also be used as rain gardens to enhance groundwater infiltration.

5 Water Supply Feasibility Study

5.1 Exploratory Drilling

The exploratory drilling including drilling test boreholes and installation of one (1) pumping well (PW) and two (2) observation wells (OW1 and OW2) were completed by Constable Water Wells Inc. using conventional mud rotary method between April 25 and May 17 of 2024.

The available MOE water well records for PW, OW1 and OW2 are provided in Appendix A. Construction of PW, OW1 and OW1 were observed by EXP staff. Appendix B presents borehole logs for PW1, OW1 and OW2. The wells were completed in a sand aquifer at depths ranging from 80.57 and 83.57 m below grade. A water supply well (PW1) was constructed as the 6-inch (152 mm) diameter pumping wells with a 127 mm (5 inch) diameter three (3) long 30 slot stainless steel telescopic well screen. Table 5-1 summarizes the well construction details for pumping well and both observation wells. Pumping well was completed as a natural pack (no filter sand) well. PW was completed at the base of the sand aquifer and was reportedly not artesian with groundwater levels approximately 44.15 m below ground surface.

5.2 Water Supply Well and Observation Wells Construction

One (1) 150 mm diameter steel pumping well (PW), domestic water supply well MECP Well Tag A387542, to a depth of approximately 80.52 m, was completed as natural pack with telescopic 30 slot stainless steel screen installed between 80.52 and 83.52 m. Two (2) 50 mm diameter PVC observation wells (OW1 and OW2) were installed to the approximately same depth as pumping well (to 83.57 m), with three (3) m long 10 slot screens.

Figure 4 shows the pumping well and observation wells locations. Appendix B presents borehole logs for PW, OW1 and OW2. MECP water well records included in Appendix A. Table 5-1 summarizes the well construction details for pumping well and both observation wells. Pumping well (PW) was completed as a natural pack (no filter sand) well.

Table 5-1: Summary of Pumping Well and Observation Wells Construction Details

Well ID (MOE Well Record)		PW (A387542)	OW1 (A403953)	OW2 (A403952)
UTM NAD 83 Coordinates	Easting	627684.019	627684	627685.08
	Northing	4875193.176	4875193	4875190.317
Ground Surface Elevation, masl		304.75	303.97	304.86
Measuring Point (Top of the Pipe) Elevation, masl		305.30	304.80	305.77
Well Depth, mbgs		83.52	83.72	84.63
Stick Up, m		0.55	0.83	0.91
Static Water Level (mbgs) / Elevation, masl		43.52 /261.23	43.54/260.43	43.53/261.33
Screened Interval, m		80.52 - 83.52	80.52 - 83.52	80.52 - 83.52
Screen Length, m		3	3	3
Screen Slot Size		30	10	10
Aquifer Thickness, m		14.10	6.35	7.17

Well ID (MOE Well Record)	PW (A387542)	OW1 (A403953)	OW2 (A403952)
Screen/Effective Radius, m	0.076	0.025	0.025

5.3 Pumping Test

To confirm the actual long-term yield at water supply well and to assess the potential impacts, step tests and a 24- hour constant rate aquifer performance test were conducted on PW1. The pumping test was conducted in accordance with pumping test design report and under the MECP EASR permit for pumping test R-011-4302241726. Prior to the pumping test, notifications to all properties within 500 m zone were distributed, as required by MECP. The pumping test results are presented in Appendix D.

5.3.1 Mogg-type Step Drawdown Pumping Test

Initially, a three-step Mogg-type step drawdown pumping test was completed at PW1 on October 1, 2024. The PW1 step tests were completed at rates of 45.46 L/min (65.46 m^3/day); 90.92 L/min (130.93 m^3/day) and 136.38 L/min (196.39 m^3/day). Each step carried for duration of one hour each followed the next step at a higher pumping rate started immediately after the previous test was done. Step test 3 at a constant rate of 136.38 L/min (196.39 m^3/day) was continued as 24-hour pumping test. Figure 1 in Appendix G shows the semi-logarithmic plot of drawdown versus time for the PW1 three step tests. The results suggest there is only a small loss of specific capacity with increased pumping rate.

It should be noted that for the completion of the pumping test, the construction schedule was considered. This enabled pumping well and observation wells to be equipped with data loggers before the testing.

5.3.2 Aquifer Performance Pumping Test (24-hour Pumping Test)

A constant rate aquifer performance test was conducted on PW1 between October 1 and 2 of 2024 under MECP EASR permit for pumping test No. R-011-4302241726. The well test started at a constant pumping rate of 136.38 L/min (196.39 m^3/day, 30 GPM) and continued for 1440 minutes (24 hours). The pump intake was installed at approximately 70.45 m (231 feet). Flow was controlled using an in-line flow control device and adjustments were achieved using a gate valve. All available observation wells were also monitored during both the pumping and recovery periods. The results of the aquifer performance pumping test are presented in Appendix G. The depth to water was measured in the pumping well and observation wells using an electric water level meter and digital data loggers. Table 5-2 presents a summary of the water level changes at the end of the pumping test for the pumping and observation wells.

Table 5-2: Water Level Measurement – Summary PW1 Aquifer Performance Pumping Test

Well Identification	Distance from PW [m]	Static Water Level [m bmp]	Water Level after 24 hours (1440 min) of pumping [m]	Drawdown after 24 hours (1440 min) of pumping [m]
PW1	0	46.13	47.89	1.76
OW1	10	45.99	46.60	0.61
OW2	5	46.50	47.11	0.61

Note: m bmp – metres below measuring point

The aquifer performance test results for the pumping well (Appendix G, Figure 2) show that after about 400 minutes of pumping, the expanding cone of influence encountered a positive boundary, shown as a decrease in the slope of the drawdown time curve. This could be interpreted as either a zone of increased permeability in the aquifer or a stronger interaction between the shallower zones and the deeper aquifer. The distance drawdown curve is presented in Figure 4 (Appendix G). These results suggest that cone of depression had expanded on the order of 450 m during the test.

Using the following equations the transmissivity of the formation was calculated as:

$$\mathbf{T = 0.183 * Q/\Delta s = 239.6\ m^2/d}$$

where: **T** = coefficient of transmissivity [m^2/d];

Q = pumping rate = 196.39 m^3/day;

Δs = drawdown per log cycle = 0.15 m/cycle (from the Log time vs Drawdown graph Figure 2 in Appendix G);

Using the time drawdown plot for the monitoring well at OW1 (Appendix G), the aquifer storage coefficient was calculated using the following equation.

$$\mathbf{S = 2.25 * T * t_0 / r^2 = 3.1 \times 10^{-4}}$$

where: **S** = storativity – dimensionless;

T = coefficient of transmissivity [m^2/d]

$\mathbf{t_0}$ – intercept of extended straight line at zero drawdown = 0.05 sec (5.8×10^{-5} days);

r – distance from the pumping well = 10 m.

The calculated aquifer parameters suggest that the formation in the area of PW is typical of coarse sand to fine gravel. Based on the above calculations, it is interpreted that the well is completed in a permeable formation that has a storativity indicative of confine aquifer conditions.

To assist in understanding aquifer conditions, water levels were continuously monitored before, during and after the pumping test in a pumping well and observation wells. The results are presented on Figure 3 (Appendix G). The results show generally stable water levels both prior and after the test. The results show the effects on water levels in all observation wells from the beginning of the monitoring period suggesting the strong hydraulic connection. It should be noted that the baro-logger data was used to correct water level data for changes in atmospheric pressure.

Using the calculated aquifer parameters and the following equation, the theoretical drawdown (s) at both the pumping well and the observation wells was calculated.

$$s = \frac{0.183Q}{T} \mathrm{Log}\left\{ \frac{2.25Tt}{r^2 S} \right\}$$

The results are summarized in Table 5-3.

Table 5-3: Comparison of Theoretical to Actual Drawdown

Well Identification	Distance from Pumping well (m)	Measured Drawdown after 1440 minutes of pumping (m)	Theoretical Drawdown after 1440 minutes of pumping (m)
PW1	0.076	1.76	1.27
OW1	10	0.61	0.73
OW2	5	0.61	0.64

The calculations show some variance between theoretical and actual drawdowns. This may be a result of several factors including well efficiency. Based on the testing and water level monitoring results, it appears that there may be variations in aquifer parameters with both increased distance and direction from the pumping well. There is a potential that the impacts of boundary conditions might contribute to the difference between theoretical and actual drawdown.

It should be noted that upon completion of pumping test, both monitoring wells (OW1 and OW2) were decommissioned as per O.Reg. 903 by Constable Water Wells Inc. on October 4, 2024.

5.4 Water quality

To assess the groundwater quality of the proposed water supply source for domestic consumption, total of three (3) groundwater samples were collected from a pumping well (PW) on three occasions. One (1) sample (sample ID PW) was collected during well development on May 13, 2024. Two (2) samples were collected during the 24-hour constant rate pumping test with one (1) sample collected at the beginning of the test on October 1, 2024 (sample ID PW- OCT1), and another sample collected approximately one hour prior to the end of the pumping test on October 2, 2024 (sample ID PW-OCT2).

All samples were collected unfiltered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted for analysis of parameters listed in Ontario Drinking Water Standards (ODWS) to Bureau Veritas Laboratory (BV), a CALA certified independent laboratory in Mississauga, Ontario. Analytical results are provided in Appendix H.

Table 5-4 summarizes exceedance(s) of the Ontario Drinking Water Standards (ODWS).

Table 5-4: Summary of Analytical Results from Water Supply Well (PW)

Parameter	Units	ODWS Standards MAC	ODWS Standards A/O	Concentration PW 13-May-2024*	Concentration PW (PW-OCT1) 01-Oct-2024	Concentration PW (PW-OCT2) 02-Oct-2024**
Hardness (CaCO3)	mg/L	-	80-100	**140**	100	97

Parameter	Units	ODWS Standards MAC	ODWS Standards A/O	Concentration PW 13-May-2024*	Concentration PW (PW-OCT1) 01-Oct-2024	Concentration PW (PW-OCT2) 02-Oct-2024**
Aluminum (Al)	ug/L	-	100	**520**	<4.9	6.6
Iron (Fe)	ug/L	-	300	**810**	110	<100
Total Coliforms	CFU/100	0		7	0	0

Notes:
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively (Made under the Ontario Safe Drinking Water Act, 2002)
Underline - Exceeds Ontario Drinking Water Standards (ODWS) - Maximum Acceptable Concentration [MAC]
Bold – Exceeds Ontario Drinking Water Standards (ODWS) Table 4-Chemical/Physical Objectives [A/O] - Not Health Related
*Sampling occurred upon initial pumping well development and prior well disinfection
** Sampling conducted at the end of 24-hour pumping test

The water quality from the water supply well indicated that the water source generally meets the ODWS with the exception of a minor exceedance Aluminum (Al) and Iron (Fe) in samples collected at well development stage and in beginning of 24-hour pumping test. Elevated hardness above operational guidelines was observed at the well development stage only. The operational guideline for hardness in drinking water is between 80 and 100 mg/L as calcium carbonate. Hardness is caused by dissolved calcium and magnesium and is expressed as the equivalent quantity of calcium carbonate. On heating, hard water tends to form scale deposits and can form excessive scum with regular soaps. However, certain detergents are largely unaffected by hardness. Water supplies with a hardness greater than 200 mg/L are considered poor but tolerable. Hardness in excess of 500 mg/L in drinking water is unacceptable for most domestic purposes. Soft water (below 60 mg/L) can be harmful to individuals that require a low sodium diet. These include diabetics or those with high blood pressure. Water is softened using a process known as ion exchange, where mineral ions are exchanged for sodium ions, therefore concentrations of sodium are typically much higher in soft water.

After 24 hours of pumping, the water sample indicated that there were 0 colony forming units (CFUs) of total coliform bacteria and 0 (CFUs) for E-Coli. The results indicate no treatment is required for bacteriological parameters although it is generally recommended that UV light be installed on all water supply systems that obtain their water from groundwater wells.

5.5 Aquifer Security

To ensure that the operational demand can be consistently satisfied, PW well can be readily utilized for the water supply system. Based on pumping well record, monitoring to date and 24-hour pumping test completed, well PW can yield up to 136 L/min of groundwater.

It is recommended that pump intake in pumping well to be installed above the screen at approximately 70 m below grade (Elevation 234.75 m). The testing and monitoring results suggest that PW having a long-term sustainable yield between 114 and 136 L/min (163 and 196 m3/day) can be expected. If daily water taking exceeds 50 m^3/day for water supply, a Category 3 Permit to Take Water (PTTW) from MECP would be required.

Groundwater quality for private water supply operations suggests that it is suitable for human consumption without treatment as water quality at the end of pumping test meets ODWS. However, it is recommended to implement a routine water quality monitoring program to confirm that water quality consistently meets ODWS. Suitable treatment would be required if water

quality demonstrates any exceedances above ODWS. Based on water quality results for the sample collected after a 24-hour pumping test, all parameters analyzed meet ODWS standards.

The location of the pumping well is situated approximately 200 m away from a proposed septic system and approximately 15 m away from MTO boundary, which meets minimum MECP requirements for horizontal separation of 15 m between water supply well, septic system, as defined in Ontario Regulation 332/12 (Building Code) made under the Building Code Act, 1992, and contaminant sources (R.R.O. 1990, Reg. 903: WELLS).

6 Septic System Feasibility and Nitrate Impact Evaluation

Available on-site borehole information indicates that ground surface at the site varies between approximate elevations 291.57 (BH18) and 309.44 (BH204) masl. The Site is entirely located within the East Holland River Watershed (tributaries of East Holland River branch Subwatershed). During our site visits, no groundwater discharge or seepage areas were observed on the site. The tributary of East Holland River flows across the most eastern flanks of the property within limits of designated natural heritage system (Appendix L).

6.1 Groundwater Conditions

Five (5) shallow boreholes (i.e., BH210, BH211, INF 304, INF 306 and INF 307) for in situ infiltration testing were advanced within proposed septic system to depths varying from approximately 3.80 to 4.58 mbgs. Boreholes BH210 and BH211, installed in the area of the previously proposed septic tile bed, have been "Dry" during all site visits. Figure 6 Groundwater contour plan (as measured on March 29, 2023) indicates that seasonal high water table elevations within the newly proposed septic system area can be found at elevations varying between 300.00 and 300.50 masl. It is anticipated that water levels would vary seasonally at the subject site. Groundwater elevation within the newly proposed septic area varies between dry at INF 304 to 302.38 masl (2.58 mbgs at INF 306) as measured on December 9, 2024. These water levels are interpreted to represent perched water table conditions. A 1.0 m separation between the highest water level measured at location of the proposed septic system and its bottom would be required. Based on site conditions, this requirement will be met at both proposed septic system locations.

6.2 Percolation Time

Based on the in-situ infiltration testing results conducted at the previously and newly proposed septic system locations (Section 3.6), measured infiltration rates at IT210, IT211, INF 304, INF 306 and INF 307 very between 32 and 75 mm/hr. The mean measured infiltration rate for the tested soil layer at subsurface is calculated as 47 mm/hr. Using the geometric mean infiltration rate and a safety factor 2.5 (Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010), the design infiltration rate was calculated to vary between 13 (min) and 30 (max) mm/hr for the entire Site. The estimated geometric mean design infiltration rate based on in-situ infiltration testing for the Site is 19 mm/hr. Based on measured infiltration rates, the percolation time (T) is estimated to vary between 20 and 46 min/cm, with geometric mean of 32 min/cm.

Based on these results, the appropriate size and type effluent disposal system can be designed. All septic systems must be designed and constructed in compliance with Section 8 of the Ontario Building Code, including setbacks, tank sizes, and effluent disposal area size.

6.3 Nitrate Loading

To evaluate the impacts of developing the site using the private sewage disposal system for BLOCK 1 area, a nitrate loading evaluation was completed. The analysis is a dilution calculation that considers infiltration of precipitation into the soil (estimated at 118.7 mm/yr or 0.119 m/year) over entire site, the development lot size, effluent loading from the building, impervious surface area (assumed 73%) and existing average background nitrate levels (less than 0.1 mg/l).

The impacts of creating an industrial building on the 58,400 m^2 (14.43 acres) site were estimated as shown below.

The calculation was done, assuming a sewage nitrate concentration of 40 mg/L which produces a nitrate loading of 120 gm/day based on 9,500 L/day hydraulic loading. It is also assumed that both effluent from the septic systems and incident precipitation percolate vertically downward to the water table. The effluent and precipitation mix with groundwater; however, groundwater flow through is not used in the impact assessment.

6.4 Nitrate Impact Calculations

Assumptions

Development Area (A)	14.43 acres (58,400 m^2) – BLOCK 1
Proposed Number lots (P)	1
Infiltration (I)	117.7 mm/yr = 0.118 m/yr (Water Balance, Section 4 of this report)
Sewage Loading (SL)	9,500 L/day (Waterloo Biofilter BA100 Tertiary Treatment System – OBC compliance analysis - Reference OBC Table 8.2.1.3.A, Item 15 - drawing SP-1 by Gunnell Engineering Ltd., dated September 24, 2024)
Sewage Nitrate Concentration (C)	10 mg/L (Waterloo Biofilter WaterNOx-LS Unit (for nitrate reduction 10 mg/L) - as per drawing DT-1 by Gunnell Engineering Ltd., dated September 24, 2024)
Nitrate Loading (for industrial development) (N)	95 gm/day
Background Nitrate Concentration (B)	0.1 mg/L (PW water quality results, dated October 2, 2024)
Impervious surface area (S)	77%
Ontario Drinking water Standard (O)	10 mg/L

Evaluation:

Property Recharge (R)

R=A x (1-S) x I = 58,400 m^2 x (1-0.77) x 0.118 m / yr = 1,585 m^3 / yr (4,342.4 L / day)

Total Hydraulic Loading (H)

H = R + SL = 4,342.4 L / day + 9,500 L/day = 13,842.4 L/day

Nitrate Loading (L)

L = N x P = 95 gm/day x 1 = 9.5 x 10^4 mg /day

Resulting Down Gradient Nitrate Concentration (RNC)

RNC = L / H = 9.5 x 10^4 mg / day / 13,842.4 L/ day = 6.9 mg /L

Using the methodology presented in calculation above, the downgradient nitrate concentration is estimated to be approximately 6.9 mg/L (including the background average nitrate concentration), which is less than the established criteria of 10 mg/l. Therefore, the 14.43 acres site can support an industrial development on private septic system having a total effluent loading of 9,500 L/day resulting in downgradient nitrate concentration (RNC) of 6.9 mg/L.

7 Dewatering Assessment

Based on draft plan of subdivision, it is EXP's understanding that the proposed development consists of seven (7) industrial blocks (BLOCKs 1 to 7).

The development of BLOCK 1 includes construction of two (2) storey slab-on grade industrial buildings to be serviced with sewers and above ground parking (paved) areas. Also, the site will be provided with private water supply and septic system. Based on information provided by the Client, it is assumed the proposed building floor slab will be at an elevation of 305.75 masl.

For dewatering assessment purposes, it was assumed that development of BLOCKS 2 to 7 will be similar to BLOCK 1 development and will involve construction of slab on grade industrial buildings and services installations.

To accommodate relatively dry and stable working conditions for underground services installations and proposed industrial buildings (BLOCKS 1 to 7), the water levels will have to be lowered approximately 1 m below the bottom of lowest excavation.

It is our understanding that servicing will be completed using cut and cover technology and might require simultaneous construction dewatering / groundwater control. For the purpose of this assignment, it was assumed that a trench segment of approximately 30 m long, 5 m wide and 5 m deep will be opened for any servicing segment across the site at any given time.

For purposes of this Hydrogeological Investigation and Water Balance Assessment, a footing depth of approximately 1.5 m below the floor slab was assumed for construction dewatering calculations purposes.

Construction dewatering calculations for the proposed development are provided in Appendix K. The Draft Plan of subdivision included in Appendix L. Table 7-1 below presents the assumptions used to calculate the dewatering rates for services installations and buildings construction.

Table 7-1 Construction Dewatering Estimate Assumptions

Input Parameter	Building BLOCK 1	Building BLOCK 2	Building BLOCK 3	Building BLOCK 4	Building BLOCK 5	Building BLOCK 6	Building BLOCK 7	Servicing	Units	Notes
Ground Elevation	306.22	304	303	303	303	300	298	306.22	masl	Assumed (topo map)
Groundwater elevation	305.93	303	302	301	300	299	298	305.93	masl	The highest recorded groundwater elevation (March 29, 2023)
Top of Lowest Slab Elevation	305.75	304	303	303	303	300	298	-	masl	Servicing Plan for BLOCK 1 and assumptions for BLOCKs 2 to 7
Lowest Footing Elevation/Service Excavation Depth	304.25	302.5	301.5	301.5	301.5	298.5	296.5	301.22	masl	Assumed (5.0 mbgs for servicing and 1.5 mbgs for building)
Construction Dewatering Elevation Target	303.25	301.5	300.5	300.5	300.5	297.5	295.5	300.22	masl	Assumed to be approximately 1.0 m below the lowest footing/excavation depth
Bottom Elevation of Water-Bearing Zone	293	293	293	293	293	293	293	293	masl	Assumed from borehole logs.
Total Excavation Area	11,272	8,345	8,345	8,400	6,880	7,280	8,000	150	m^2	Approximate building area Draft Plan of Subdivision
Hydraulic Conductivity (K)	$3.2x10^{-7}$	$3.2x10^{-7}$	$3.2x10^{-7}$	$3.2x10^{-7}$	$3.2x10^{-7}$	$3.2x10^{-7}$	$3.2x10^{-7}$	$1.6 x10^{-6}$	m/s	Representative K-value for overburden in area (highest and geometric mean)

7.1 Dewatering Flow Rate Estimate and Zone of Influence Slab-on-Grade Buildings Construction (BLOCKS 1 to 7)

The Dupuit-Forcheimer equation for radial flow to both sides of an excavation through an unconfined aquifer resting on a horizontal impervious surface was used to obtain a flow rate estimate for building construction. Dewatering flow rate is expressed as follows:

$$Q_w = \frac{\pi K(H^2 - h^2)}{Ln\left[\frac{R_o}{r_e}\right]}$$

$$r_e = \frac{a+b}{\pi} \qquad R_o = R_{cj} + r_e$$

Where:

Qw = Rate of pumping (m^3/s)
X = Length of excavation (m)
K = Hydraulic conductivity (m/s)
H = Hydraulic head beyond the influence of pumping (static groundwater elevation) (m)
h = Hydraulic head above the base of aquifer in an excavation (m)
R_0 = Radius of influence (m)
R_{cj} = Cooper-Jacob's radius of influence (m)
r_e = Equivalent perimeter (m)
a = Length of the excavation area (m)
b = Width of the excavation area (m)

It is expected that the initial dewatering rate will be higher to remove groundwater from within the overburden formation. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed, primarily from storage, resulting in lower seepage rates into the excavation. The results of dewatering calculations based on assumptions in this report provided in Appendix K (Table K-1).

7.2 Dewatering Flow Rate Estimate and Zone of Influence (Site Servicing)

The Dupuit equation for steady state linear flow to both sides of a site or servicing trench excavation through an unconfined aquifer resting on a horizontal impervious surface was used to obtain a flow rate estimate. Dewatering flow rate is expressed as follows:

$$Q_w = xK(H^2 - h^2)/Lo$$

Where:

Qw = Rate of pumping (m^3/s)
X = Length of excavation (m)
K = Hydraulic conductivity (m/s)
H = Hydraulic head beyond the influence of pumping (static groundwater elevation) (m)
h = Hydraulic head above the base of aquifer in an excavation (m)
Lo = Distance of influence (m)

It is expected that the initial dewatering rate will be higher to remove groundwater from within the overburden formation within the excavation area. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed, primarily from storage, resulting in lower seepage rates into the excavation. The results of dewatering calculations based on assumptions in this report provided in Appendix K (Table K-2).

7.3 Radius of Influence

7.3.1 Cooper-Jacob's

The radius of influence (Rcj) for the construction dewatering fro building construction was calculated based on Cooper-Jacob's equation for radial flow. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible.

The estimated radius of influence due to pumping is based on Cooper-Jacob's formula as follows:

$$R_{cj} = \sqrt{2.25KDt/s}$$

Where:
Ro = Estimated radius of influence (m)
D = Aquifer thickness (original saturated thickness) (m)
K = Hydraulic conductivity (m/s)
S = Storage coefficient
t = Duration of pumping (s)

Based on Cooper-Jacob's formula, the calculated distance of influence (Lo = Ro/2) is provided in Appendix K Table K-1.

7.3.2 Sichardt's

The radius of influence (Rs) for the site servicing dewatering was calculated based on Sichardt's equation. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible. This empirical formula was developed to provide representative flow rates using the steady state linear flow dewatering equations, as discussed below.

The radius of influence (Rs) for the site servicing dewatering was calculated based on Sichardt's equation. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible. This empirical formula was developed to provide representative flow rates using the steady state flow dewatering equations, as discussed below.

The estimated radius of influence due to pumping is based on Sichardt's formula as follows:

$$R_s = C(H - h)\sqrt{(K)}$$

Where:
Rs = Estimated Sichardt's radius of influence (m)
H = Hydraulic head in aquifer (static water level or saturated depth) (m)
h = Dynamic water level (m)
K = Hydraulic conductivity (m/sec)
C = Constant (3,000)

Based on Sichardt's formula and the highest K-value, the calculated distance of influence (Lo = Ro/2) is provided in Appendix K Table K-2.

7.4 Stormwater

Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. Therefore, the dewatering rates at the Site should also include removing stormwater from the excavation.

A 25 mm precipitation event was utilized for estimating the stormwater volume. The calculation of the stormwater volume is included in Appendix K Table K-1.

The estimate of the stormwater volume only accounts for direct precipitation into the excavation. The dimensions of the excavation are considered in the dewatering calculations. Runoff, which originated outside of the excavations' footprint, is excluded and it should be directed away from the excavation.

During precipitation events greater than 25 mm (ex: 100-year storm), measures should be taken by the contractor to retain stormwater onsite in a safe manner to not exceed the allowable water taking and discharge limits, as necessary. A one hundred (100) year storm event over a 24-hour period is 57.3 mm, which would produce up to 686,500 L/day for the building contraction within BLOCK 1 to 7 limits, and up to 8,600 L/day for Site servicing segments.

7.5 Results of Dewatering Rate Estimates

7.5.1 Construction Dewatering Rate Estimate

For this assessment, it was assumed that the proposed construction plans include the excavation of footings within the building extents and infrastructure on the Site. EXP should be retained to review the assumptions outlined in this section.

Short-term (construction) dewatering calculations are presented in Appendix K (Tables K-1 and K-2).

Pits (sump pits) are assumed to have the same excavation depth and dewatering target as the main excavation; deeper pits may require localized dewatering and revised dewatering estimates.

Based on the assumptions provided in this report, the results of the dewatering rate estimate can be summarized as follows:

Table 7-2 Summary of Construction Dewatering Rates

Description	Building BLOCK 1 (L/day)	Building BLOCK 2 (L/day)	Building BLOCK 3 (L/day)	Building BLOCK 4 (L/day)	Building BLOCK 5 (L/day)	Building BLOCK 6 (L/day)	Building BLOCK 7 (L/day)	Servicing (L/day)
Estimated Short Term Dewatering Rate (without safety factor or precipitation)	19,500	8,800	8,200	2,700	0	5,700	8,800	23,700 to 52,900
From Precipitation Event of 25 mm in one day	282,500	207,900	207,900	209,600	172,500	182,00	200,000	3,750
With Factor of Safety 2 (excluding precipitation) for permit	39,000	17,500	16,400	5,400	0	11,400	17,500	47,300 to 105,800
With Factor of Safety 2 (including precipitation) for designs, and budgeting	321,500	225,400	224,300	215,000	172,500	193,400	217,500	51,100 to 109,600
Radius of Influence from sides of excavation (m)	22	19	18	17	0	15	14	5 to 11

The maximum flow estimate is based on the highest and the geometric mean hydraulic conductivity, highest groundwater level and a safety factor, and as such it provides a conservative construction dewatering rate evaluation. The dewatering volumes estimated for construction dewatering should be considered as potential peak volumes and will likely decline over time. This peak dewatering flow rate also provides additional capacity for the dewatering contractor. The peak dewatering flow rates do not account for flow from utility beddings and variations in hydrogeological properties beyond those encountered during this investigation.

The actual dewatering volumes will vary over time subject to reaching steady state conditions, accumulation of precipitation, seasonal fluctuations in the groundwater table, flow from bedding materials of existing sewers, variation in hydrogeological properties beyond those encountered during this investigation, and construction sequence.

It is imperative to note that the contractors are solely responsible to ensure dry conditions are maintained within the excavation zone during the construction process at all costs. Safety measures must be considered when planning for construction, especially during the wet seasons. In the event of heavy rainfall or snow melting seasons, it is advised to implement an appropriate drainage system to divert the storm water runoffs and maintain the excavation zone free of water.

To prevent trench bedding acting as preferential pathway for groundwater flow along the driveway for the Site, the use of 'trench plugs' in the granular around the pipe should be considered. Where the granular bedding is below water table, the typical spacing between the 'trench plugs' should be approximately 80 to 100 m along the full length of the trench.

Local dewatering may be required for pits (sump pits) and for localized areas with permeable, soft, or wet soil conditions. Local dewatering is not considered to be part of this assessment, but contractors should be ready to install additional system to manage such conditions. Dewatering estimates should be reviewed once the pit dimensions are available.

All grading around the perimeter of the excavation should be graded away from the shoring systems/excavation and ramp/site access to redirect runoff away from excavation.

The dewatering assumptions are based on using shoring system and/or open cuts with sloped excavations.

The dewatering contractor is responsible for the design of the dewatering systems (depth of wells, screen length, number of wells, spacing sand pack around screens, prevent soil loss etc.) to ensure that dry conditions are always maintained within the excavation at all costs.

Dewatering should be monitored using dedicated monitoring wells within and around the perimeter of the excavation, and these wells should be monitored using manual measurements and with electronic data loggers; records should be maintained on site to track dewatering progress. Discharge rates should be monitored using calibrated flow meters and records of dewatering progress, and daily precipitation as per MECP requirements should be maintained.

7.5.2 Post-Construction Dewatering Rate Estimate

It is our understanding that the proposed development is slab-on-grade with no subsurface structures and that long-term dewatering is not required. Therefore, a long-term dewatering assessment is not warranted.

7.6 MECP Water Taking Permits

7.6.1 Short-Term Discharge Rate (Construction Phase)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering is more than 50 m^3/day, then an online registration in the Environmental Activity and Sector Registry (EASR) with the MECP will be required.

As of July 1, 2025, an amendment of O. Reg. 63/16 came into effect and replaced the former subsection 7 (5) such that the EASR water taking limit of 400 m^3/day would no longer apply to groundwater takings of each dewatered work area only and include

stormwater.

Table 7-2 provides the short-term dewatering rate estimates for the saturated upper water bearing zones with and without an applied safety factor of 2.0 for each BLOCK development and servicing installations, respectively.

Based on the dewatering estimate for this project, an EASR will be required to facilitate the construction dewatering program of the Site. Additionally, these dewatering rates correspond to initial dewatering conditions, and these are expected to reduce once stabilized conditions are reached.

While excavating in the upper till, sump pumps can be utilized to manage rain and perched groundwater seepage. In the sand or more granular layers encountered, an active dewatering system (well points, eductors or large diameter wells) will be required. It is noted that these dewatering rates and approach may be revised upon final design.

A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. The Discharge Plan and monitoring for both water quantity and water quality must be carried out at the Site during the entire construction dewatering phase. The daily water taking records must be maintained onsite for the entire construction dewatering phase.

The EASR, Water Taking and Discharge Reports, hydrogeological report, and geotechnical assessment of settlements due to dewatering must always also be available at the construction Site for the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since the EASR will need to be updated to reflect these modifications.

7.6.2 Long-Term Discharge Rate (Post Construction Phase)

It is our understanding that the proposed development is slab-on-grade with no subsurface structures and that long-term dewatering is not required. Therefore, a long-term dewatering assessment is not warranted.

8 Potential Impacts

Based on the findings of this report, an assessment of potential impacts of the proposed development is provided below.

8.1 Surface Water Resources

The Site is entirely located within the East Holland River Watershed (tributaries of East Holland River branch Subwatershed). The nearest surface water feature is a tributary of East Holland River, which flows across the most eastern portions of the property.

The shallow dewatering system is designed to temporarily lower the water table and maintain relatively dry stable soil conditions in the completed excavation prior construction. The dewatering process is designed and controlled by the dewatering contractor to limit drawdown in areas away from the pumping system. The anticipated maximum theoretical zone of influence (ZOI) was calculated to reach up to 22 m from the sides of the excavation areas.

Based on the extent of zone of influence and the distance to the nearest surface water feature from development areas, impacts to surface water features are not anticipated.

8.2 Groundwater Resources

Well Records from the MECP Water Well Record (WWR) Database were reviewed to determine the presence and number of water supply wells within a 500 m radius of the Site boundaries. Given that water supply records exist within the 500 m buffer but at a distance of at least 99 m and including on site water supply well installed at depths of approximately 83.52 mbgs, no shallow dewatering related impact on water supply wells is expected in the area.

A door-to-door survey for all wells located within 500 m zone of the site was conducted to confirm well uses in the area. Based on well survey results, one (1) well owner (15517 Woodbine Avenue) agreed to participate in the monitoring program for water sampling, ten (10) other owners of private properties did not respond to the well survey notice and were not at home at the time of conducting the door-to-door survey.

The pumping test was conducted at water supply well (A387542) in accordance with pumping test design report and under the MECP EASR permit for pumping test R-011-4302241726. Prior to the pumping test, notifications about pumping test to all properties within 500 m zone were distributed, as required by MECP. The on-site water supply well (A387542) is approximately 83.52 m deep and installed in lower confined aquifer system. The anticipated zone of influence from 24-hour pumping test at water supply well reached up to 450 m. Given the depth of proposed water supply well (83.52 m) and proposed daily water taking demand for proposed industrial development (likely less than 50,000 L/day), no long-term water taking related impacts anticipated to neighbouring wells in the area.

The proposed private septic system will operate to reduce nitrate loading to meet MECP established criteria of 10 mg/L for nitrate concentration at the Site boundary. Therefore, no long-term related impacts are predicted to downgradient neighbouring wells in the area as a result of proposed private septic system.

Given that the estimated hydraulic conductivity of the geological strata to a depth of approximately 6.1 m at the Site is relatively moderate and the depth of site excavations are expected to be shallow and limited, the dewatering related impacts are also anticipated to be restricted to a limited depth and area. In general, no change in the overall direction of groundwater flow at the Site is expected as a result of temporary groundwater control activities during construction.

To prevent trench bedding acting as preferential pathway for groundwater flow at the Site the use of ‘trench plugs’ in the granular around the pipe along the driveway should be considered. Where the granular bedding is below water table, the typical spacing between the ‘trench plugs’ should be approximately 80 to 100 m along the full length of the trench.

8.3 Well Head Protection and Recharge Areas

The Site is located within WHPA Q1/Q2 area. As such, a policy LUP-12 of the South Georgian Bay Lake Simcoe Source Protection Plan would apply.

As the site is partially mapped within a Significant Groundwater Recharge Area (SGRA). As construction dewatering and groundwater control activities are anticipated to be temporarily in nature and will be completed in the shallow subsurface less than 5 mbgs, it is unlikely that short-term dewatering related impacts are expected on the recharge areas within the Site.

Infiltration deficit on site in post construction phase (long term) will be mitigated through proposed LID systems (infiltration tank for BLOCK 1) designed to fully offset infiltration deficit on the site.

Given the depth of proposed water supply well (83.52 m) and proposed daily water taking demand for proposed industrial development (likely less than 50,000 L/day), no long-term water taking related impacts expected to neighbouring wells in 500 m area.

8.3.1 Ecologically Significant Groundwater Recharge Area (ESGRA)

The available regional information suggests that the site is partially mapped within an Ecologically Significant Groundwater Recharge Area (ESGRA), Lake Simcoe Protection Policy 6.40-DP would be applicable. Pre-development recharge must be maintained on-site within ESGRA areas. The ESGRA mapping is provided on Figure 10.

To mitigate the infiltration deficit in the post development scenario, installation of infiltration tank (LID) designed to fully offset the post-development infiltration deficit is proposed for BLOCK 1. Therefore, no long-term impact to western and southern ESGRA areas are predicted as a result of proposed development.

8.4 Identification of Vulnerable Areas

Based on LSRCA, Town of Whitchurch-Stouffville and MECP mapping available, the Site is not located within any areas identified as vulnerable aquifers, nor in any areas with identified surface water vulnerability or GUDI vulnerability (Appendix C).

8.5 Geotechnical Considerations

As per the MECP technical requirement for PTTW and EASRs, the geotechnical assessment of the stability of the soils due to water taking (ex: settlement, soil loss, subsidence, etc.) is required. The water taking should not have unacceptable interference on soils and underground structures (foundations, utilities, etc.).

A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.

8.6 Point of Discharge

It is our understanding that the potential discharge from the dewatering system during the construction activities will be directed either to the environment or to municipal sewer system, if approved. As such, the quality of groundwater discharge will have to conform to the Region of York Sewer Use By-Law criteria and/or Provincial Water Quality Objectives (PWQO).

It is anticipated that levels of TSS and associated metals in the pumped groundwater may become elevated and may exceed the PWQO / York Region Sewer Use By-Law Criteria prior to discharge. During construction, a treatment system, such as settlement, filtration tanks or any other applicable treatment systems, will be required to lower sediment content in the dewatered effluent prior to discharge. A written approval to discharge the treated groundwater to the sewer system must be obtained from applicable agencies (i.e., York Region, and/or LSRCA).

The specifications of the treatment system will need to be adjusted to the water quality by the treatment specialist/process engineer.

8.7 Quality Control and Conservation

It is our understanding that the potential effluent from the dewatering system during the construction might be released to the municipal sewer system or environments. As such, the quality of groundwater discharge is required to conform to the Region of York Sewer Use By-Law criteria and Provincial Water Quality Objectives (PWQO).

For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed both Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.

Dewatering (short-term) may induce migration of contaminants within the zone of influence and beyond due to changing hydraulic gradients, hydrogeological conditions beyond Site boundaries and preferential pathways in utility beddings etc. The water quality sampling conducted as part of this assessment was performed under static conditions. As a result, monitoring may be required during dewatering activities (short and long-term) to monitor potential migration, and this should be performed more frequently during early dewatering stages.

The water quality results presented in this report may not be representative of the long-term condition of groundwater quality onsite. As such, regular water quality monitoring is recommended for the post-construction phase as required by the Region.

An approval to discharge construction dewatering effluent to the environment might be required from LSRCA for regulated areas.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

8.8 Well Decommissioning

In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells, observation or monitoring wells must be completed by a licensed contractor. This will be required for all wells that are no longer in use.

EXP understands that all monitoring wells previously installed on site, including two (2) deep observation wells utilized for a water supply feasibility study were decommissioned by a licensed well contractor as per O.Reg. 903. Only three (3) shallow infiltration test wells (INF 304, INF 306 and INF 307), two (2) monitoring wells (BH18, BH11) and a former pumping well converted into a water supply well (A387542) were not decommissioned and remain on site.

9 Monitoring Program

To ensure that discharge meets the required standards, and the effects of the dewatering are not widespread, both water quantity and water quality of groundwater must be documented and monitored during the pre-construction, construction and post-construction periods. This will include both water quality and water quantity monitoring. The monitoring will confirm the zone of influence from the dewatering system, assist in documenting changes over time and help to evaluate whether any changes are a result of construction dewatering.

During construction, all domestic wells, where permission for monitoring was granted, and the existing monitoring wells that remain functional, must be used for water level monitoring purposes. Post construction monitoring of water levels and groundwater quality will be conducted again about 1 month after construction dewatering is completed. The monitoring results can be compiled and presented in a summary report that documents the work done, the results, any interference complaints and the mitigation completed.

It is also recommended that the quality of groundwater from dewatering system be monitored for suspended solids, metals and inorganic parameters listed in PWQO and/or Storm Sewer Use By-Law Criteria, once weekly for the first month of construction dewatering. If the results demonstrate that groundwater consistently meets the applicable standards, the monitoring frequency can be reduced to monthly thereafter.

The monitoring will include discharge monitoring at each point of discharge or for each batch discharge (should water be previously stored) prior release for turbidity, suspended solids (TSS), metals and inorganic parameters at the following frequency:

- once at initiation of construction dewatering;
- weekly for the first month of construction dewatering; and,
- monthly for the remainder of the dewatering period, if the results demonstrate that groundwater consistently meets the applicable standards.

This will be done at each discharge location. The field monitoring of TSS/turbidity will be completed daily for the first week of construction dewatering at each point of discharge prior to release. After correlation between on-site and laboratory TSS and turbidity, the results will be used along with future field monitoring results to determine discharge quality. Daily field monitoring of turbidity will continue until the end of construction dewatering along with sedimentation and erosion control observations. Should the future field turbidity results suggest unacceptable levels, additional confirmatory laboratory testing be done and a mitigation strategy specific to the situation be implemented (e.g., additional filtration etc.)

10 Conclusions and Recommendations

Based on the findings of the Hydrogeological Investigation and Water Balance Assessment, the following conclusions and recommendations are provided:

- The Site development consists of nine blocks (Blocks 1 through 9) with Blocks 1 to 7 to be developed for industrial use, Block 8 is assigned as a landscape buffer between access road along northern portion of the Site, and Block 9 designated as Natural Heritage System. The site will be provided with two access roads (Streets A and B) and will be supported with private services (water supply and septic system).
- MECP WWRs database indicates sixty-eight (68) water well records within a 500 m radius of the Site including twenty (20) on-site WWRs and forty-eight (48) off-site WWRs. All records indicate that there are twenty-one (21) water supply wells, thirty-six (36) monitoring and observation wells or test holes, six (6) (9) abandoned wells and five (5) wells listed with unknown use. records. The all-offsite water supply well records are located approximately 99 m from the Site boundary.
- Based on door-to-door well survey results completed on April 4, 2024, one (1) well owner (15517 Woodbine Avenue) agreed to participate in the monitoring program for water sampling and ten (10) other owners of private properties did not respond to the well survey notice and were not at home at the time of conducting the door-to-door survey.
- The Site located in the physiographic region known as the Oak Ridges Moraine, characterized by rolling sandy hills, hummocky topography and closed depressions that form the source of the headwaters to major streams (consisting primarily of surficial sand and gravel deposits).
- The Site is entirely within the Lake Simcoe and Couchiching/Black River Source Protection Area (SPA). The Site is within WHPA Q1/Q2 and partially within SGRA and ESGRA areas.
- The Site is located with the East Holland River watershed. The nearest surface water body is a tributary of East Holland River flowing along most eastern portions of the Site.
- The main overburden soil type encountered during drilling was fill to depths of up to 5.4 mbgs, underlain by native deposits of sand, silty sand, clayey silt and/or silt to the depth of exploration.
- Total of twenty (20) monitoring wells, one (1) pumping well and two (2) observation wells were installed by EXP between May 25 of 2021 and December 5 of 2024.
- The groundwater elevations recorded in twenty-one (21) measurements events between May 26, 2021, and August 15, 2025. Groundwater elevations for shallow water bearing zones varied between 289.33 and 305.93 masl while the groundwater elevations for a water supply well (deep aquifer) ranged from 258.78 and 261.33 masl. The hydrographs for shallow wells confirm that the highest groundwater levels for the wells were recorded during the spring season with a seasonal high-water level encountered on March 29 of 2023 monitoring event.
- The water level monitoring suggests the groundwater flow directions in the shallow overburden wells on the Site are interpreted to follow topographic relief. It should be noted that groundwater divide exists along the eastern boundary of the Block 1 limits and groundwater east of the Block 1 boundary flows towards the east to southeast and groundwater within Block 1 limits flows south to southwest.
- The highest measured K-value of the tested shallow water-bearing zone is $1.6x10^{-6}$ m/sec. The geometric mean estimated bulk hydraulic conductivity (K) values is $3.2x10^{-7}$ m/s.
- Based on the in-situ infiltration testing results, measured infiltration rates at IT210, IT211, INF 304, INF 306 and INF 307 very between 32 and 75 mm/hr. Using the geometric mean infiltration rate and a safety factor 2.5 (Low Impact Development (LID) Stormwater Management Planning and Design Guide, CVC – TRCA, 2010), the design infiltration rate was calculated to vary between 13 (min) and 30 (max) mm/hr for the entire Site with geometric mean value of 19 mm/hr.

- To offset the post development infiltration deficit of 14,004 m^3/year at the Site, feasible LID mitigation measures with a total area of approximately 980 m^2 in size and a minimum storage of 875 m^3 would be required. The proposed LID infiltration tank (cultec chamber) with volume of 966 m^3 within Block 1 area is designed to offset the infiltration deficit in post development.
- One (1) water supply well (PW A387542) of 150 mm diameter to an approximate depth of 83.52 mbgs and two (2) observation wells (OW1 and OW2) of 50 mm diameter up to 85 mbgs each were installed between April 25 and May 17 of 2024. A mud rotary drilling method was utilized for drilling test holes. A three (3) meter 30 slot stainless steel screen was installed at PW, and a six (6)-meter length 10 slot screens were installed for OW1 and OW2. Observation wells were located approximately 5 m south (OW2) and 10 m northeast (OW1) of PW, respectively. The location of the pumping well is situated approximately 200 m away from a proposed septic system and approximately 15 m away from MTO boundary, which meets minimum MECP requirements for horizontal separation.
- The constant pumping rate utilized during the pumping test was 136.38 L/min or 196.39 m^3/day over the 24-hr duration between October 1 and 2, 2024. Both observation wells along with a pumping well (PW) were monitored with manual and data logger measurements during a pumping test and a recovery period.
- Based on pumping test results, the calculated aquifer parameters suggest that the formation in the area of PW is a coarse sand to fine gravel that has a storativity indicative of confined conditions (3.1×10^{-4}). The transmissivity of the formation was calculated as 239.6 m^2/day. A cone of depression had expanded on the order of 450 m during the pumping test.
- The aquifer performance test results for the pumping well show that after about 200 minutes of pumping, the expanding cone of influence encountered a positive boundary, shown as a decrease in the slope of the drawdown time curve. This is interpreted as being a zone of increased permeability in the aquifer.
- The pumping test and monitoring results suggest that a water supply well (PW A387542) having a long-term sustainable yield between 114 and 136 L/min (163 and 196 m^3/day) can be expected. If operational demand for daily water taking exceeds 50 m^3/day for a water supply, a Category 3 Permit to Take Water (PTTW) from MECP would be required for operations.
- Groundwater quality for private water supply operations suggests (raw groundwater from pumping well A387542) that it is suitable for human consumption without treatment as water quality at the end of pumping test meets ODWS. However, it is recommended to implement a routine water quality monitoring program to confirm that water quality consistently meets ODWS. Suitable treatment would be required if water quality demonstrates any exceedances above ODWS.
- The nitrate impact evaluation results for the proposed septic system suggest that the downgradient nitrate concentration is estimated to be approximately 6.9 mg/L (including the background average nitrate concentration). This is below the established ODWS criteria of 10 mg/L. Therefore, the 14.43 acres site (Block 1) can support an industrial development having a total effluent loading of 9,500 L/day resulting in downgradient nitrate concentration (RNC) of 6.9 mg/L.
- Based on the assumptions outlined in this report, the estimated total construction peak dewatering rate (including precipitation) can reach approximately 321,500 L/day for slab-on-grade buildings construction for Block 1 to Block 7 areas and up to 109,600 L/day for Site servicing segments. This is the rate which will be required for discharge to the municipal sewer system or to environment.
- As the total dewatering flow rate is more than 50,000 L/day, an EASR would be required to facilitate the construction dewatering program for the Site. Sequential construction of site services and foundations would reduce the overall dewatering requirements for the Site.
- While excavating in the upper till, sump pumps can be utilized to manage rain and perched groundwater seepage. In the sand or more granular layers encountered, an active dewatering system (well points, eductors or large diameter wells) will be required. It is noted that dewatering rates and approaches assessed in this report may be revised upon final design.
- Given that the estimated hydraulic conductivity of the geological strata to a depth of approximately 6.1 m at the Site is relatively moderate and the depth of site excavations are expected to be shallow and limited, the dewatering related

influence is also anticipated to be restricted to a limited depth and area. In general, no change in the overall direction of groundwater flow at the Site is expected as a result of temporary groundwater control activities during construction.

- No long-term dewatering is anticipated for the proposed development as proposed building structure is slab-on-grade.
- Given the depth of proposed water supply well (83.52 m) and proposed daily water taking demand for proposed industrial development (likely less than 50,000 L/day), no long-term water taking related impacts anticipated to neighbouring wells in the area.
- To prevent trench bedding from acting as preferential pathway for groundwater flow at the Site, the use of 'trench plugs' in the granular around the pipe should be considered. Where the granular bedding is below water table, the typical spacing between the 'trench plugs' should be approximately 80-100 m along the full length of the trench.
- For short term construction dewatering, when comparing the analytical results of the collected groundwater sample to the Region of York Sanitary Sewer discharge parameters there were no parameter exceedances.
- When comparing the analytical results of the collected groundwater sample to the Region of York Storm Sewer discharge parameters, the following parameters were reported with an exceedance: Total Kjeldahl Nitrogen (TKN).
- When comparing the analytical results of the collected groundwater sample to the PWQO the following parameters were reported with an exceedance attributed to RDL exceeding in the criteria: Total Nonylphenols, Bis(2-ethylhexylphthalate), Total PCBs and Total Phosphorus.
- For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed both Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.
- The potential discharge from the dewatering system during the construction will be directed either to the municipal sewer system or to the environment. As such, the quality of groundwater discharge will have to conform to the applicable Provincial Water Quality Objectives (PWQO) and / or the York Region Sewer Use By-Law Criteria.
- For discharge to be directed to the natural environment, the turbidity of the effluent should be below 8 NTU within 30 m of surface water body and Total Suspended Solids (TSS) below 25 mg/L. Therefore, continuous monitoring of TSS and turbidity of the discharge is recommended during construction dewatering.
- To ensure that discharge meets the required standards, and the effects of the dewatering are not widespread, both water quantity and water quality of groundwater must be documented and monitored during the pre-construction, construction and post-construction periods.
- A monitoring and mitigation plan is presented. The monitoring will confirm the zone of influence from the dewatering system(s), assist in documenting changes over time and help to evaluate whether any changes are a result of construction dewatering.
- As per the MECP technical requirement for PTTW and EASRs, the geotechnical assessment of the stability of the soils due to water taking (ex: settlement, soil loss, subsidence etc.) is required. The water taking should not have unacceptable interference on soils and underground structures (foundations, utilities etc.). A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.
- A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. The Discharge Plan and monitoring for both water quantity and water quality must be carried out at the Site during the entire construction dewatering phase. The daily water taking records must be maintained onsite for the entire construction dewatering phase.

- The EASR, Water Taking and Discharge Reports, hydrogeological report, and geotechnical assessment of settlements due to dewatering must always also be available at the construction Site for the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since the EASR will need to be updated to reflect these modifications.
- The construction dewatering is based on the assumptions outlined in this report. Any variations in hydrogeological conditions beyond those encountered as part of this preliminary investigation may significantly influence the discharge volumes.
- In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells or monitoring wells must be completed by a licensed well contractor. This will be required for all wells that are no longer in use.

The conclusions and recommendations provided above should be reviewed in conjunction with the entirety of the report. They assume that the present design concept described throughout the report will proceed to construction. Any changes to the design concept may result in a modification to the recommendations provided in this report.

11 Limitations

This report is based on a limited investigation designed to provide information to support an assessment of the current hydrogeological conditions within the study area. The conclusions and recommendations presented within this report reflect Site conditions existing at the time of the assessment. EXP must be contacted immediately if any unforeseen Site conditions are experienced during construction activities. This will allow EXP to review the new findings and provide appropriate recommendations to allow the construction to proceed in a timely and cost-effective manner.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the geoscience/engineering profession. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of Galatia Lane Estates Inc. This report may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust that this information is satisfactory for your purposes. Should you have any questions or comments, please do not hesitate to contact this office.

Sincerely,

EXP Services Inc.

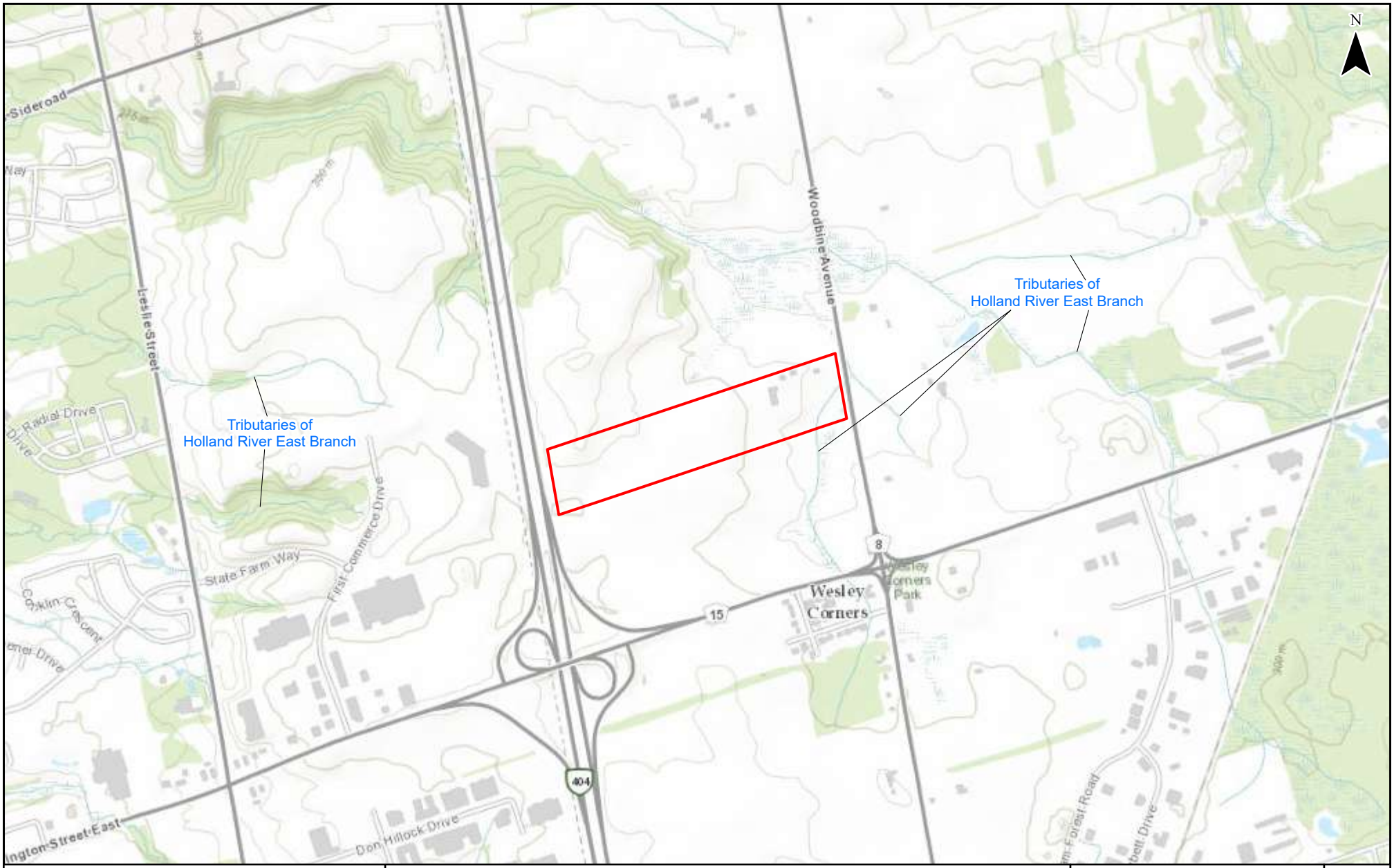
Mehari Menghistu, P.Geo. (Limited).
Hydrogeologist
Earth and Environment

Nataliya Tkach, P.Geo., PMP, P.Eng., FGC
Senior Hydrogeologist
Earth and Environment

12 References

- Provincial Policy Statement (2014).
- Clean Water Act (2006).
- R.R.O. 1990, Reg. 903: WELLS.
- D-5-5 Private Wells: Water Supply Assessment.
- D-5-4 Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment.
- MECP document/water-supply-wells-requirements-and-best-practices (4. Siting the Well | Water Supply Wells: Requirements and Best Practices | ontario.ca).
- Ontario Regulation 332/12 (Building Code) made under the *Building Code Act*, 1992.
- Cashman and Preene (2013) Groundwater Lowering in Construction, 2nd Edition.
- Chapman, L.J. and Putnam, D.F. (2007). Physiography of Southern Ontario, 3rd Edition, Ontario Geological Survey.
- J.P. Powers, A.B. Corwin, P.C. Schmall and W.E. Kaeck (2007). Construction Dewatering and Groundwater Control, Third Edition.
- Ministry of Northern Development and Mines (May, 2012). OGS Earth. Retrieved from http://www.mndm.gov.on.ca/en/mines-and-minerals/applications/ogsearth.
- Oak Ridges Moraine Groundwater Program (ORMGP, 2022). Accessed to the website (https://oakridgeswater.ca/) dated February 2022.
- Ontario Source Protection Information Atlas 2021 - Accessed to the website (https://www.lioapplications.lrc.gov.on.ca/SourceWaterProtection/index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-CA) dated March 2023.
- Oak Ridges Moraine Conservation Plan (2002).
- York Region Official Plan (YROP) (2010) and Regional Official Plan Amendment 5 (ROPA 5 - Source Water Protection policies and mapping) (2013).
- Town of Whitchurch Stouffville Official Plan (WSOP) (2020) – Low and High Aquifer Vulnerability (Schedule “I”) and Wellhead Protection Zones (Schedule “K”).
- Toronto Region Conservation Authority (TRCA). (August 2012). Stormwater Management Criteria.
- Conservation Authority Guidelines for Hydrogeological Assessments (2013).
- Site Servicing drawings (by SCS dated January 2025)
- Sewage System Design drawings (by Gunnell Engineering Ltd., dated September 24, 2024)
- EXP Services Inc. (2021-06-17). Preliminary Geotechnical Investigation, Proposed Residential Development, 15374 and 15450 Woodbine Avenue, Gormley, Ontario.
- EXP Services Inc. (2021-06-17). Phase II Environmental Site Assessment, 15374 and 15450 Woodbine Avenue, Gormley, Ontario.

Figures



SCALE:

0 150 300 450 600 750 m

LEGEND:

APPROXIMATE SITE BOUNDARY

SITE LOCATION PLAN

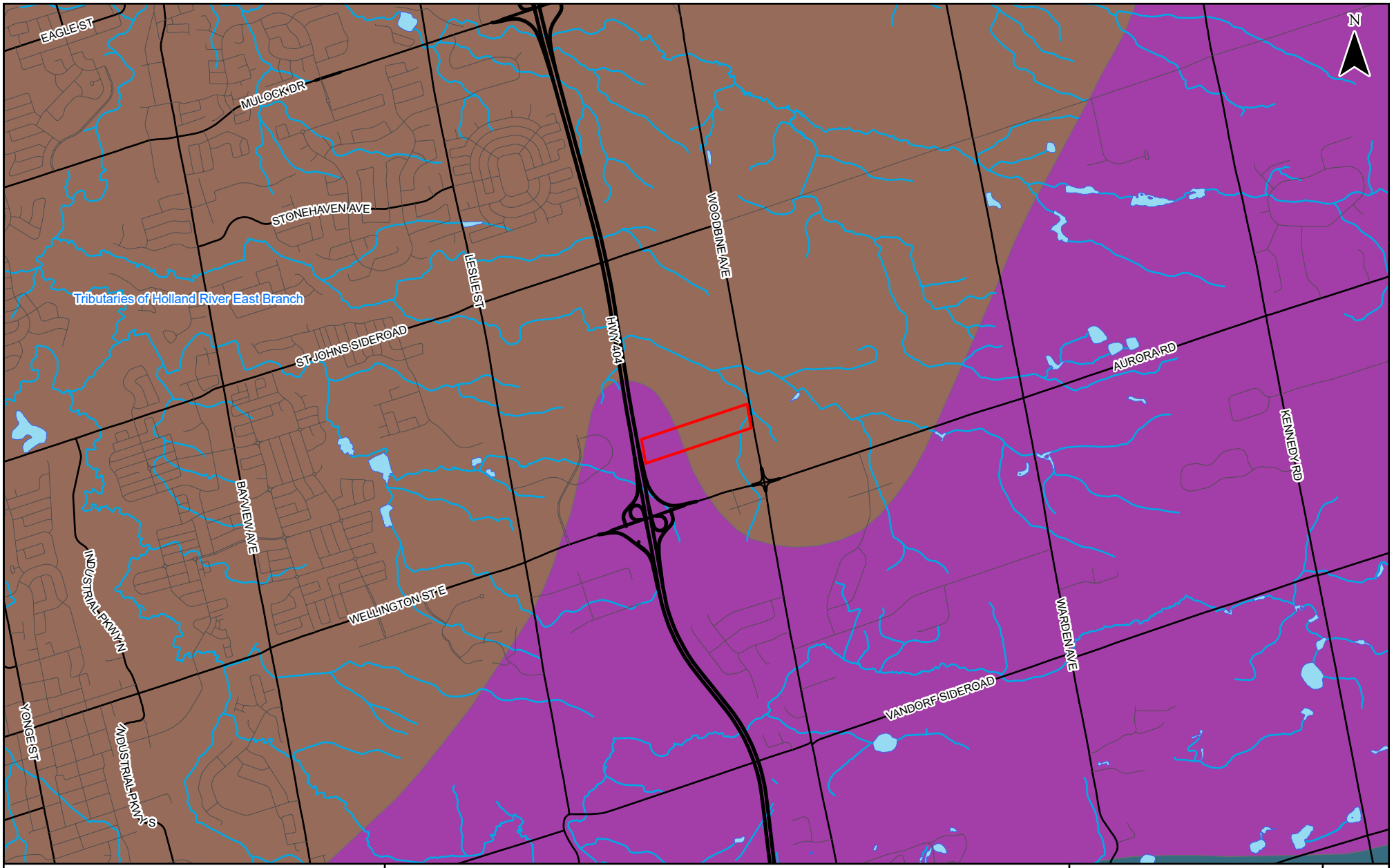
FIGURE: 1

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

DRAWN BY:	CHECKED BY:
AC	NT

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025



SCALE:

0 500 1,000 1,500 2,000 2,500 m

SOURCE:

BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2007

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

- APPROXIMATE SITE BOUNDARY
- OAK RIDGES MORAINE
- SOUTH SLOPE
- SCHOMBERG CLAY PLAINS

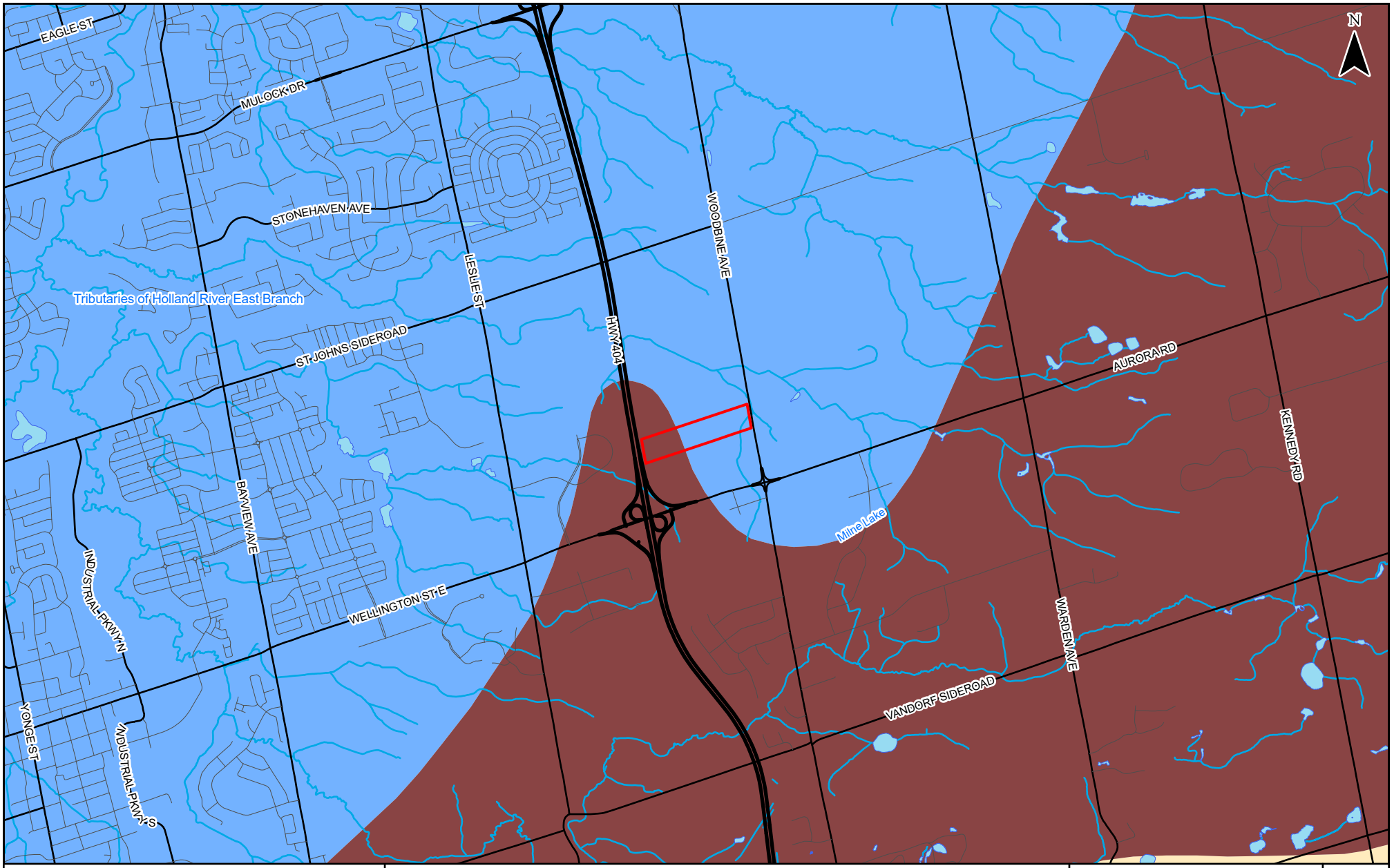
PHYSIOGRAPHIC REGIONS

FIGURE: 2A

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025



SCALE:

0 500 1,000 1,500 2,000 2,500 m

SOURCE:

BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2007

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

- APPROXIMATE SITE BOUNDARY
- CLAY PLAINS
- TILL PLAINS (DRUMLINIZED)
- KAME MORAINES

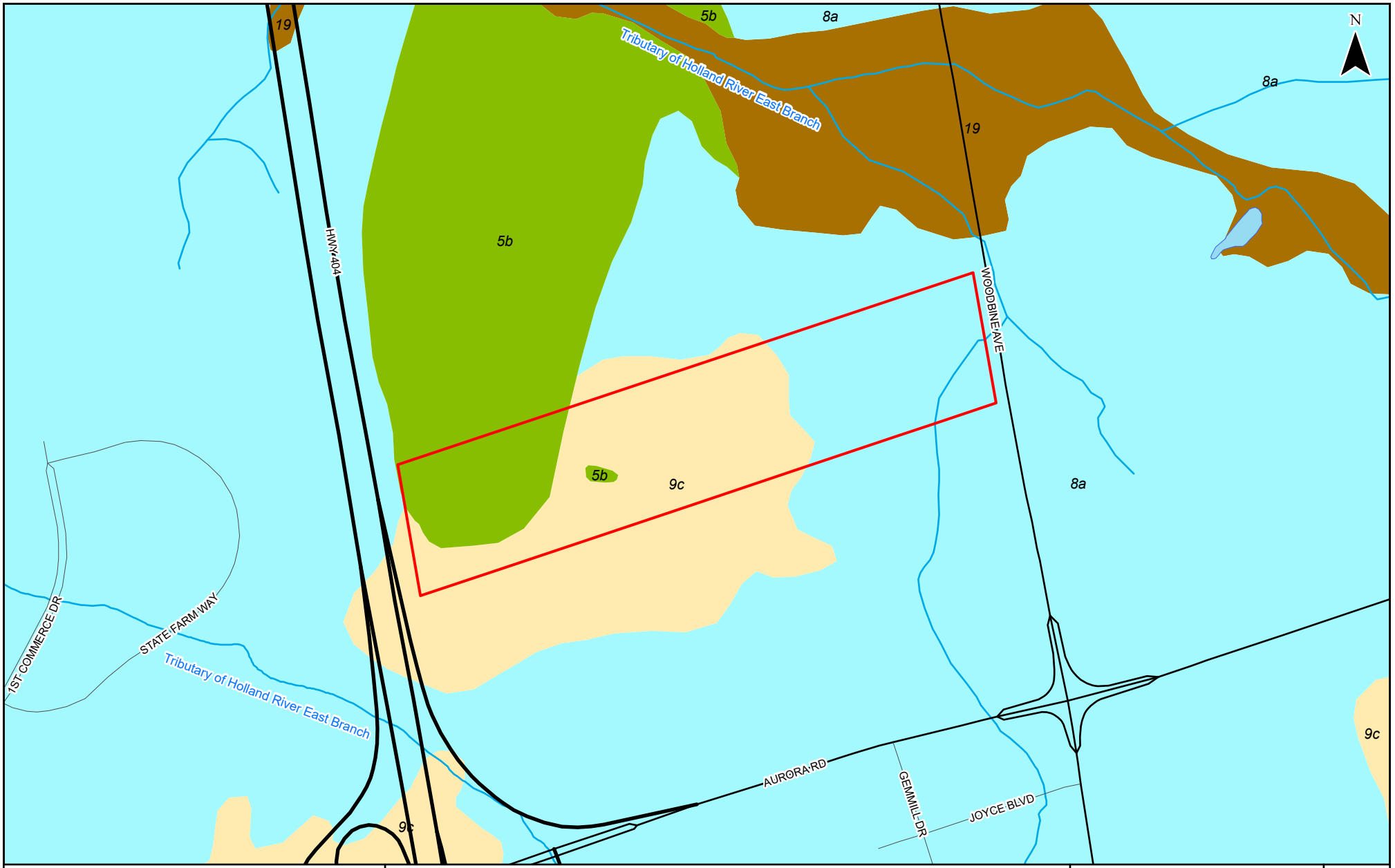
PHYSIOGRAPHIC LANDFORMS

FIGURE: 2B

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025



SCALE:
0 100 200 300 400 500 m

SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2010

exp.

DRAWN BY:	CHECKED BY:
AC	NT

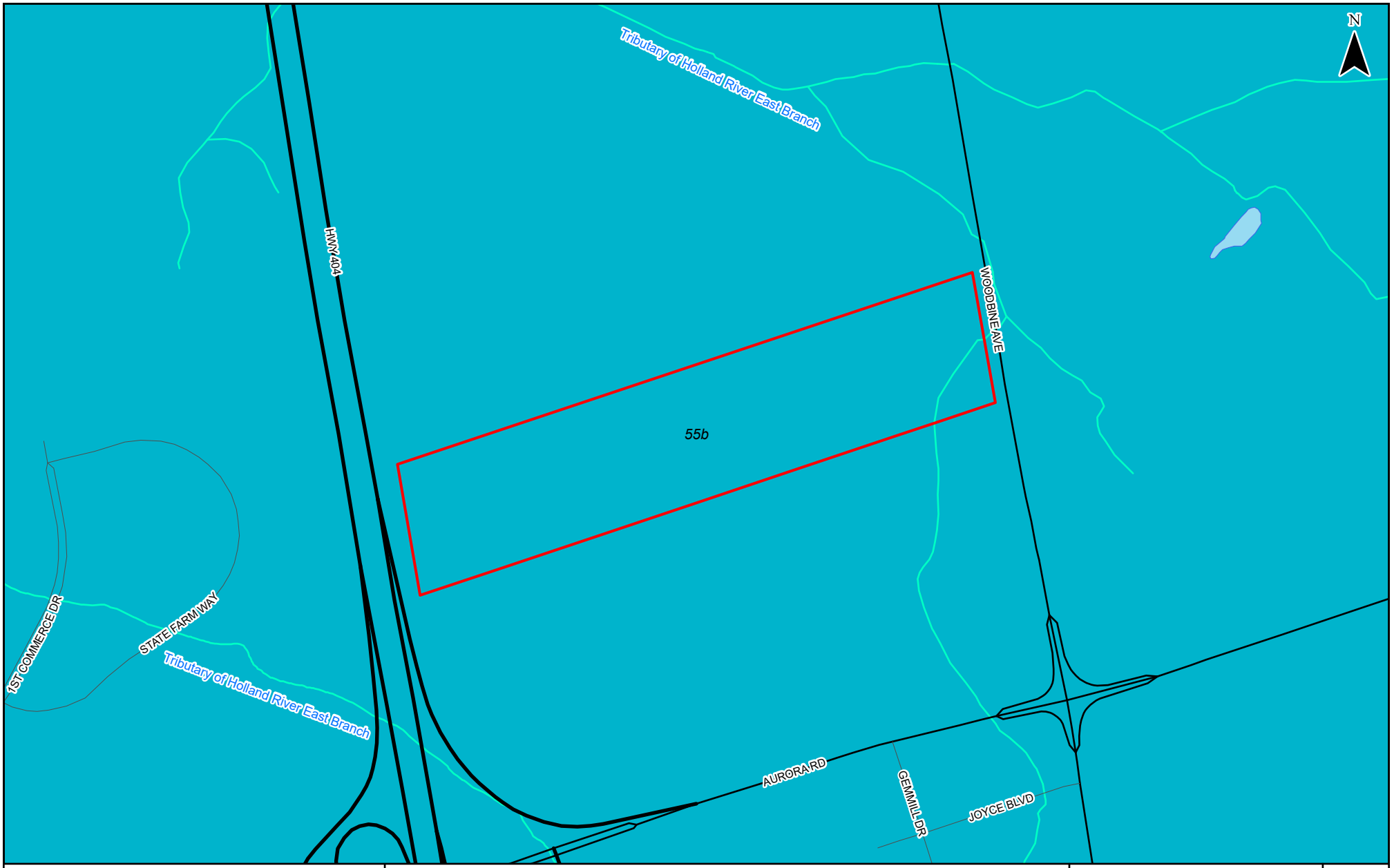
LEGEND:
- APPROXIMATE SITE BOUNDARY
- 19: MODERN ALLUVIAL DEPOSITS
- 9C: COARSE-TEXTURED (FORESHORE-BASINAL) GLACIOLACUSTRINE DEPOSITS
- 8A: FINE-TEXTURED GLACIOLACUSTRINE DEPOSITS
- 5B: STONE-POOR, CARBONATE-DERIVED SILTY TO SANDY TILL

SURFICIAL GEOLOGY

FIGURE: 2C

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2 | DATE: AUGUST 2025



SCALE:
0 100 200 300 400 500 m

SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2011

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

55b: SHALE, LIMESTONE, DOLOSTONE, SILTSTONE
(Georgian Bay Formation; Blue Mountain Formation; Billings Formation; Collingwood Member; Eastview Member)

BEDROCK GEOLOGY

FIGURE: 2D

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2 | DATE: AUGUST 2025

SCALE:

0 100 200 300 400 500 m

SOURCE:

BASED ON GOOGLE EARTH IMAGERY DATED 2023,
AVAILABLE WELL RECORD INFORMATION AS OF JANUARY 2024

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

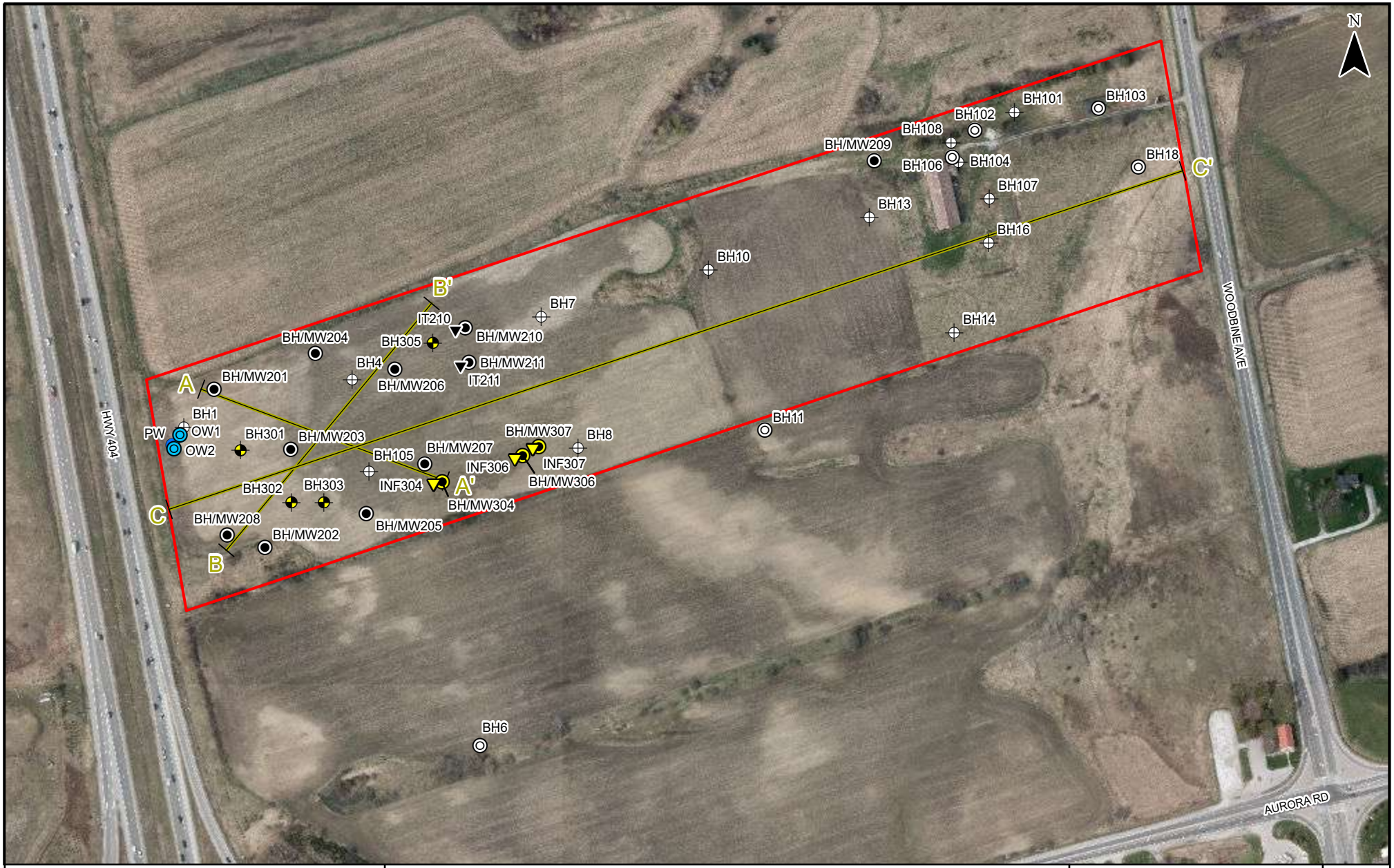
- MONITORING WELL / TEST HOLE
- WATER SUPPLY WELL
- ABANDONED WELL
- UNCLASSIFIED / UNFINISHED WELL
- APPROXIMATE SITE BOUNDARY
- 500 m ZONE

MECP WATER WELL RECORDS MAP

FIGURE: 3

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2 | DATE: AUGUST 2025



SCALE:

0 50 100 150 200 250 m

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

- BOREHOLE (EXP, 2024)
- BOREHOLE (EXP, 2021)
- BOREHOLE / MONITORING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2023)
- BOREHOLE / MONITORING WELL (EXP, 2021)
- INFILTRATION TEST LOCATION (EXP, 2024)
- INFILTRATION TEST LOCATION (EXP, 2023)
- PUMPING WELL (EXP, 2024)
- OBSERVATION WELL (EXP, 2024)
- CROSS SECTION AXIS
- APPROXIMATE SITE BOUNDARY

BOREHOLE / MONITORING WELL AND INFILTRATION TEST LOCATION PLAN

FIGURE: 4

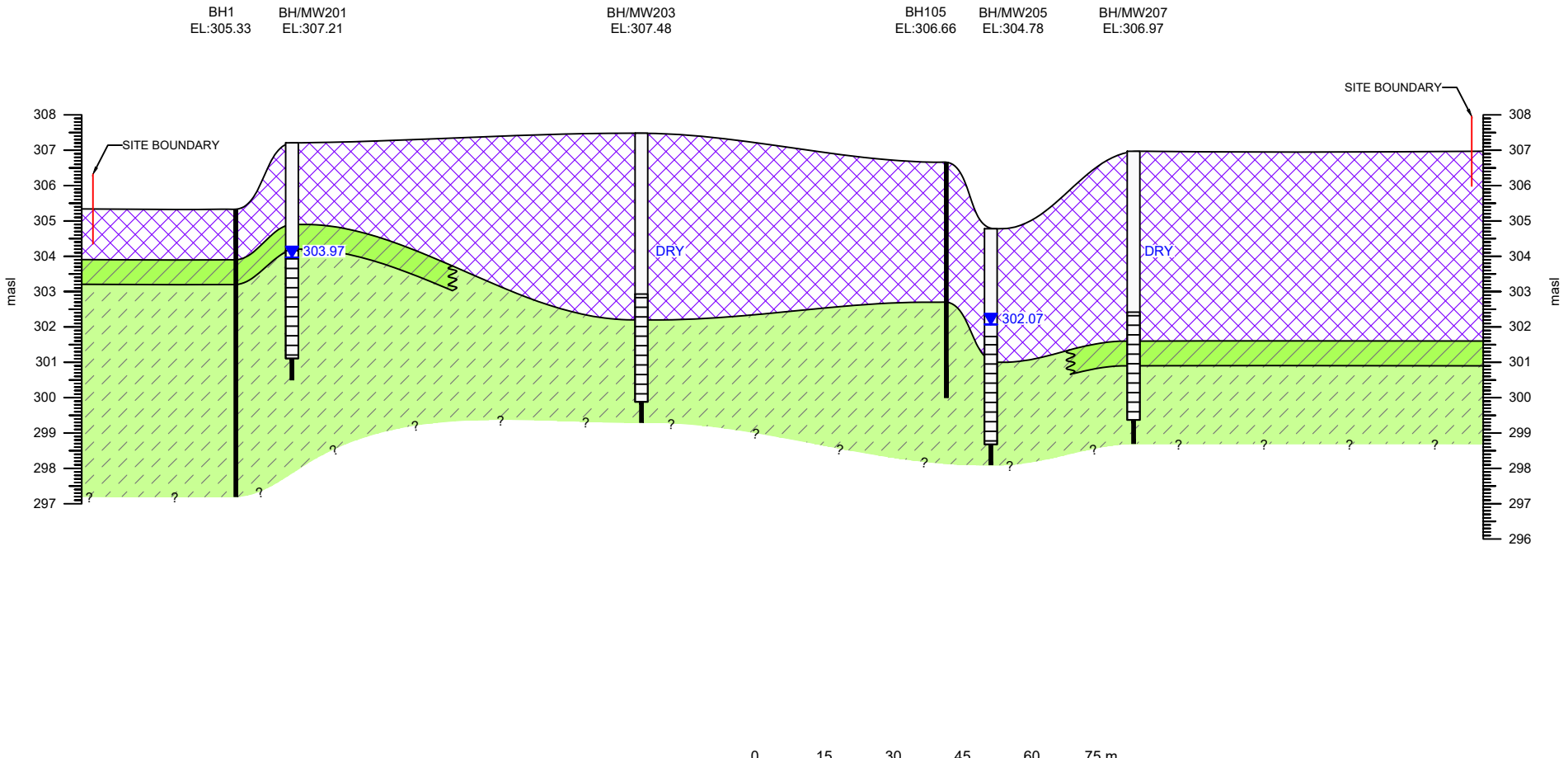
HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025

A
NORTHWEST

A'
SOUTHEAST



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 15 30 45 60 75 m

EXP Services Inc.
t: +1.905.793.9800 | f: +1.905.793.0641
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada
www.exp.com

• BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

LEGEND:
- FILL
- CLAYEY SILT
- SILT

GROUNDWATER ELEVATION (masl) AS MEASURED ON MARCH 2, 2023

TITLE AND LOCATION:

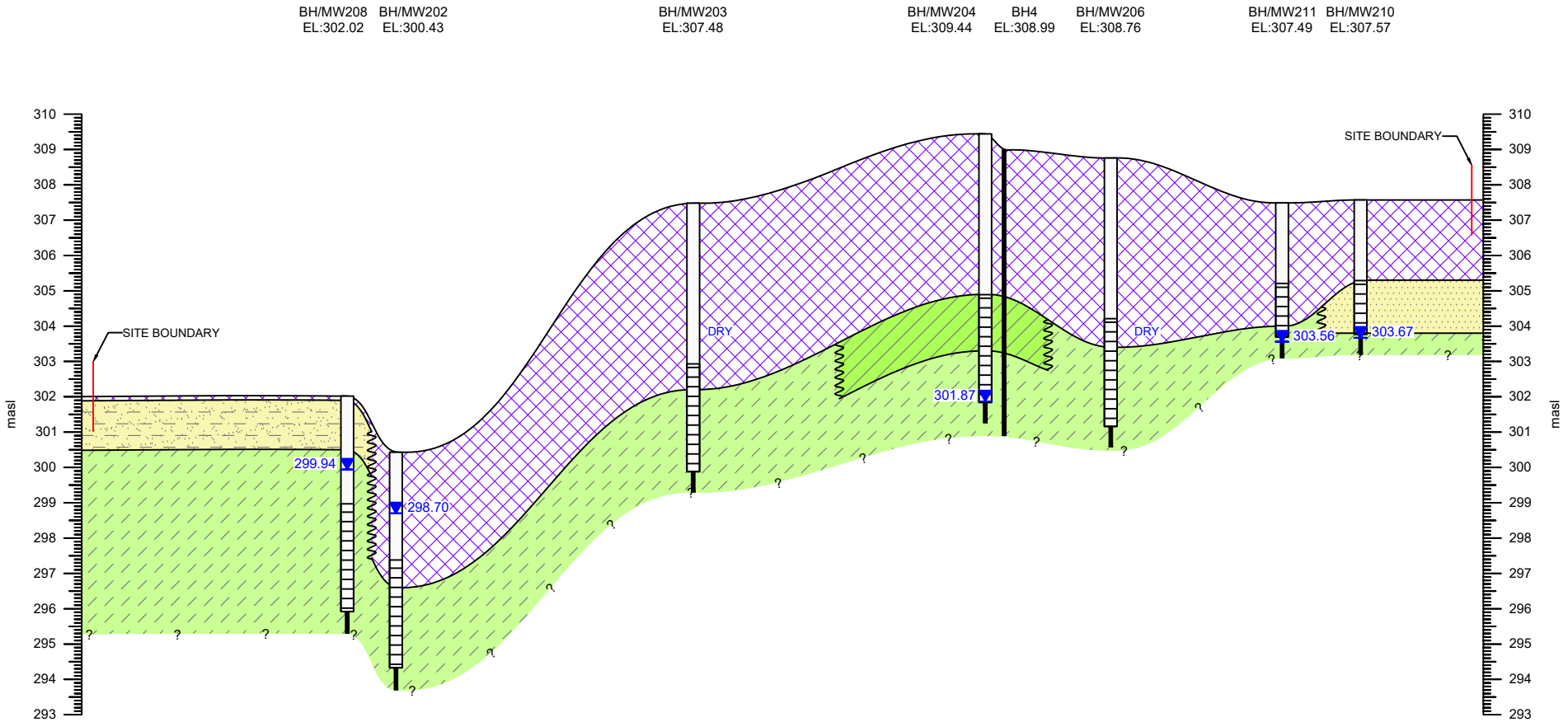
CROSS SECTION A-A'
HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NO.:	DWN.:
GTR-21010864-C1	K.G.
SCALE: AS NOTED	CK: RF
DATE: APRIL 2024	FIG. NO.: 5A

E:\BRM\BRM-21010864-C0\60 Execution\65 Drawings\Cross Sections\GTR-21010864-C1.dwg

B
SOUTHWEST

B'
NORTHEAST



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 15 30 45 60 75 m

EXP Services Inc.
t: +1.905.793.9800 | f: +1.905.793.0641
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada
www.exp.com

• BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

LEGEND:
- FILL
- CLAYEY SILT
- SILT
- SILTY SAND
- SAND

GROUNDWATER ELEVATION (masl) AS MEASURED ON MARCH 2, 2023

TITLE AND LOCATION:

CROSS SECTION B-B'
HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NO.: GTR-21010864-C1	DWN.: K.G.
SCALE: AS NOTED	CK: RF
DATE: APRIL 2024	FIG. NO.: 5B

E:\BRM\BRM-21010864-C0\60 Execution\65 Drawings\Cross Sections\GTR-21010864-C1.dwg

C
SOUTHWEST

C'
NORTHEAST

BH/MW208 EL:302.02
BH301 EL:305.30
BH302 EL:305.34
BH/MW203 EL:307.48
BH303 EL:305.29
BH105 EL:306.66
BH/MW207 EL:306.97
BH/MW304 EL:304.78
BH/MW211 EL:307.49
BH/MW306 EL:304.96
BH/MW307 EL:305.09
BH10 EL:303.90
BH13 EL:299.09
BH16 EL:297.72
BH17 EL:293.27
BH18 EL:291.57

masl

308 307 306 305 304 303 302 301 300 299 298 297 296 295 294 293 292 291 290

289.33

283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308

VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE:

0 50 100 150 200 250 m

EXP Services Inc.
t: +1.905.573.4000
1266 South Service Road Suite C1-1
Stoney Creek, ON L8E 5R9
Canada
www.exp.com
• BUILDINGS • EARTH & ENVIRONMENT • ENERGY •
• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

LEGEND:

- FILL
- ASPHALT
- SILTY SAND
- SILT
- SAND
- CLAYEY SILT
- TOPSOIL
- GROUNDWATER ELEVATION (masl) AS MEASURED ON AUGUST 15, 2025

TITLE AND LOCATION:

CROSS SECTION C-C'
HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

JOB NO.:	DRAWN BY:
GTR-21010864-C2	MS
SCALE: AS NOTED	CHECKED BY: NT
DATE: AUGUST 2025	FIG NO.: 5C

\\exp\data\BRM\BRM-21010864-C0\60 Execution\65 Drawings\Cross Sections\GTR-21010864-C2.dwg

SCALE:

0 40 80 120 160 200 m

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

- PUMPING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2023)
- BOREHOLE / MONITORING WELL (EXP, 2021)
- XX.XX GROUNDWATER ELEVATION (m asl) AS MEASURED ON MARCH 2, 2023
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE SITE BOUNDARY

GROUNDWATER CONTOUR PLAN - MARCH 2, 2023

FIGURE: 6A

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025

SCALE:

0 40 80 120 160 200 m

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

- PUMPING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2023)
- BOREHOLE / MONITORING WELL (EXP, 2021)
- XX.XX GROUNDWATER ELEVATION (m asl) AS MEASURED ON MARCH 29, 2023
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE SITE BOUNDARY

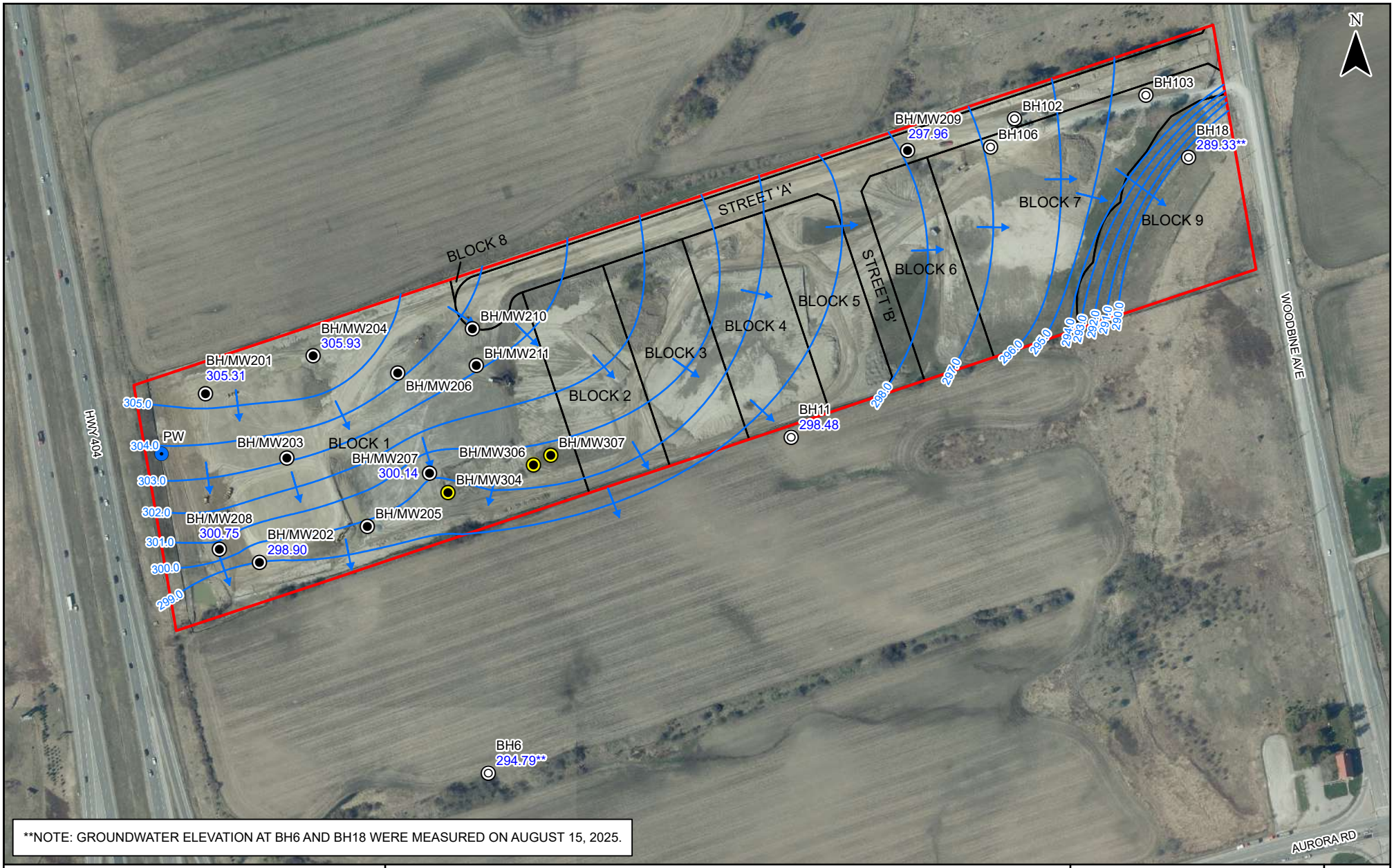
GROUNDWATER CONTOUR PLAN - MARCH 29, 2023

FIGURE: 6B

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025



**NOTE: GROUNDWATER ELEVATION AT BH6 AND BH18 WERE MEASURED ON AUGUST 15, 2025.

SCALE:

0 40 80 120 160 200 m

LEGEND:

- PUMPING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2024)
- BOREHOLE / MONITORING WELL (EXP, 2023)
- BOREHOLE / MONITORING WELL (EXP, 2021)
- XX.XX GROUNDWATER ELEVATION (m asl) AS MEASURED ON MARCH 29, 2023
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- APPROXIMATE SITE BOUNDARY

DRAWN BY:	CHECKED BY:
AC	NT

SHALLOW GROUNDWATER CONTOUR PLAN

FIGURE: 6C

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2 DATE: AUGUST 2025

SCALE:

0 30 60 90 120 150 m

LEGEND:

- BUILDING
- LANDSCAPE
- PAVED SURFACE (GRAVEL)
- APPROXIMATE SITE BOUNDARY

DRAWN BY:	CHECKED BY:
AC	NT

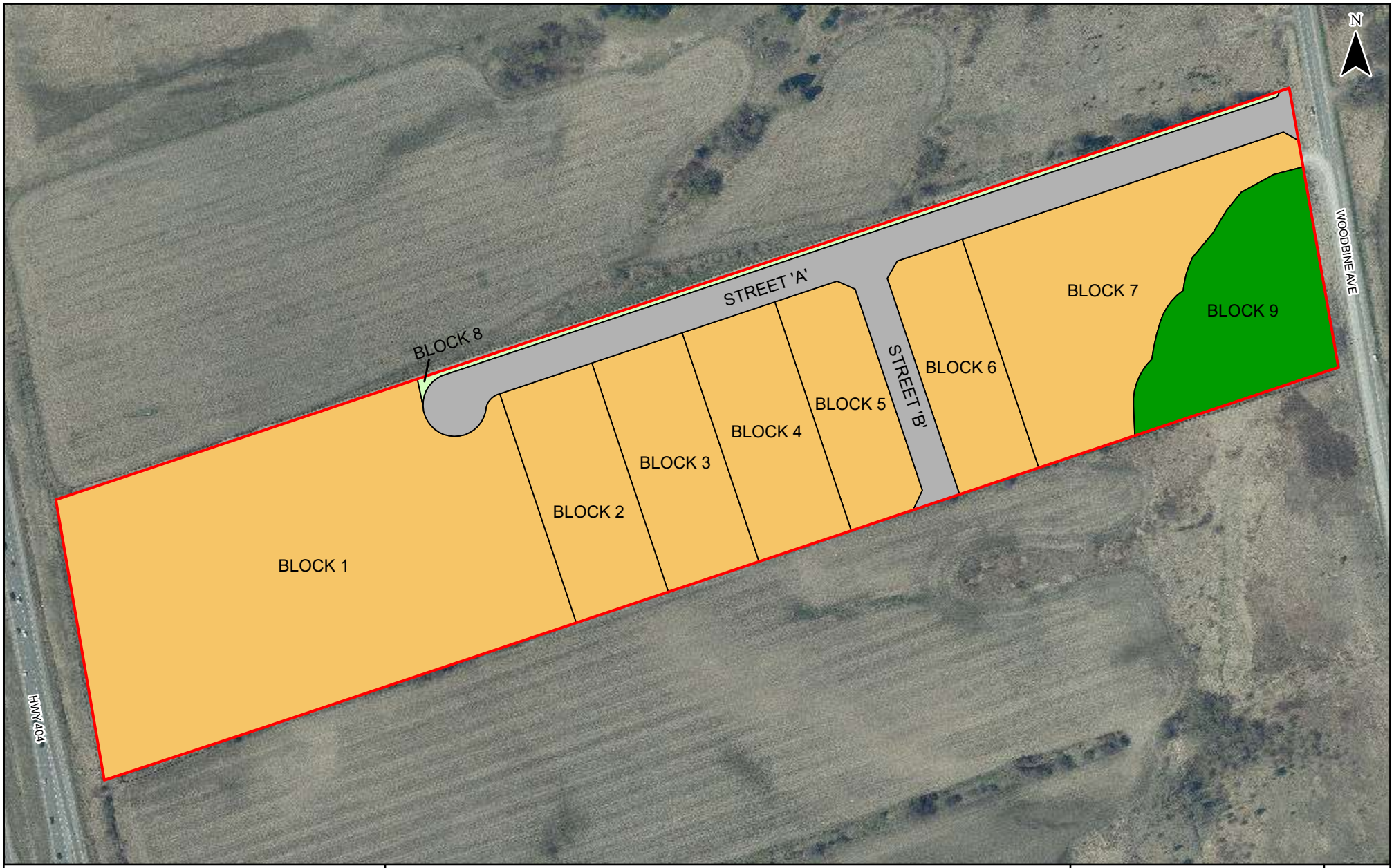
EXISTING LAND USE

FIGURE: 7

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025



SCALE:

0 30 60 90 120 150 m

LEGEND:

- INDUSTRIAL (BLOCK 1 - 7)
- LANDSCAPE (BLOCK 8)
- NATURAL HERITAGE SYSTEM (BLOCK 9)
- PAVED ROAD
- APPROXIMATE SITE BOUNDARY

exp.

DRAWN BY:	CHECKED BY:
AC	NT

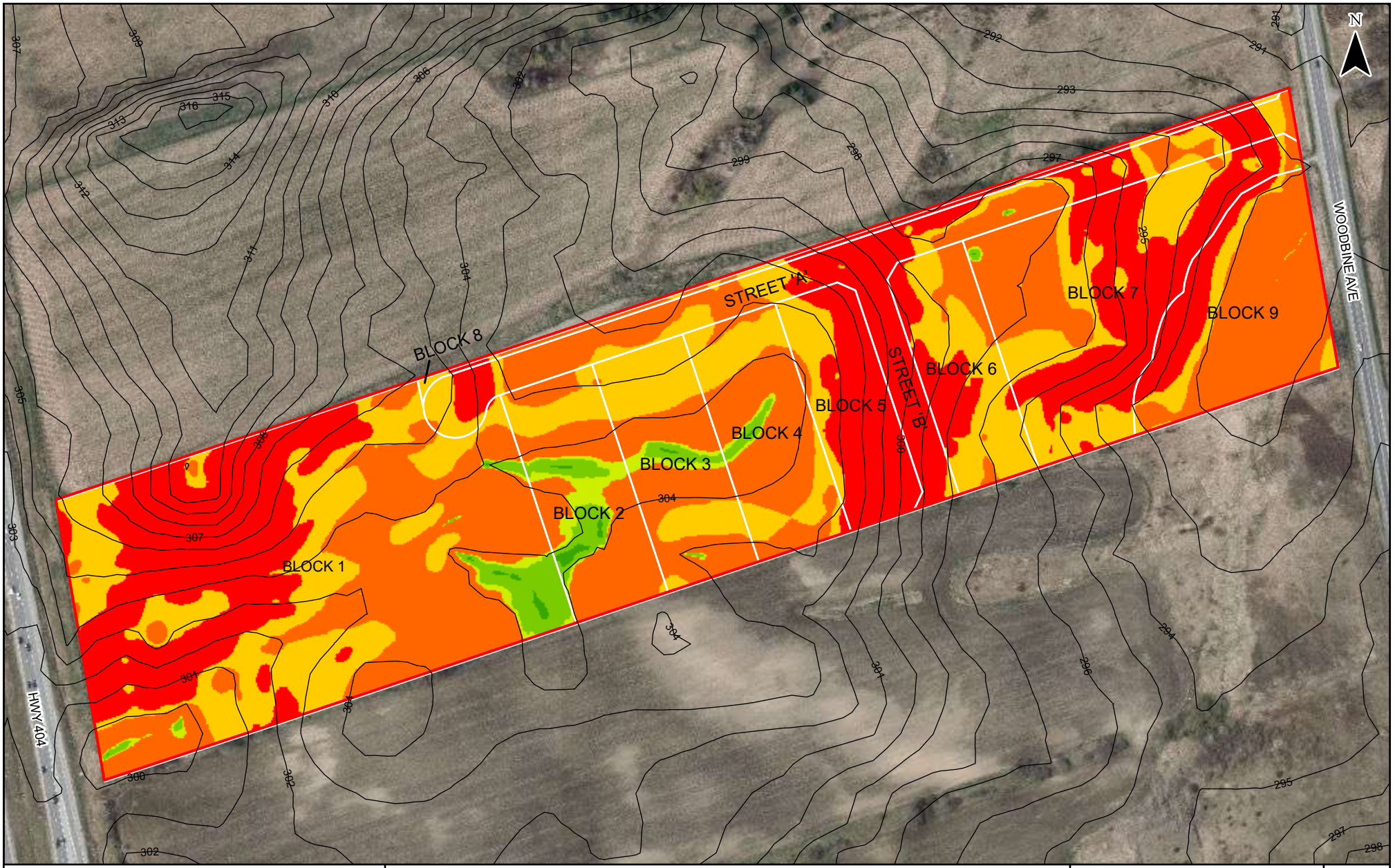
PROPOSED LAND USE

FIGURE: 8

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025



SCALE:

0 30 60 90 120 150 m

SOURCE:

TOPOGRAPHIC CONTOURS (2016) BASED ON PUBLIC SECTOR INFORMATION MADE AVAILABLE UNDER THE REGIONAL MUNICIPALITY OF YORK'S OPEN DATA LICENSE.

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:

—— TOPOGRAPHIC CONTOUR (m asl)

APPROXIMATE SITE BOUNDARY

EXISTING SLOPE (INFILTRATION FACTOR):

- <0.06% (0.30)
- 0.06 - 0.28% (0.25)
- 0.28 - 0.38% (0.20)
- 0.38 - 2.8% (0.15)
- 2.8 - 4.7% (0.10)
- >4.7% (0.05)

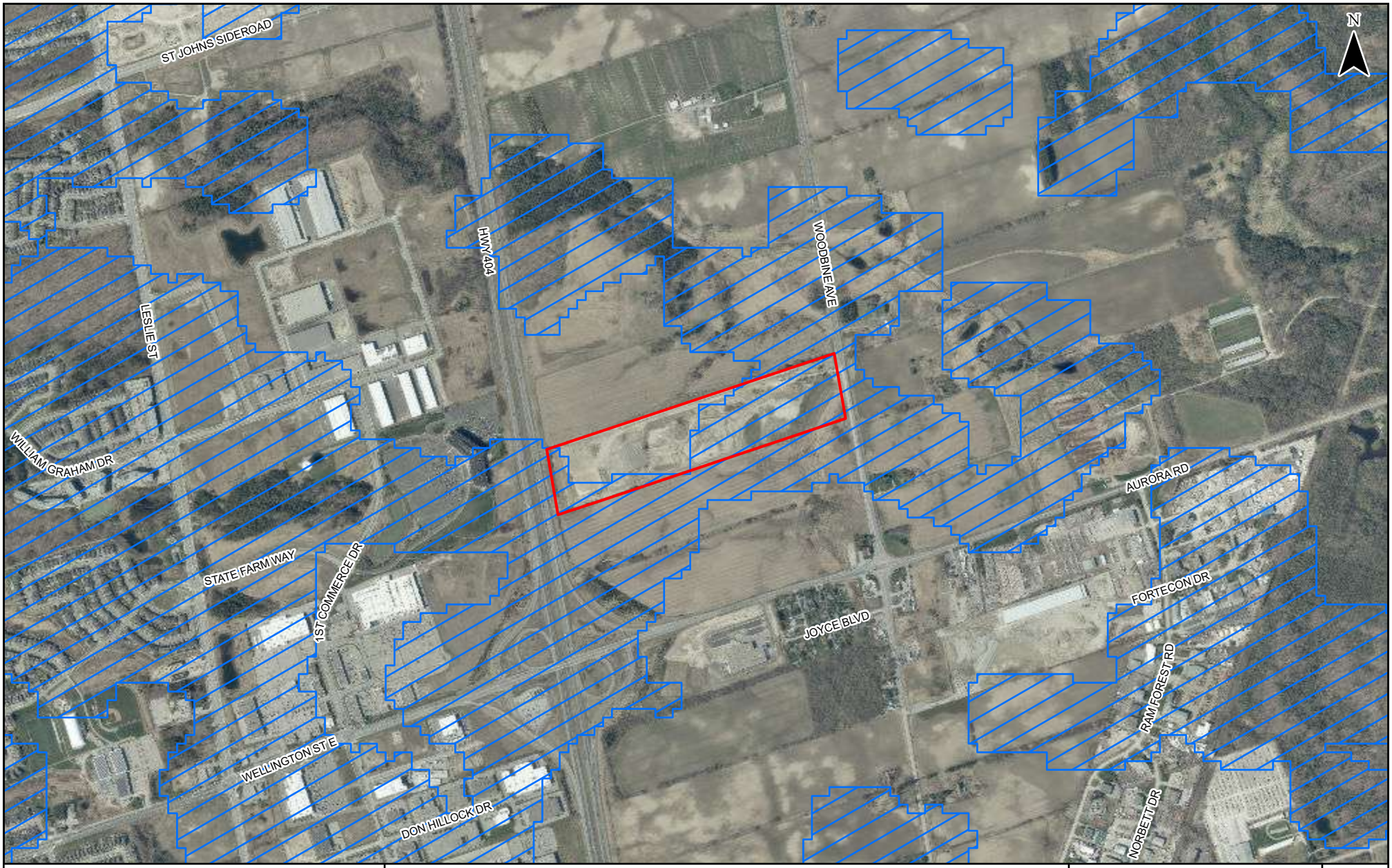
EXISTING SLOPE

FIGURE: 9

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025



SCALE:

0 150 300 450 600 750 m

LEGEND:

ECOLOGICALLY SIGNIFICANT GROUNDWATER RECHARGE AREA (ESGRA)

APPROXIMATE SITE BOUNDARY

DRAWN BY:	CHECKED BY:
AC	NT

ECOLOGICALLY SIGNIFICANT GROUNDWATER RECHARGE AREA (ESGRA) MAP

FIGURE: 10

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C2

DATE: AUGUST 2025

Appendix A – MECP WWR Summary Table

Appendix -A
MECP Water Well Record Summary -500m
15450 Woodbine Avenue, Stouffville, Ontario

Project Number: GTR-21010864-C1

On-Site

BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE BOUNDARY (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
1008661644	7388753	5/27/2021	627928	4874942	301.4	on Water Well Record	. 15450 Woodbine Ave, Whitchurch-Stouffville			Auger	7.6	5.5	5.1	Monitoring		Observation Wells
1008661647	7388754	5/26/2021	628158	4875212	303.3	on Water Well Record	. 15450 Woodbine Ave, Whitchurch-Stouffville			Auger	7.6	6.7	5.1	Monitoring		Observation Wells
1008661653	7388756	6/2/2021	628317	4875429	298.3	on Water Well Record	. 15450 Woodbine Ave, Whitchurch-Stouffville			Auger	6.1	5.8	5.1	Monitoring		Observation Wells
1008661656	7388757	6/1/2021	628435	4875467	294.7	on Water Well Record	. 15450 Woodbine Ave, Whitchurch-Stouffville			Auger	6.1		5.1	Monitoring		Observation Wells
1008661659	7388758	6/1/2021	628348	4875449	298.1	on Water Well Record	. 15450 Woodbine Ave, Whitchurch-Stouffville			Auger	6.1		5.1	Monitoring		Observation Wells
1009327397	7438557	1/11/2023	627925	4875256	306.7	on Water Well Record	15450 Woodbine Avenue	Gormely		Auger	3.8		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327400	7438558	1/11/2023	627870	4875185	306.8	on Water Well Record	15450 Woodbine Avenue	Gormley		Auger	7.6		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327403	7438559	1/12/2023	627923	4875286	307.5	on Water Well Record	15450 Woodbine Avenue	Gormely		Auger	3.8		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327406	7438560	1/12/2023	628195	4875407	300.1	on Water Well Record	15450 Woodbine Avenue	Gormley		Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327409	7438561	1/10/2023	627730	4875118	300.6	on Water Well Record	15450 Woodbine Ave	Gormley		Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327412	7438562	1/10/2023	627838	4875134	304.6	on Water Well Record	15450 Woodbine Avenue	Gormley		Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327415	7438563	1/10/2023	627754	4875119	300.4	on Water Well Record	15450 Woodbine Avenue	Gormley		Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327418	7438564	1/11/2023	627855	4875185	306.9	on Water Well Record	15450 Woodbine Avenue	Gormley		Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327421	7438565	1/12/2023	627801	4875262	309.1	on Water Well Record	15450 Woodbine Avenue	Gormely		Auger	7.6		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009327424	7438566	1/12/2023	627855	4875255	308.7	on Water Well Record	15450 Woodbine Avenue	Gormely		Auger	7.6		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1008676712	7389569	5/25/2021	628458	4875408	292.0	on Water Well Record	. 15450 Woodbine Ave, Whitchurch-Stouffville			Auger	7.6	7.0	5.1	Monitoring		Observation Wells
	7467668	12/5/2023	627783	4875012	0.0	on Water Well Record	Highway 404 & Aurora Road			Auger	6.1		5.1	Monitoring		Observation Wells
	7467670	12/5/2023	627977	4874979	0.0	on Water Well Record	Highway 404 & Aurora Road			Auger	9.1		5.1	Monitoring		Observation Wells
	7467671	12/5/2023	628198	4875048	0.0	on Water Well Record	Woodbine Avenue & Aurora Road			Auger	6.1		5.1	Monitoring		Observation Wells
	7467669	12/5/2023	628384	4875171	0.0	on Water Well Record	Woodbine Avenue & Aurora Road			Auger	6.1		5.1	Monitoring		Observation Wells

Off-Site

BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE BOUNDARY (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
10498309	6907614	7/28/1952	628594	4874928	297.4	unknown UTM			408	Jetting	6.1	4.9		Domestic		Water Supply
10498310	6907615	8/2/1952	628585	4874912	297.4	unknown UTM			423	Jetting	16.2	15.2		Domestic		Water Supply
10498311	6907616	5/20/1959	628498	4874902	296.3	margin of error : 100 - 300 m			403	Jetting	6.1	1.5	76.2	Domestic		Water Supply
10498312	6907617	5/12/1961	628474	4874872	298.5	margin of error : 100 - 300 m			423	Boring	8.5	6.1	76.2	Domestic		Water Supply
10498313	6907618	10/10/1961	628406	4874834	298.5	margin of error : 100 - 300 m			438	Boring	13.7	12.2	76.2	Domestic		Water Supply
10498315	6907620	10/14/1960	628600	4874913	297.8	margin of error : 100 - 300 m			428	Boring	10.4	4.9	86.4	Commerical		Water Supply
10498316	6907621	11/30/1961	628388	4874790	300.6	margin of error : 100 - 300 m			471	Boring	13.7	12.2	76.2	Domestic		Water Supply
10498317	6907622	1/16/1963	628534	4874839	295.5	margin of error : 100 - 300 m			473	Boring	7.9	4.9	76.2	Domestic		Water Supply
10498323	6907628	11/25/1966	628471	4874885	295.2	margin of error : 100 - 300 m			410	Cable Tool	37.2	37.2	15.2	Domestic		Water Supply
10498324	6907629	8/19/1967	628501	4874891	296.3	margin of error : 100 - 300 m			415	Cable Tool	18.6	18.6	15.2	Domestic		Water Supply
10498327	6907632	5/28/1946	627568	4875220	301.5	Lot centroid			96	Jetting	53.3	18.3	5.1	Livestock	Domestic	Water Supply
10498328	6907633	4/3/1950	627568	4875220	301.5	Lot centroid			96	Cable Tool	19.8	19.5	10.2	Livestock	Domestic	Water Supply
10498331	6907636	9/22/1965	628128	4875871	289.3	margin of error : 100 - 300 m			442	Cable Tool	61.6	56.7	17.8	Domestic		Water Supply
10498443	6907748	6/26/1962	628710	4875491	292.9	margin of error : 100 - 300 m			216	Boring	9.8	8.5	86.4	Livestock		Water Supply
10500125	6909447	9/12/1969	628405	4874823	299.8	margin of error : 30 - 100 m			445	Cable Tool	21.9	20.7	12.7	Domestic		Water Supply
10500919	6910270	1/5/1971	628135	4875813	289.3	margin of error : 30 - 100 m			388	Cable Tool	47.5	12.2	15.2	Domestic		Water Supply
10503106	6912499	12/2/1974	628688	4875233	293.5	margin of error : 30 - 100 m			195	Cable Tool	84.7	84.1	17.8	Livestock	Domestic	Water Supply
10508177	6917839	12/4/1985	628620	4875603	292.5				156	Cable Tool	17.1	16.8	15.2	Livestock		Water Supply
10511329	6921014	5/7/1990	628647	4874853	297.5	on Water Well Record			499	Cable Tool	25.3	21.3	15.2	Commerical		Water Supply
10514934	6924656	10/5/1998	628578	4874865	297.6				463	Rotary (Air)	29.0	29.0	15.2	Commerical		Water Supply
10548459	6927278	8/26/2003	627564	4875220	301.5	Lot centroid			96	Not Known				Not Used		Abandoned-Other
10548460	6927279	8/26/2003	627564	4875220	301.5	Lot centroid			96	Not Known				Not Used		Not A Well
10548461	6927280	8/26/2003	627564	4875220	301.5	Lot centroid			96	Not Known				Not Used		Abandoned-Other
10548462	6927281	8/26/2003	627564	4875220	301.5	Lot centroid			96	Not Known				Not Used		Not A Well
10548463	6927282	8/26/2003	627564	4875220	301.5	Lot centroid			96	Not Known				Not Used		Abandoned-Other
10548464	6927283	8/26/2003	627564	4875220	301.5	Lot centroid			96	Not Known				Not Used		Not A Well
11100797	6927483	10/16/2003	627564	4875221	301.5	Lot centroid			96	Not Known				Not Used		Abandoned-Other
11180018	6928171	8/12/2004	628451	4874837	297.1	on Water Well Record	2175 Aurora Road	Wesley	450				81.3			Abandoned-Quality
11559105	6930305	5/29/2006	628733	4875365	292.9	on Water Well Record	15451 WOODBINE	VANDORF	215	Rotary (Air)	76.5	76.2	15.2	Domestic		Water Supply
1005308621	7237731	12/4/2014	627334	4875299	300.1	on Water Well Record	15625 LESLIE ST		333	Boring	4.6	0.6	1.9	Monitoring		Observation Wells
1006272987	7273451	9/2/2016	628256	4875713	289.5	on Water Well Record			255				5.1	Monitoring and Test Hole		Test Hole
1006678345	7291739		627524	4875436	301.8	on Water Well Record			237							
1007622270	7340505	7/27/2019	628602	4875600	292.1	on Water Well Record			137							Abandoned-Other
1008541551	7377173	11/27/2020	627312	4875548	301.8	on Water Well Record	350 First Commerce Dr		463	Direct Push			5.1	Monitoring		Observation Wells
1008600998	7384287	1/23/2020	627308	4875545	301.9	on Water Well Record	. 350 First Commerce Dr, Aurora, ON L4G 7C7		463	Auger	6.1		5.1	Monitoring		Observation Wells
1008672755	7389082	5/6/2021	627228	4875350	301.4	on Water Well Record	Block 9 & 10 Addison Hall Dr	Aurora	448	Boring	6.1	3.2	5.2	Monitoring and Test Hole		Observation Wells
1008672752	7389081	5/5/2021	627206	4875395	301.3	on Water Well Record	Block 9 & 10 Addison Hall Dr	Aurora	481	Boring	6.1		5.2	Monitoring and Test Hole		Observation Wells
1008967237	7412621	2/16/2022	627293	4875443	301.7	on Water Well Record	N/A Addison Hall Circle	Aurora	418	Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1008967240	7412622	2/16/2022	627331	4875429	302.0	on Water Well Record	N/A Addison Hall Circle	Aurora	381	Auger	3.0		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1008967243	7412623	2/17/2022	627343	4875372	302.3	on Water Well Record	N/A Addison Hall Circle	Aurora	345	Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1008967246	7412624	2/17/2022	627294	4875387	301.9	on Water Well Record	N/A Addison Hall Circle	Aurora	395	Auger	6.1		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1008986770	7414088	2/17/2022	627238	4875507	301.4	on Water Well Record			500							
1009327427	7438567	1/10/2023	627801	4875626	310.7	on Water Well Record	15450 Woodbine Avenue	Gormley	315	Auger	7.6		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1009388081	7444379	4/25/2023	628443	4875580	290.2	on Water Well Record	15518 Woodbine Avenue		69	Auger	6.1	0.6	5.1	Monitoring		Observation Wells
1009388087	7444381	4/25/2023	628156	4875439	299.2	on Water Well Record	15518 Woodbine Avenue		25	Auger	6.1	0.6	5.1	Monitoring		Observation Wells
1009388078	7444378	4/26/2023	627723	4875306	308.0	on Water Well Record	. 15518 Woodbine Avenue		35	Auger	6.1		5.1	Monitoring		Observation Wells
1009388084	7444380	4/26/2023	628054	4875529	300.5	on Water Well Record	. 15518 Woodbine Avenue		145	Auger	6.1		5.1	Monitoring		Observation Wells
1009388688	7444406	4/26/2023	627682	4875435	311.4	on Water Well Record	. 15518 Woodbine Avenue		173	Auger	6.1		5.1	Monitoring		Observation Wells

	COUNT
Monitoring Well / Test Hole	36
Dewatering Well	0
Water Supply Well	21
Abandoned Well	6
Unclassified / Unfinished Well	5
TOTAL	68

Ontario — Ministry of the Environment, Conservation and Parks

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. Tag#:A403953 — [redacted] A403953

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	EXP		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
15450 Woodbine Ave	Whitchurch Stouffville	23	4

County/District/Municipality	City/Town/Village	Province	Postal Code
York	Aurora	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	627684	4875193		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand	clay		0'	15'
Grey	Clay	Sand, Gravel		15	50'
Grey	Hard Clay	sand, Gravel		50'	94'
Grey	Hard Silty Clay	sand Gravel		94'	153'
Grey	Hard Clay	sand		153'	195'
Grey	Hard Silty sand	Gravel		195'	258'
Grey	Med Sand	Gravel, silt		258'	262'
Grey	Med Sand gravel	stones		262'	277'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0'	6'	Bentonite	
6'	252'	Grout	
252'	261'	Bentonite	
261'	274'	Wellsand	

Method of Construction

☐ Cable Tool ☐ Diamond
☑ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	3/16"	+3	264'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2 3/8"	PVC	10	264'	274'

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

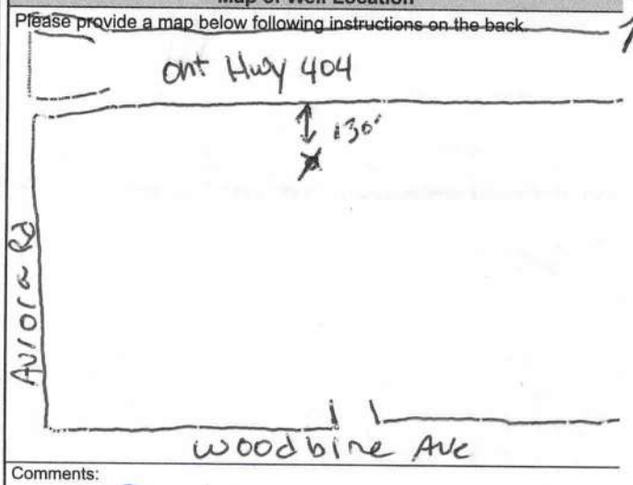
Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	144			
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth (m/ft)	Gas	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
144	☐	☐ Fresh ☑ Untested ☐ Other, specify	0	274'	6"
	☐	☐ Fresh ☐ Untested ☐ Other, specify			
	☐	☐ Fresh ☐ Untested ☐ Other, specify			

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Constable Water Wells Inc.	8072

Business Address (Street Number/Name)	Municipality
197 Wanda St,	Bradford

Province	Postal Code	Business E-mail Address
ON	L3Z 4B9	info@constablewaterwells.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-778-9888	Horsley Kirk / Kevin McDonald

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2521		2024 05 28

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2024 05 28	2024 05 24

Ministry Use Only

Audit No. Z407530

Received

Ministry's Copy

MW0W2

Ontario — Ministry of the Environment, Conservation and Parks

Well Tag No: Tag#:A403952 — A403952

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☑ Imperial

Page 1 of 1

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	EXP		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
15450 Woodbine Ave	Whitchurch Stouffville	23	4

County/District/Municipality	City/Town/Village	Province	Postal Code
York	Aurora	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	627684	4875193		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Topsoil			Ø	3'
Brown	Sandy Clay			3'	33'
Brown	Med Sandy Clay	Gravel		33'	45'
Grey	Hard Silty Clay	Sand Gravel		45'	146'
Grey	Hard Clay	Sand		146'	203'
Grey	Hard Silty Clay	Trace of Gravel		203'	260'
Grey	Med Sand	Gravel		260'	279'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
Ø	5'	Bentonite	
5'	253'	Grout	
253'	262'	Bentonite	
262'	279'	Well Sand	

Method of Construction

☐ Cable Tool ☑ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Other, specify
☐ Diamond ☐ Jetting ☐ Driving ☐ Digging

Well Use

☐ Public ☐ Domestic ☐ Livestock ☐ Irrigation ☐ Industrial ☐ Other, specify
☐ Commercial ☐ Municipal ☑ Test Hole ☐ Cooling & Air Conditioning
☐ Not used ☐ Dewatering ☑ Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	3/16"	+3'	264'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2 3/8"	PVC	10	264'	274'

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	Kind of Water	Gas	Other, specify
144'	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	
	☐ Fresh ☐ Untested	☐	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
Ø	279	6"

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

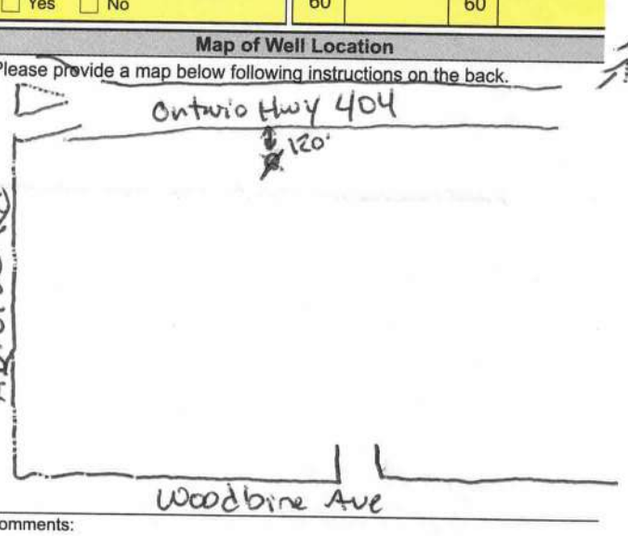
Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	144			
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Constable Water Wells Inc.	8072

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
197 Wanda St.	Bradford	ON	L3Z 4B9	info@constablewaterwells.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
905-778-8888	Horsley Kirk / Kevin McDonald	2521		2024 05 28

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2024 05 28	2024 05 24

Ministry Use Only

Audit No. Z407531

Received

0506E (2020/06) © Queen's Printer for Ontario, 2020

Ministry's Copy

MW0B1

Ontario — Ministry of the Environment, Conservation and Parks

Well Tag No. A387542 Tag#:A387542

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☑ Imperial

Page 1 of 1

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	EXP		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
15450 Woodbine ave	Whitchurch stouffville	23	4

County/District/Municipality	City/Town/Village	Province	Postal Code
York	Aurora	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	627684	4875193		

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Top soil			Ø	3'
Brown	Sandy Clay			3'	34'
Brown	Med Sand gravel	Clay		34'	44'
Grey	Hard silty Clay	Sand, Gravel		44'	147'
Grey	Hard Clay	sand		147'	193'
Grey	Hard silty Sand	gravel		193'	253'
Grey	Med. Sand	silt		253'	259'
Grey	Med Sand, gravel	stones		259'	279'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
Ø	42'	Grout	
42'	261'	Brick Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☑ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, specify

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☑ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6"	Steel	.188	+2'	264'
5"	Steel	.188	261'	264'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
5"	Stainless Steel	30	264'	274'

Status of Well

☑ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Water Details

Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☑ Untested ☐ Other, specify
144'		
Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify
Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
Ø	264'	9"
264'	274'	6"

Results of Well Yield Testing

After test of well yield, water was: ☑ Clear and sand free ☐ Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft): 200

Pumping rate (l/min / GPM): 17.48 IGPM

Duration of pumping: 01 hrs + 0 min

Final water level end of pumping (m/ft): 147.34'

If flowing give rate (l/min/GPM)

Recommended pump depth (m/ft): 200

Recommended pump rate (l/min/GPM): 25

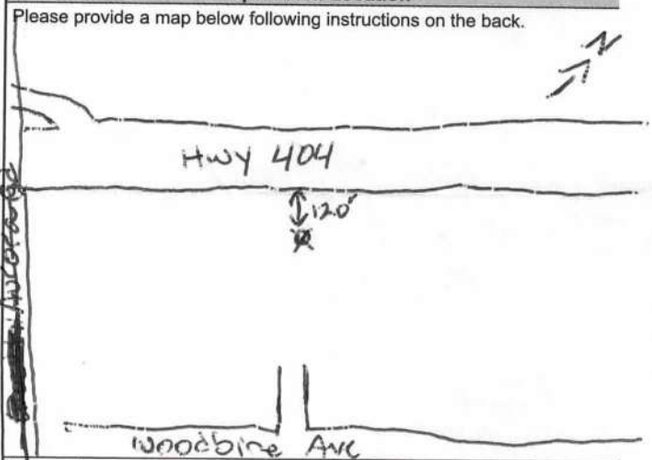
Well production (l/min/GPM): 30+

Disinfected? ☑ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	144.9'		147.34'
1	146.7'	1	145.53'
2	146.8'	2	145.49'
3	146.8'	3	145.44'
4	146.8'	4	145.43'
5	146.8'	5	145.45'
10	146.9'	10	145.37'
15	147'	15	145.34'
20	147'	20	145.31'
25	147.1'	25	145.27'
30	147.15'	30	145.24
40	147.26	40	145.19'
50	147.31'	50	145.15'
60	147.34'	60	145.12'

Map of Well Location

Please provide a map below following instructions on the back.



Comments: PW 1

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Constable Water Wells Inc.	8072

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
197 Wanda St.	Bradford	ON	L3Z 4B9	info@constablewaterwells.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-778-9888	Horsley Kirk / Kevin mcdonald

Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
21		2024 05 28

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☑ Yes ☐ No	2024 05 28	2024 05 24

Ministry Use Only

Audit No. Z407376

Received

Ministry's Copy

Appendix B – Door-to-Door Well Survey Package and Results

Dear Resident / Property Owner:

Notice of Private Water Well Survey
15450 Woodbine Avenue, Stouffville, ON

Sorry we missed you. EXP Services Inc. (EXP) is distributing this Private Water Well Survey as part of a hydrogeological investigation and water balance assessment study in support of detailed design for the proposed development at the western portion of 15450 Woodbine Avenue in Stouffville, Ontario (herein after referred to as the 'Site').

EXP would like to offer you the opportunity to participate in a water well survey for the noted Site by completing the attached Water Well Survey Form. This water well survey is conducted to provide a preconstruction survey of private wells identified in a 500 meters distance from the proposed development.

The purpose of the well survey is to document the current condition and use of your well(s) including information about your well(s) (e.g. type of well, location, age, depth, etc.), the quantity of water (water levels, usage) and quality of water (clarity, odour, treatment types, etc.).

THERE IS NO COST TO YOU, THE PROPERTY OWNER, FOR THIS WATER WELL SURVEY.

If a well is located on your property and you wish to participate in this program, please complete the attached Water Well Survey Form to the best of your knowledge and email or mail the completed form to our office at your earliest convenience. We understand that you might have very limited or no information about your well(s), but any information will help in our study.

Please be advised that if no response is received from you, EXP will assume you do not wish to participate in the well survey nor does any well exist at your property. Property owners or their representatives who participate in this study and authorize EXP to complete this survey will be contacted for additional information and to arrange a time for a site visit.

Should you have any questions or concerns about the well survey or construction project, please feel free to contact the undersigned via email to mehari.menghistu@exp.com or at (905) 695-3217, ext. 63644.

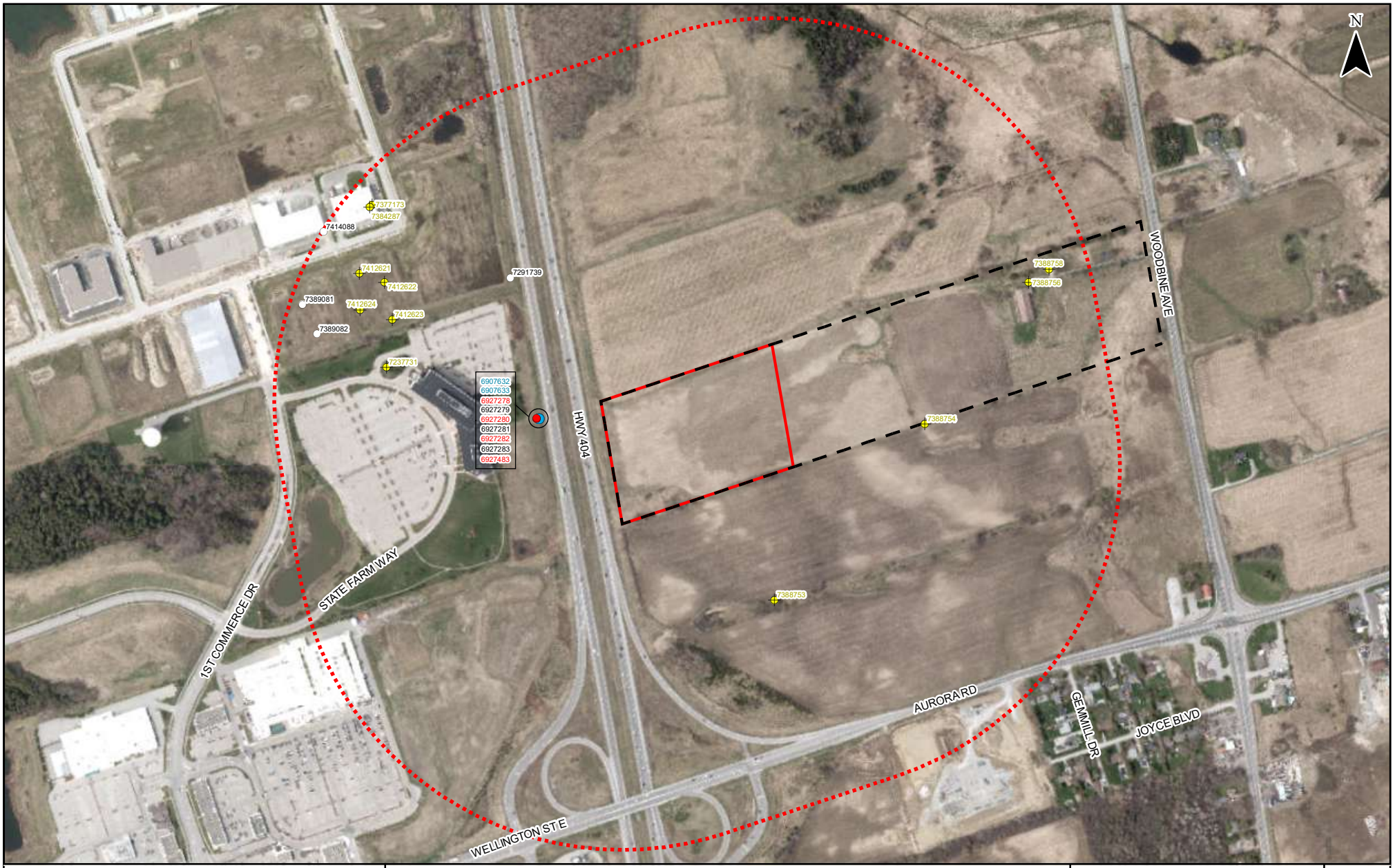
Sincerely,
EXP Services Inc.

Mehari Menghistu, P.Geo (Limited).
Hydrogeologist
Environmental Services

Nataliya Tkach, P.Geo., PMP, P.Eng., FGC
Senior Hydrogeologist
Environmental Services

Encl.:

1) Figure 1 – Ministry of the Environment, Conservation and Parks (MECP) Water Well Records Site Plan;
2) Water Well Survey Form



SCALE:
0 100 200 300 400 500 m

SOURCE:
BASED ON GOOGLE EARTH IMAGERY DATED 2023,
AVAILABLE WELL RECORD INFORMATION AS OF JUNE 2022

exp.

DRAWN BY:	CHECKED BY:
AC	NT

LEGEND:
- MONITORING WELL / TEST HOLE
- WATER SUPPLY WELL
- ABANDONED WELL
- UNCLASSIFIED / UNFINISHED WELL
- APPROXIMATE SITE BOUNDARY
- PROPERTY BOUNDARY
- 500 m ZONE

MECP WATER WELL RECORDS MAP

FIGURE: 3

HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE INVESTIGATION
15450 WOODBINE AVENUE
STOUFFVILLE, ONTARIO

PROJECT NUMBER: GTR-21010864-C1 | DATE: APRIL 2024

WATER WELL SURVEY FORM

15450 Woodbine Avenue, Stouffville, ON

ADDRESS: _____ DATE: _____
(Lot, Con., Twp., Street & No., etc.) OWNER NAME:_____

TELEPHONE NO.(Cell).: _____ (Home): _____ MOE WELL NO._____

EMAIL: _____ PROJECT NO.: GTR-21010864-C1

WELL INFORMATON

Is there a well on your property? Yes ☐ No ☐
Is the well in use? Yes ☐ No ☐
Installation: Drilled ☐ Dug or Bored ☐ Combination ☐
Date Completed:_____Depth:_____Casing:_____Diameter*:_____
Well Type: Overburden ☐ **OR** Bedrock ☐
Static Water Level: Original_____Present_____
Pumping Water Level: Original_____Present_____
Has well ever been dry? Yes ☐ No ☐
Has the well been completed by a previous owner? Yes ☐ No ☐

WATER QUALITY (if previously tested)

pH*: _____Temp.:_____Conductivity*:_____Chloride*:_____Iron*:_____Hardness*: _____Alkalinity*:_____
Bacterial*:_____Clear: Yes ☐ No ☐
Sand-free: Yes ☐ No ☐ Colour: Yes ☐ No ☐
Sulfurous: Yes ☐ No ☐ Odour: Yes ☐ No ☐

Any water treatment?_____
_____
*Provide laboratory results with chain of custody if available

PUMP INFORMATION (if known)

Make:_____Age:_____HP:_____
Type: Jet ☐ Submersible ☐ Shallow Well ☐
Deep Well ☐ Other_____
Pump Capacity (GPM)*_____
* All dimensions: indicate estimated or measured

WATER CONSUMPTION (if known)

Domestic: No. of persons_____
Livestock: (specify)
_____
Other uses:
_____
Daily consumption (litres, gallons):
_____
Other sources:
_____

MONITORING PROGRAM

Do you grant exp Services permission to:
Collect a manual water level (dug wells only) ☐
Collect a water sample (tap only) ☐

SKETCH
Please provide a drawing (on back of page or separately) showing well location.

Notes:
Water levels can only be measured if open/clear access to water in dug wells is available and pumps are turned off. Water levels from drilled wells may not be conducted, subject to well conditions.

OWNER'S ACKNOWLEDGEMENT:
I, _____, hereby authorize EXP Services Inc. to include my well(s) in the well monitoring program and permit such access or actions as reasonably necessary to conduct water level measurements and collect a water sample from the tap connected to the water well supply line.

Authorization signature _____ Date _____

Please sign and return this authorization form to the attention of Mehari Menghistu by email (mehari.menghistu@exp.com) or by mail to EXP Services Inc. at 220 Commerce Valley Dr W. #110, Markham, ON L3T 0A8.

WATER WELL SURVEY FORM

15450 Woodbine Avenue, Stouffville, ON

ADDRESS: 15517 WOODBINE DATE: April 4, 2024
(Lot, Con., Twp., Street & No., etc.) OWNER NAME: _____

TELEPHONE NO.(Cell).: _____ (Home): _____ MOE WELL NO. _____

EMAIL: _____ PROJECT NO.: GTR-21010864-C1

WELL INFORMATON

Is there a well on your property? Yes ☐ No ☐
Is the well in use? Yes ☐ No ☐
Installation: Drilled ☐ Dug or Bored ☐ Combination ☐
Date Completed: _____ Depth: _____ Casing: _____ Diameter*: _____
Well Type: Overburden ☐ **OR** Bedrock ☐
Static Water Level: Original _____ Present _____
Pumping Water Level: Original _____ Present _____
Has well ever been dry? Yes ☐ No ☐
Has the well been completed by a previous owner? Yes ☑ No ☐

WATER QUALITY (if previously tested)

pH*: _____ Temp.: _____ Conductivity*: _____ Chloride*: _____ Iron*: _____ Hardness*: _____ Alkalinity*: _____
Bacterial*: _____ Clear: Yes ☐ No ☐
Sand-free: Yes ☐ No ☐ Colour: Yes ☐ No ☐
Sulfurous: Yes ☐ No ☐ Odour: Yes ☐ No ☐

Any water treatment? _____

*Provide laboratory results with chain of custody if available

PUMP INFORMATION (if known)

Make: _____ Age: _____ HP: _____
Type: Jet ☐ Submersible ☐ Shallow Well ☐
Deep Well ☐ Other _____
Pump Capacity (GPM)* _____
* All dimensions: indicate estimated or measured

WATER CONSUMPTION (if known)

Domestic: No. of persons _____
Livestock: (specify) _____
Other uses: _____
Daily consumption (litres, gallons): _____
Other sources: _____

MONITORING PROGRAM

Do you grant exp Services permission to:
Collect a manual water level (dug wells only) ☐
Collect a water sample (tap only) ☐

SKETCH

Please provide a drawing (on back of page or separately) showing well location.

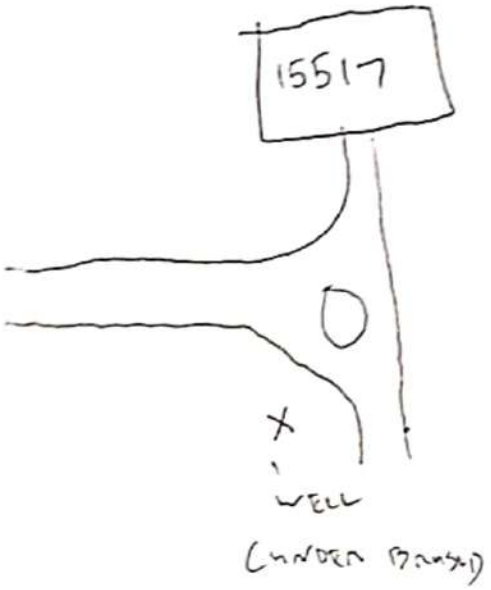
Notes:
Water levels can only be measured if open/clear access to water in dug wells is available and pumps are turned off. Water levels from drilled wells may not be conducted, subject to well conditions.

OWNER'S ACKNOWLEDGEMENT:

I, _____, hereby authorize EXP Services Inc. to include my well(s) in the well monitoring program and permit such access or actions as reasonably necessary to conduct water level measurements and collect a water sample from the tap connected to the water well supply line.

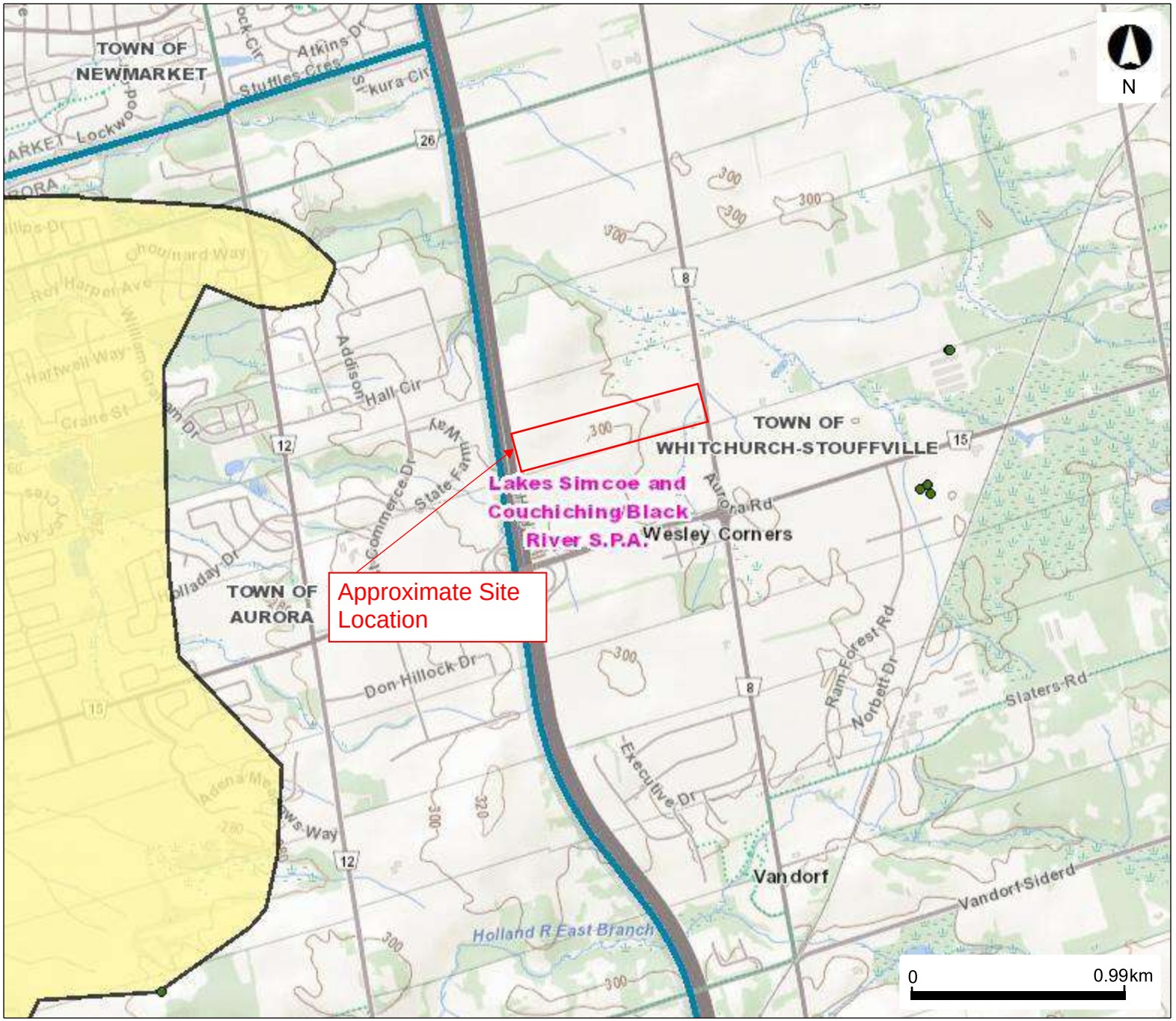
Authorization signature _____ Date _____

Please sign and return this authorization form to the attention of Mehari Menghistu by email (mehari.menghistu@exp.com) or by mail to EXP Services Inc. at 220 Commerce Valley Dr W. #110, Markham, ON L3T 0A8.


15517
WELL

Appendix C – MECP Source Protection Atlas

MECP Source Protection Information Atlas



Legend

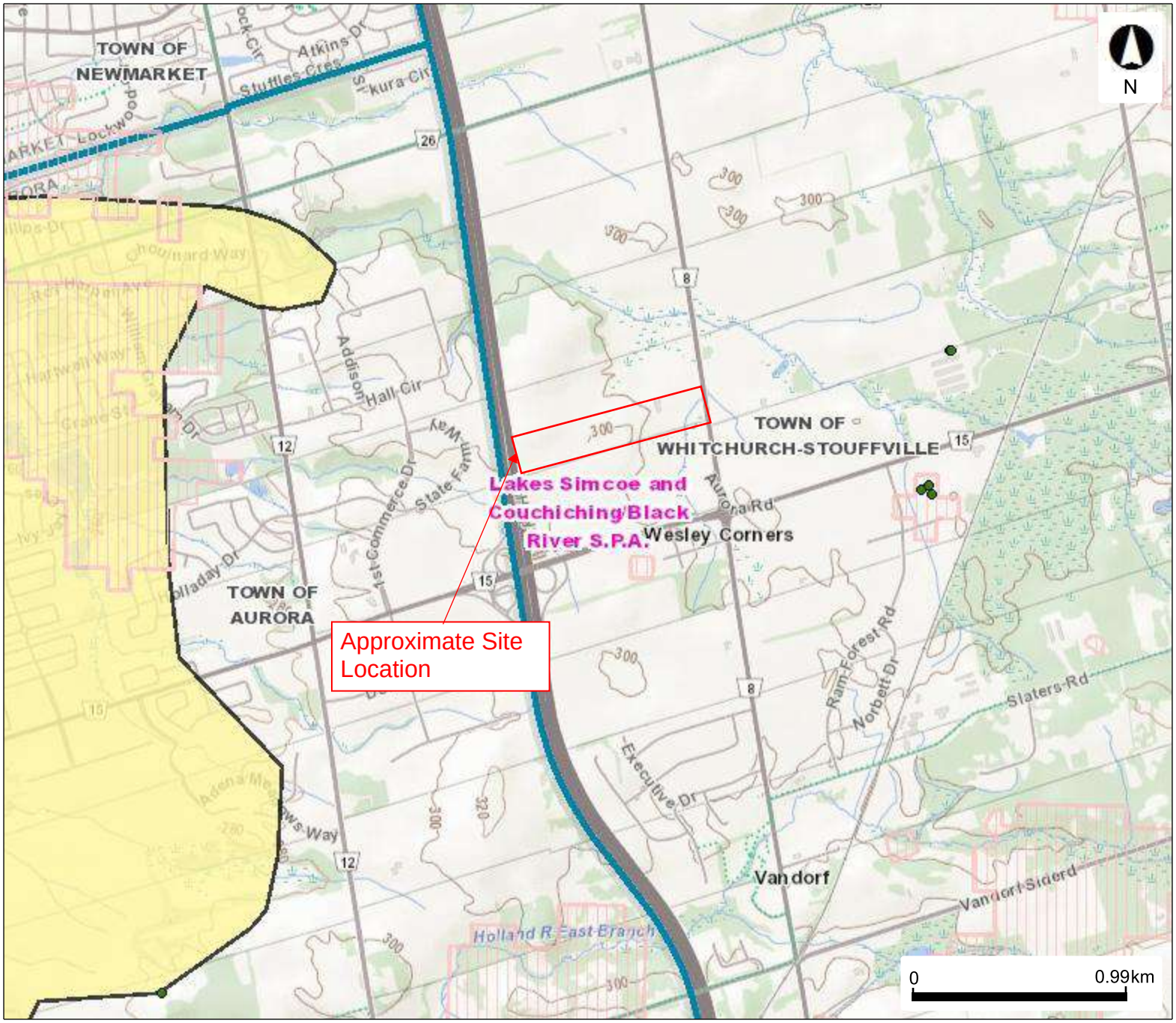
- Permits To Take Water: Active
- WHPA Groundwater Under Direct Influence (WHPA-E)
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Vulnerable Scoring Area - Groundwater Under Direct Influence
  - 4.1 - 7.9
  - 8 - 8.9
  - 9 - 10
- Source Protection Areas
- Municipal Boundaries - Single and Lower Tier

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 2/22/2023
Map Center: 44.01611 N, -79.40308 W

MECP Source Protection Information Atlas Highly Vulnerable Aquifer Map



Legend

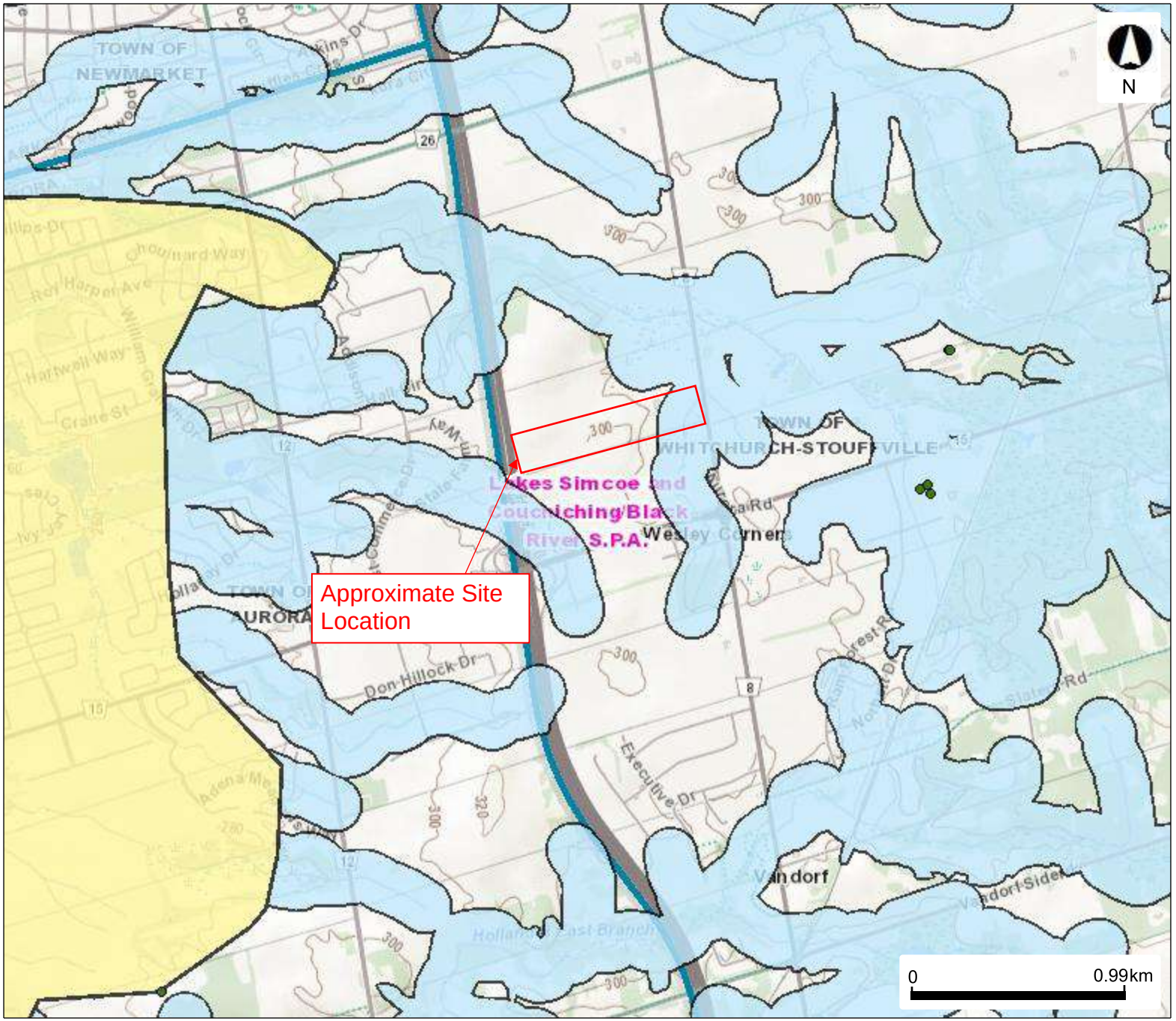
- Permits To Take Water: Active
- Highly Vulnerable Aquifers
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Source Protection Areas
- Municipal Boundaries - Single and Lower Tier

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 2/22/2023
Map Center: 44.01611 N, -79.40308 W

MECP Source Protection Information Atlas Intake Protection Zones



Legend

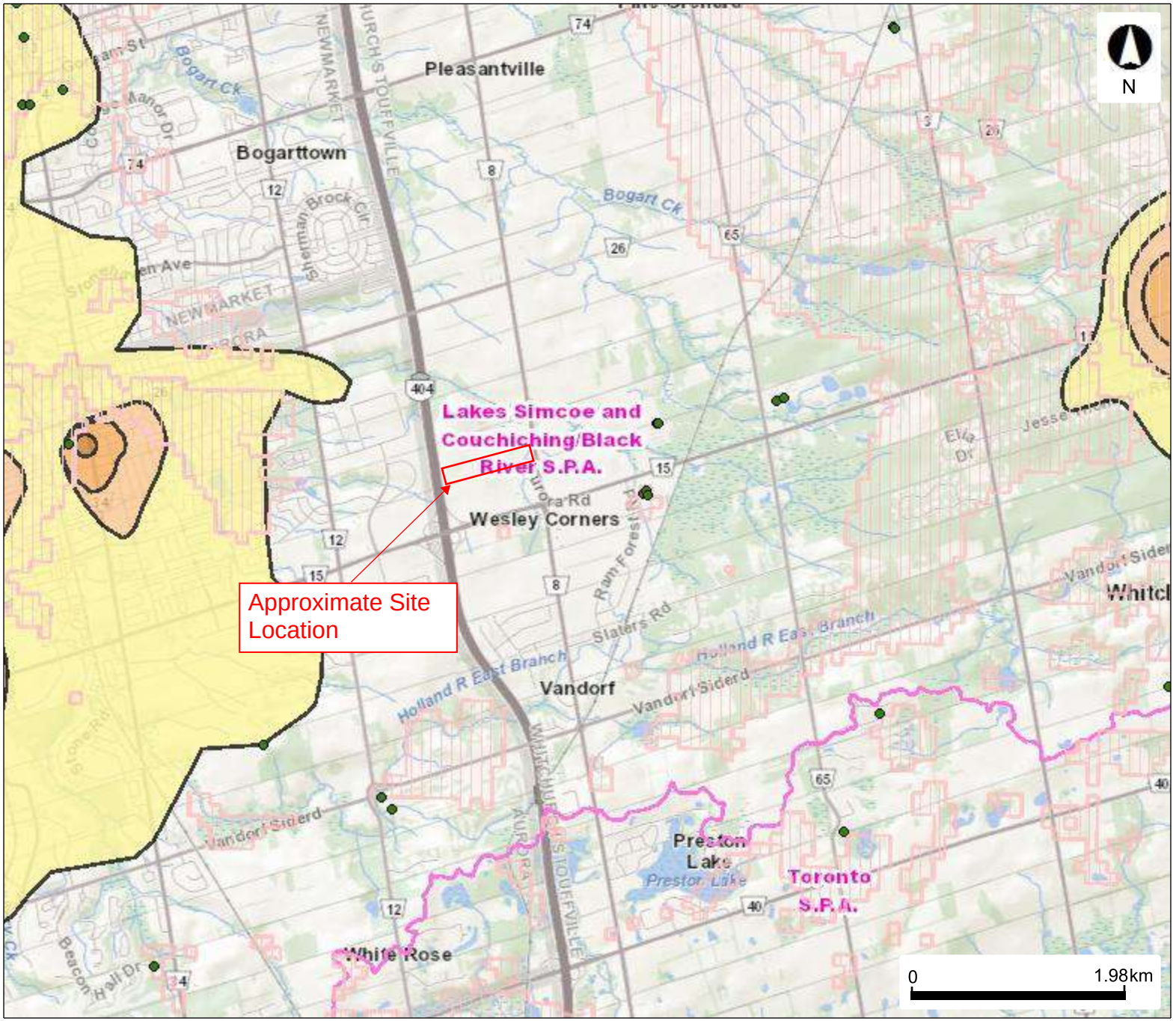
- Permits To Take Water: Active
- Intake Protection Zone Name
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Intake Protection Zone 1
- Intake Protection Zone 2
- Intake Protection Zone 3
- Vulnerable Scoring Area - Surface Water
  - 0 - 3.9
  - 4 - 7.9
  - 8 - 8.9
  - 9 - 10
- Source Protection Areas
- Municipal Boundaries - Single and Lower Tier

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 2/22/2023
Map Center: 44.01611 N, -79.40308 W

MECP Source Protection Information Atlas



Legend

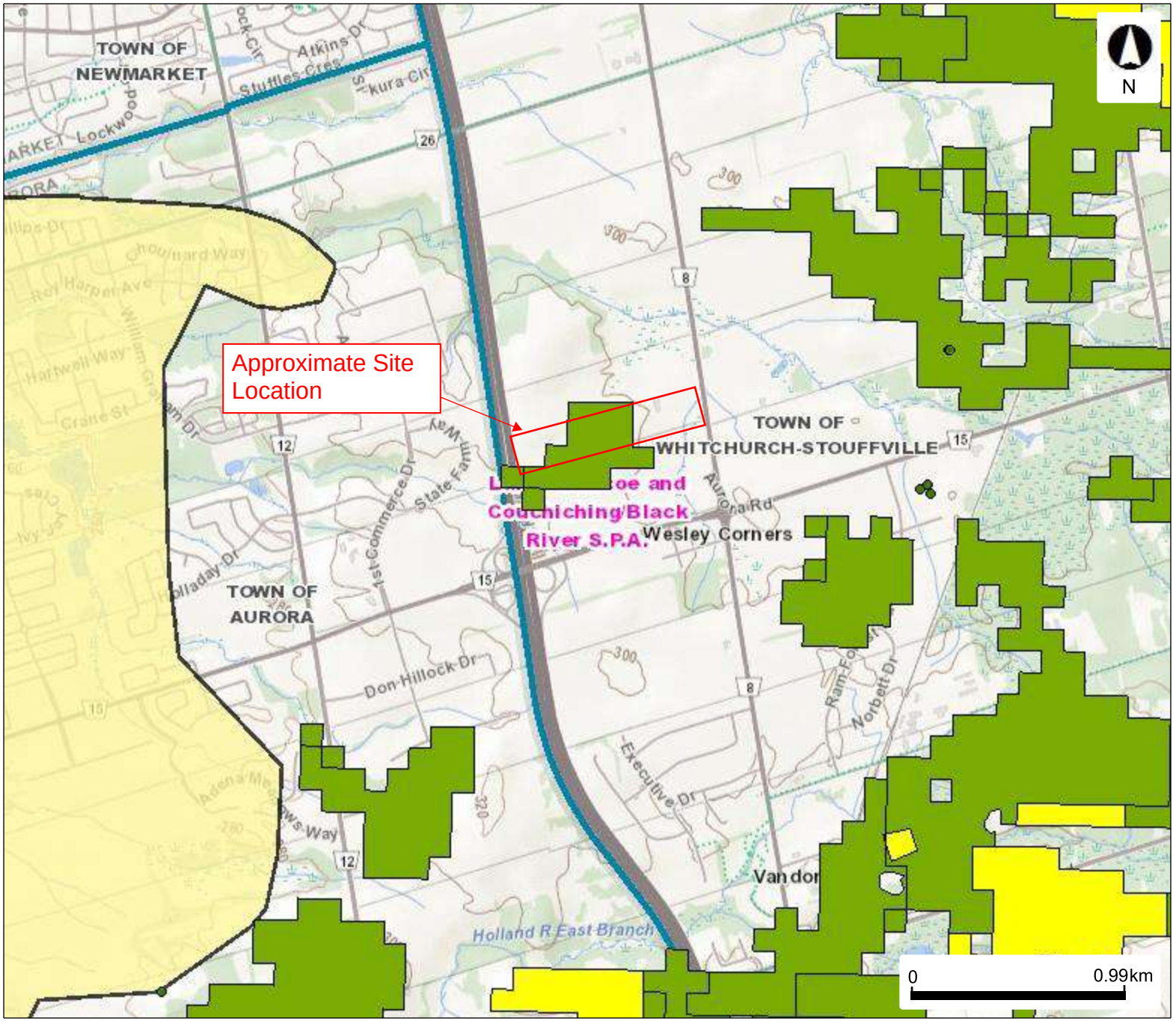
- Permits To Take Water: Active
- Issue Contributing Areas
- Highly Vulnerable Aquifers
- WHPA Groundwater Under Direct Influence (WHPA-E)
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Intake Protection Zone 1
- Event Based Areas
- Intake Protection Zone 2
- Niagara Escarpment Plan (NEI
- Source Protection Areas

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 2/22/2023
Map Center: 44.01555 N, -79.39036 W

MECP Source Protection Information Atlas Significant Groundwater Recharge Map



Legend

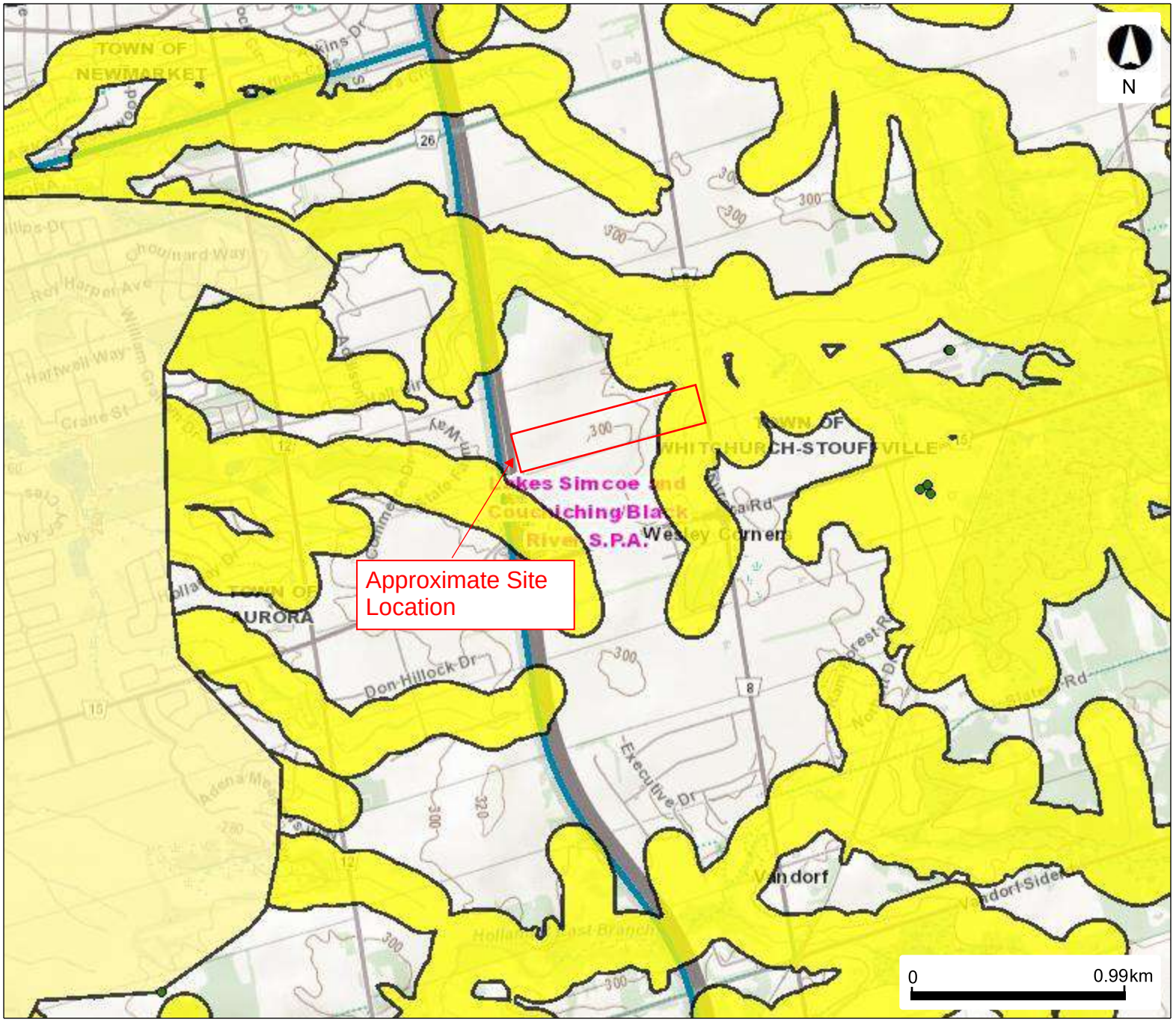
- Permits To Take Water: Active
- Intake Protection Zone Q
- Wellhead Protection Area Q1
- Wellhead Protection Area Q2
- Significant Groundwater Recharge Area
  - N/A
  - 0
  - 2
  - 4
  - 6
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Source Protection Areas
- Municipal Boundaries - Single and Lower Tier

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 2/22/2023
Map Center: 44.01611 N, -79.40308 W

MECP Source Protection Information Atlas Surface Water Vulnerability Map



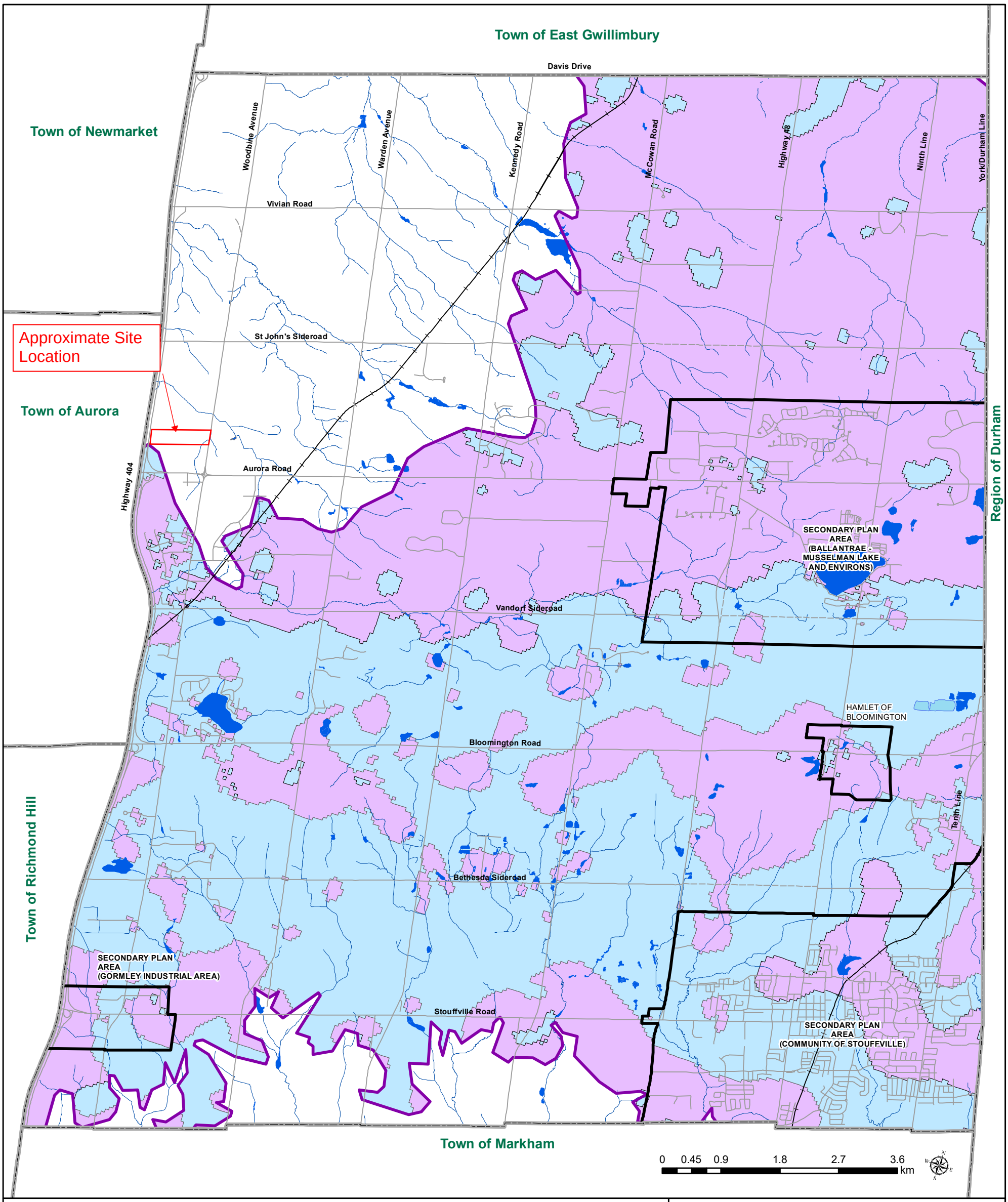
Legend

- Permits To Take Water: Active
- Intake Protection Zone Name
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Vulnerable Scoring Area - Surface Water
  - 0 - 3.9
  - 4 - 7.9
  - 8 - 8.9
  - 9 - 10
- Source Protection Areas
- Municipal Boundaries - Single and Lower Tier

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 2/22/2023
Map Center: 44.01611 N, -79.40308 W



LEGEND

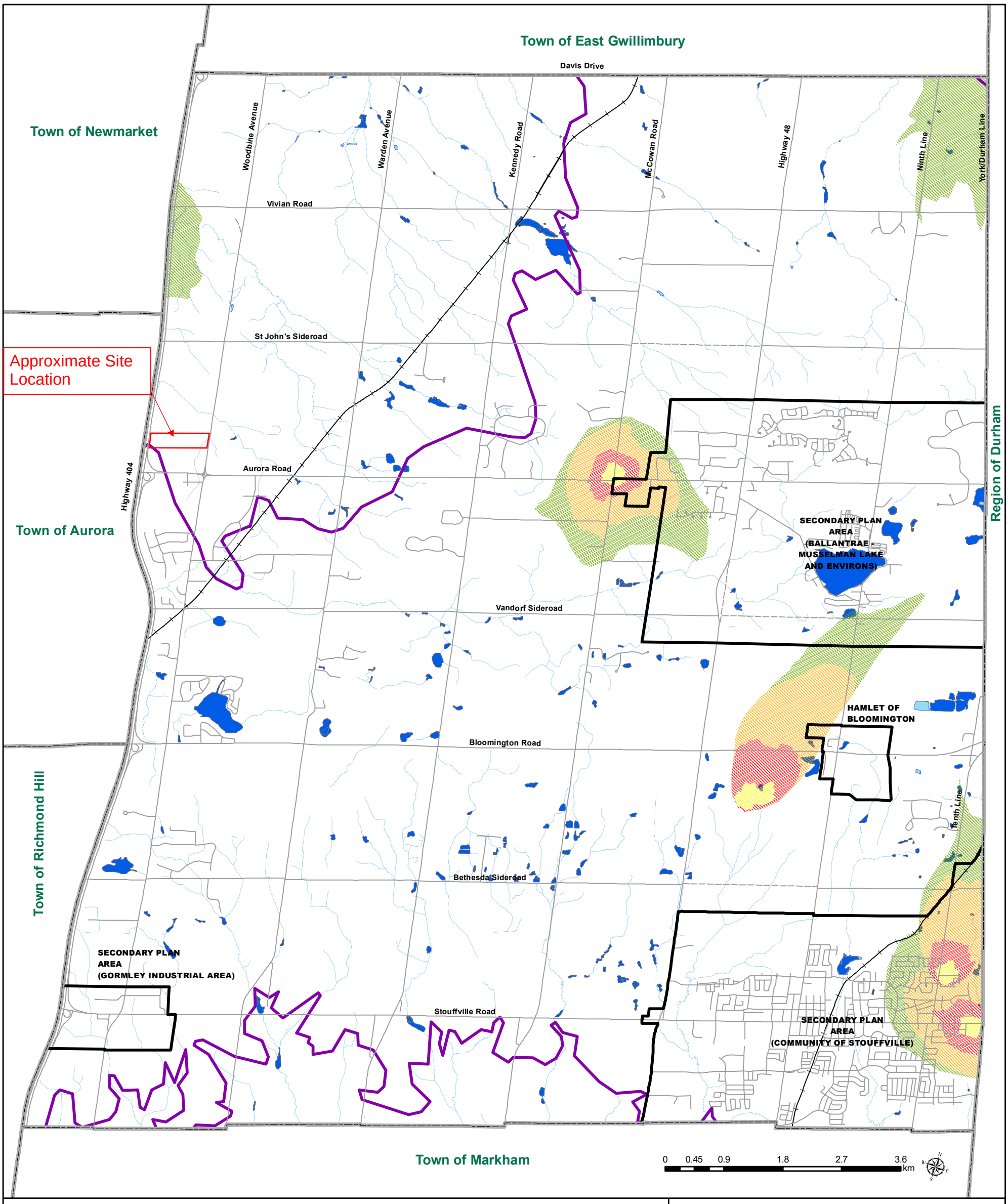
- TOWN BOUNDARY
- EXISTING CENTRELINES
- UNOPENED ROAD ALLOWANCE
- RAILWAYS
- LAKES
- RIVERS
- COMMUNITY AREAS
- OAK RIDGES MORAINE
- KETTLE LAKES
- AREAS OF HIGH AQUIFER VULNERABILITY
- AREAS OF LOW AQUIFER VULNERABILITY

TOWN OF
WHITCHURCH - STOUFFVILLE
OFFICIAL PLAN

Schedule "I"

Oak Ridges Moraine Plan Area
Areas of High Aquifer Vulnerability

Office Consolidation December, 2020



LEGEND

- TOWN BOUNDARY
- EXISTING CENTRELINES
- UNOPENED ROAD ALLOWANCE
- RAILWAYS
- LAKES
- RIVERS
- COMMUNITY AREAS
- OAK RIDGES MORAINE
- KETTLE LAKES
- 150 DAY WELLHEAD PROTECTION ZONE
- 2 YEAR WELLHEAD PROTECTION ZONE
- 10 YEAR WELLHEAD PROTECTION ZONE
- 25 YEAR WELLHEAD PROTECTION ZONE

TOWN OF
WHITCHURCH - STOUFFVILLE
OFFICIAL PLAN

Schedule "K"

Oak Ridges Moraine Plan Area
Wellhead Protection Zones

Office Consolidation December, 2020

5.10 WELLHEAD PROTECTION AREAS

5.10.1 Purpose

Wellhead Protection Areas which include lands that contribute water to each municipal well (capture zone) have been established by the Regional Municipality of York in the Moraine Plan Area. Land use restrictions shall be applied within the Wellhead Protection Areas based on “time-of-travel” for ground water to reach the municipal well and the relative threat posed by certain land use/activities in proximity to such wellheads.

5.10.2 Policies

5.10.2.1

Wellhead Protection Areas and Time-of-Travel Zones are delineated on Schedule K to this Plan.

5.10.2.2

Within Wellhead Protection Areas and zero to twenty-five year Time-of-Travel Zones on the Moraine new uses which involve the following shall be prohibited:

i) Storage, except by an individual for personal or family use of:

a) petroleum fuels;

b) petroleum solvents and chlorinated solvents;

c) pesticides, herbicides and fungicides;

d) construction equipment;

e) inorganic fertilizers;

f) road salt; and,

g) contaminants listed in Schedule 3 (Severely Toxic Contaminants) to Regulation 347 of the Revised Regulations of Ontario 1990.

ii) Generation and storage of hazardous waste or liquid industrial waste.

iii) Waste disposal sites and facilities, organic soil conditioning sites and snow storage and disposal facilities.

5.10.2.3

In addition to the policies of Section 5.10.2.2, and notwithstanding any other provisions of this Plan, new uses, which involve the following, are prohibited on the lands in the zero to two year Time-of-Travel Zone, within the Moraine Plan Area, except by an individual for personal or family use:

i) Storage of animal manure;

ii) Animal agriculture; and,

iii) Storage of agricultural equipment.

5.10.2.4

Every person who carries on a use listed above, as an owner or operator, shall be required to prepare and maintain a site management and contingency plan that is aimed at reducing or eliminating the creation of the materials referred to above, and their release into the environment, which plan shall be reviewed and approved by the Region.

5.10.2.5

The Town shall encourage restrictions on haulage routes for the transportation of chemicals and volatile materials through designated Wellhead Protection Areas.

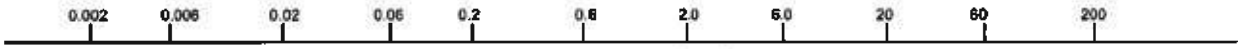
Appendix D – Borehole Logs

Notes on Sample Descriptions

1. All sample descriptions included in this report follow the International Society for Soil Mechanics and Foundation Engineering (ISSMFE), as outlined in the Canadian Foundation Engineering Manual. Note, however, that behavioral properties (i.e. plasticity, permeability) take precedence over particle gradation when classifying soil. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

UNIFIED SOIL CLASSIFICATION

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (75 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Notes On Soil Descriptions

4. The following table gives a description of the soil based on particle sizes. With the exception of those samples where grain size analyses have been performed, all samples are classified visually. The accuracy of visual examination is not sufficient to differentiate between this classification system or exact grain size.

Soil Classification		Terminology	Proportion
Clay and Silt	<0.060 mm	"trace" (e.g. Trace sand)	1% to 10%
Sand	0.060 to 2.0 mm	"some" (e.g. Some sand)	10% to 20%
Gravel	2.0 to 75 mm	adjective (e.g. sandy, silty)	20% to 35%
Cobbles	75 to 200 mm	"and" (e.g. and sand)	35% to 50%
Boulders	>200 mm		

The compactness of Cohesionless soils and the consistency of the cohesive soils are defined by the following:

Cohesionless Soil		Cohesive Soil		
Compactness	**Standard Penetration Resistance "N" Blows / 0.3 m**	**Consistency**	**Undrained Shear Strength (kPa)**	**Standard Penetration Resistance "N" Blows / 0.3 m**
Very Loose	0 to 4	Very soft	<12	<2
Loose	4 to 10	Soft	12 to 25	2 to 4
Compact	10 to 30	Firm	25 to 50	4 to 8
Dense	30 to 50	Stiff	50 to 100	8 to 15
Very Dense	Over 50	Very Stiff	100 to 200	15 to 30
		Hard	>200	>30

5. **ROCK CORING**

Where rock drilling was carried out, the term RQD (Rock Quality Designation) is used. The RQD is an indirect measure of the number of fractures and soundless of the rock mass. It is obtained from the rock cores by summing the length of the core covered, counting only those pieces of sound core that are 100 mm or more length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD (%)
Very Poor Quality	<25
Poor Quality	25 to 50
Fair Quality	50 to 75
Good Quality	75 to 90
Excellent Quality	90 to 100

$$\text{Recovery Designation \% Recovery} = \frac{\text{Length of Core Per Run}}{\text{Total Length of Run}} \times 100$$

Log of Borehole 1

Project No. BRM-21010864-AO

Drawing No. 2

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 31, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

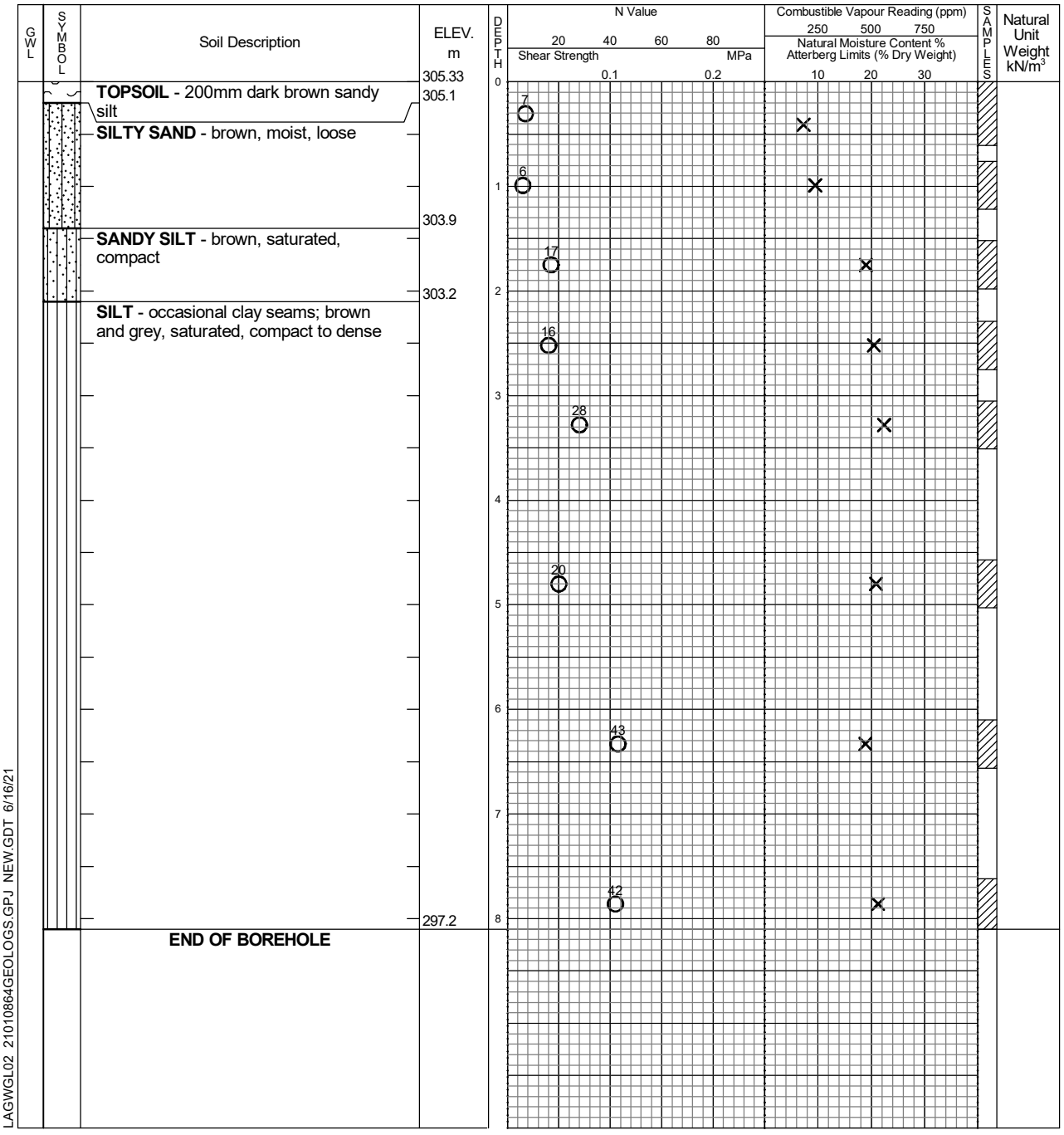
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	7.01	7.62

Log of Borehole 2

Project No. BRM-21010864-AO

Drawing No. 3

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 31, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

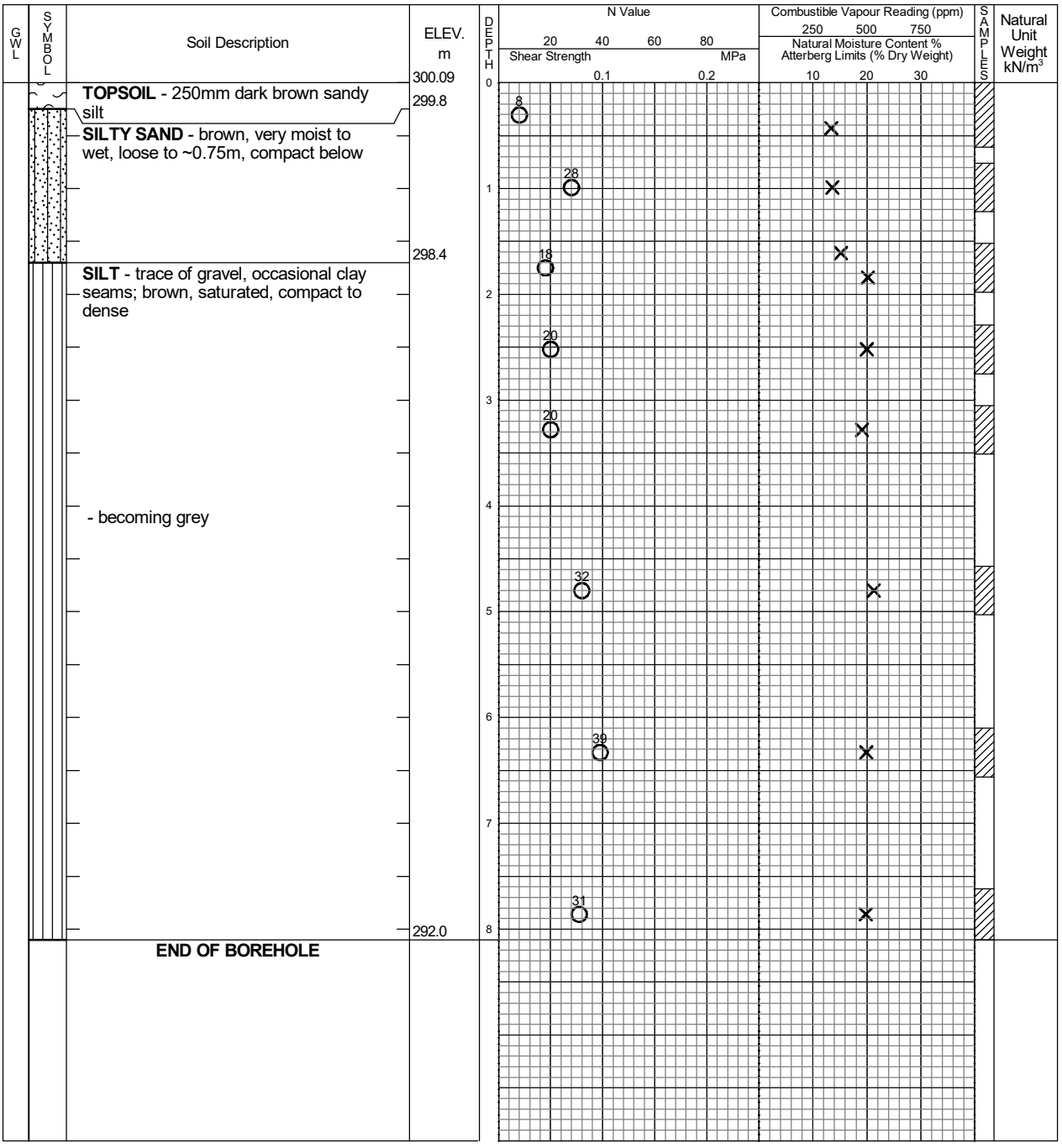
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	4.27	5.79

Log of Borehole 3

Project No. BRM-21010864-AO

Drawing No. 4

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 27, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

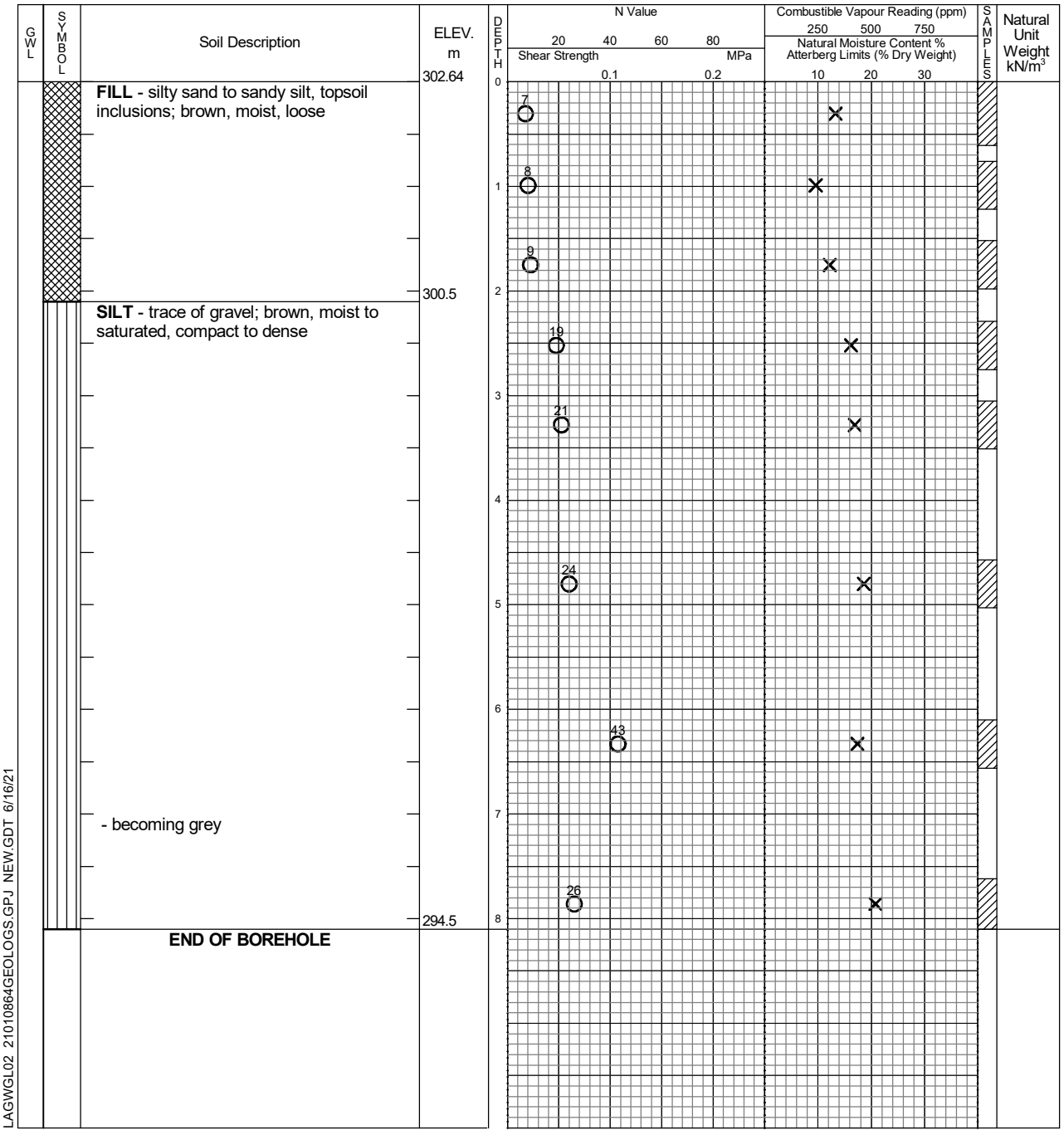
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	7.37	7.37

Log of Borehole 4

Project No. BRM-21010864-AO

Drawing No. 5

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 28, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

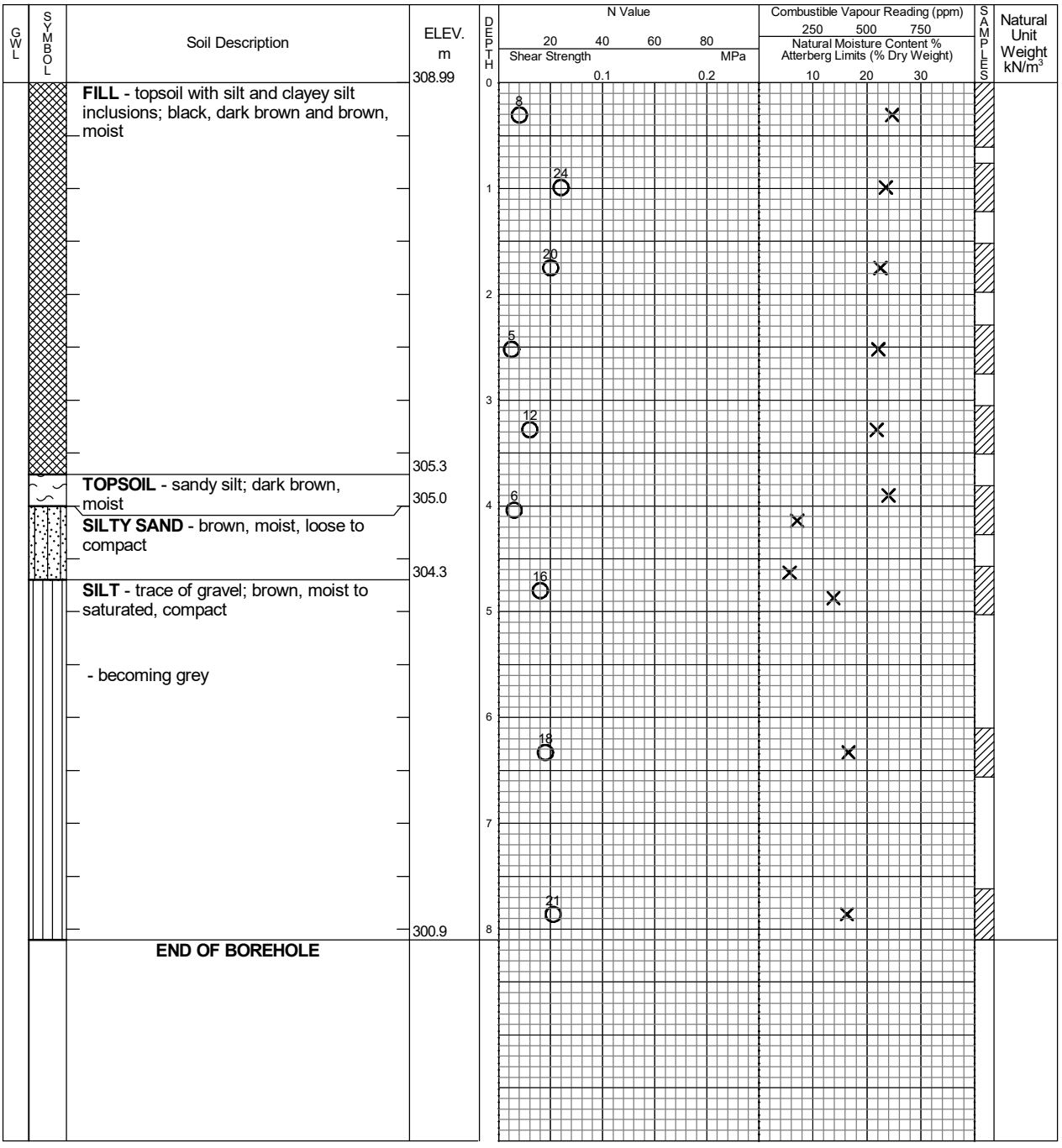
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	7.39

Log of Borehole 5

Project No. BRM-21010864-AO

Drawing No. 6

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 26, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

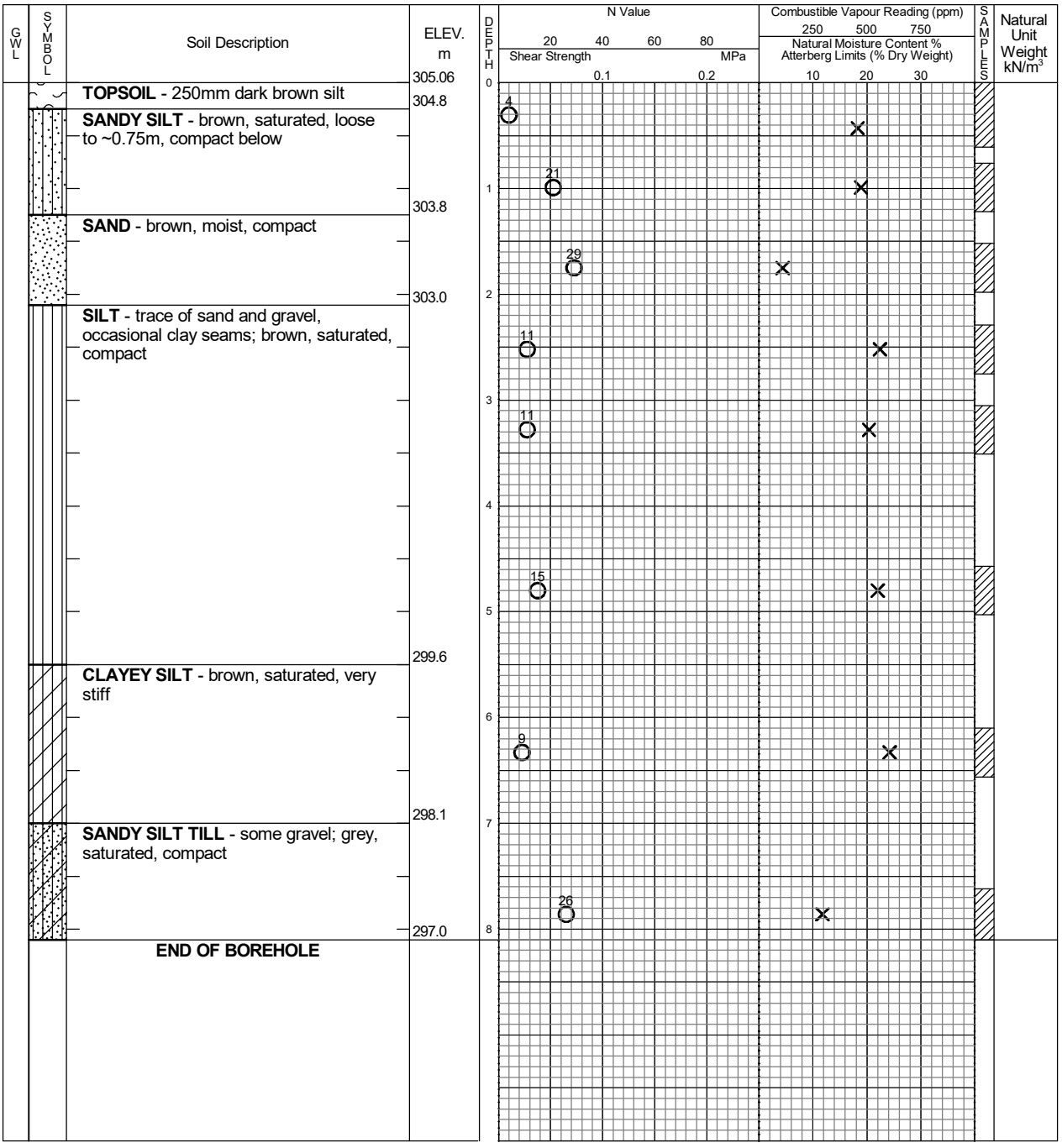
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	5.69	5.69

Log of Borehole 6

Project No. BRM-21010864-AO

Drawing No. 7

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 27, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

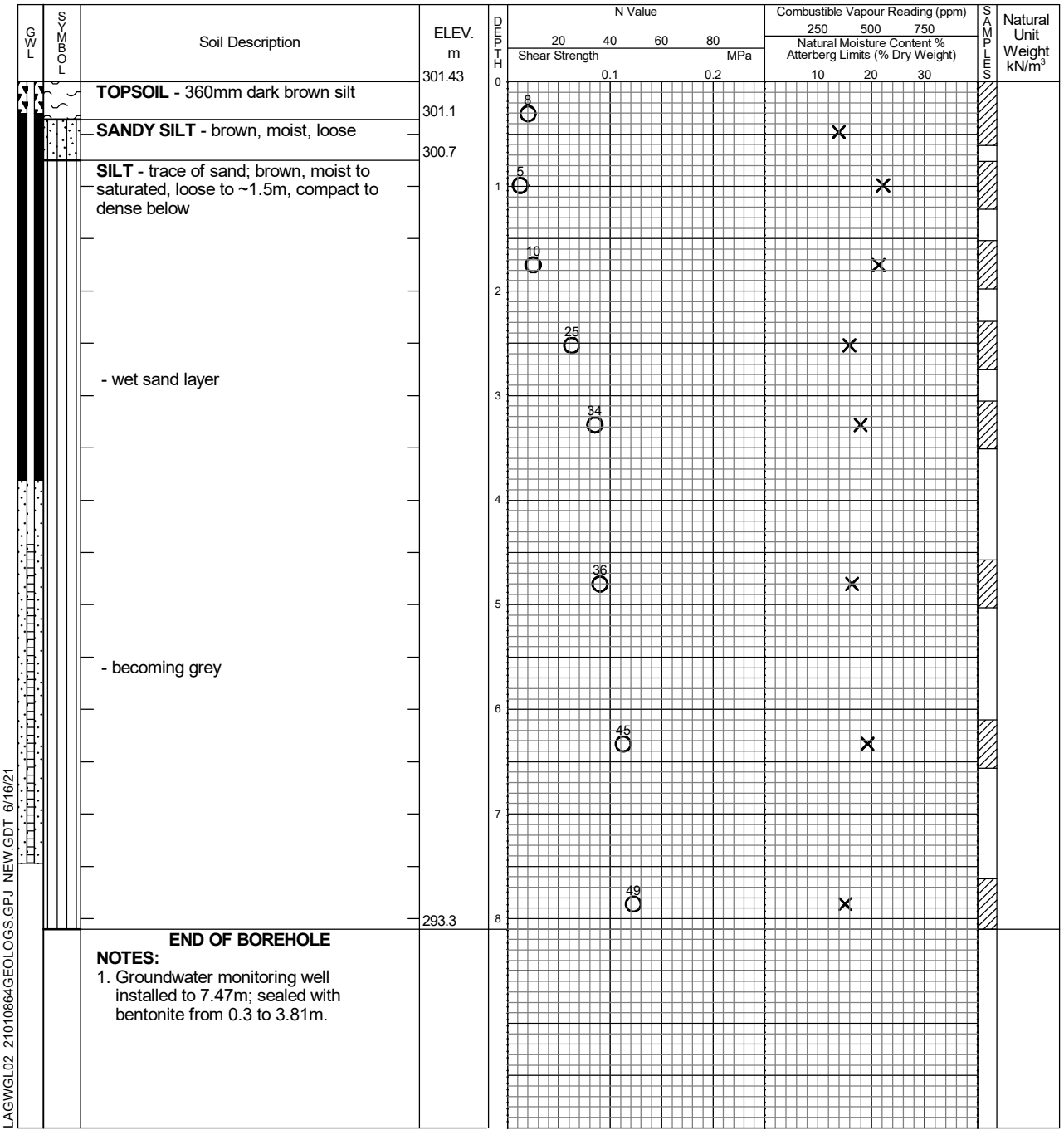
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	1.37	Borehole
After 11 days	1.68	Well

Log of Borehole 7

Project No. BRM-21010864-AO

Drawing No. 8

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

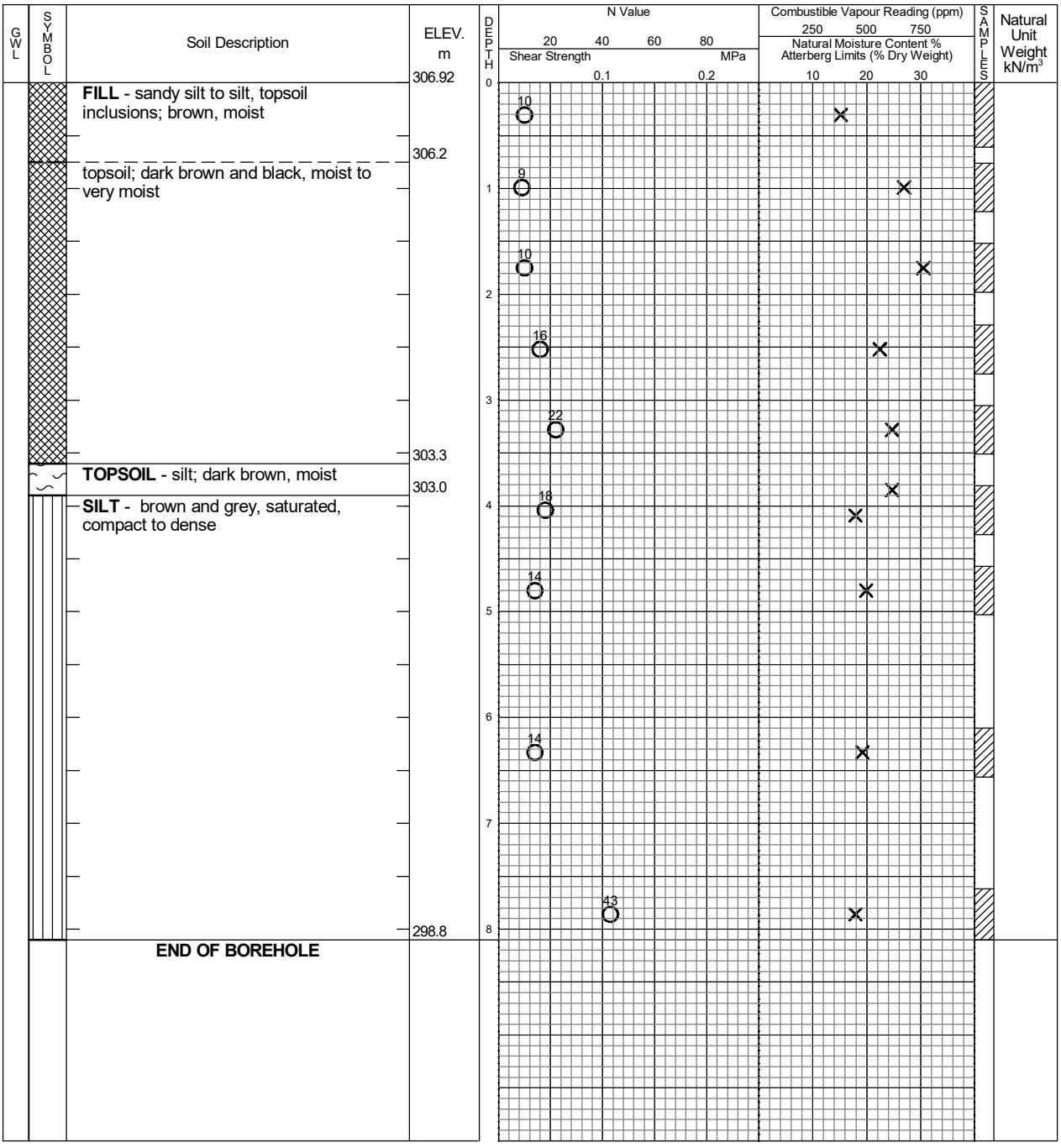
Date Drilled: May 28, 2021

Drill Type: CME 55

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	7.47	7.47

Log of Borehole 8

Project No. BRM-21010864-AO

Drawing No. 9

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 31, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

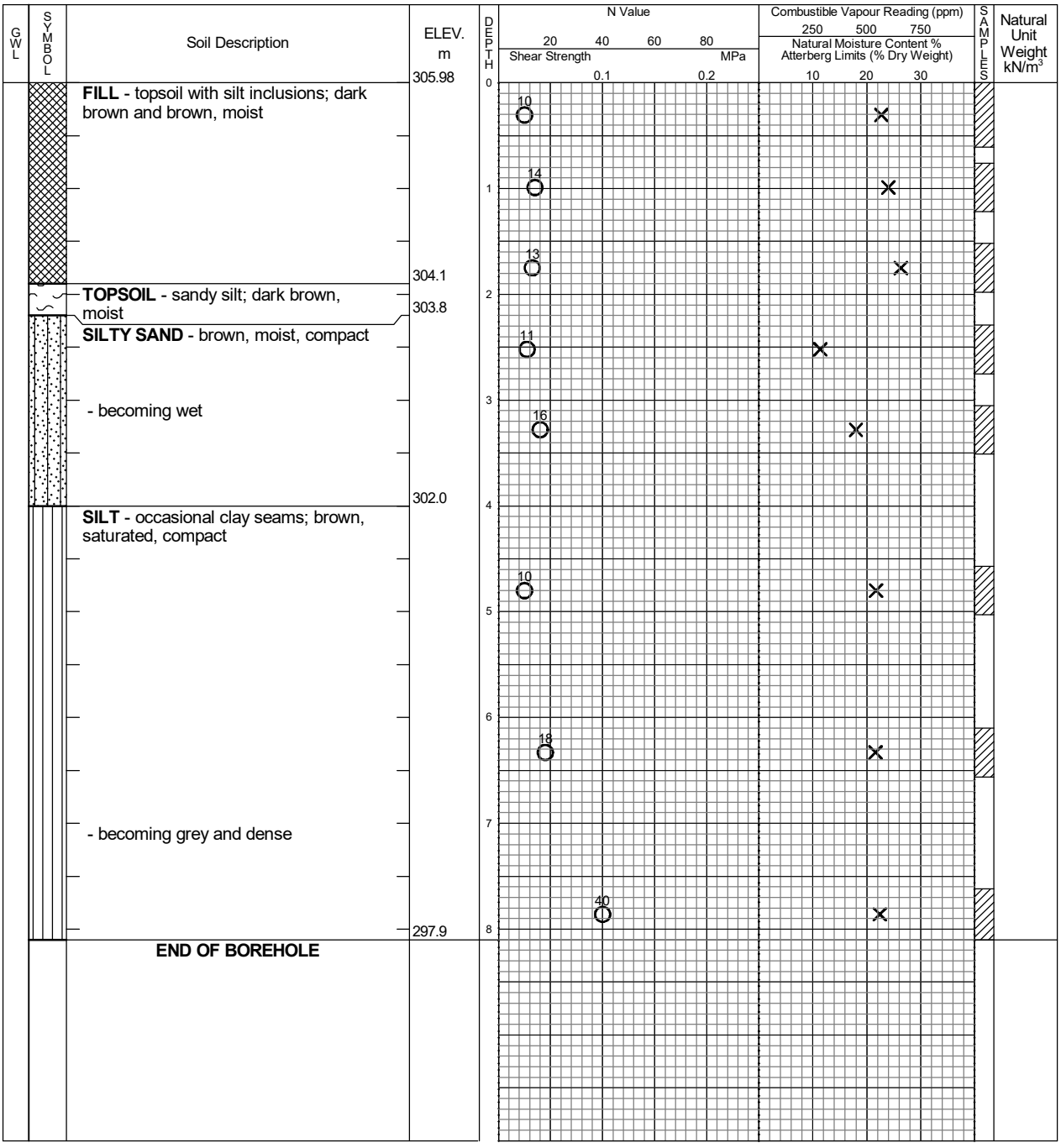
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	3.96	5.49

Log of Borehole 9

Project No. BRM-21010864-AO

Drawing No. 10

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

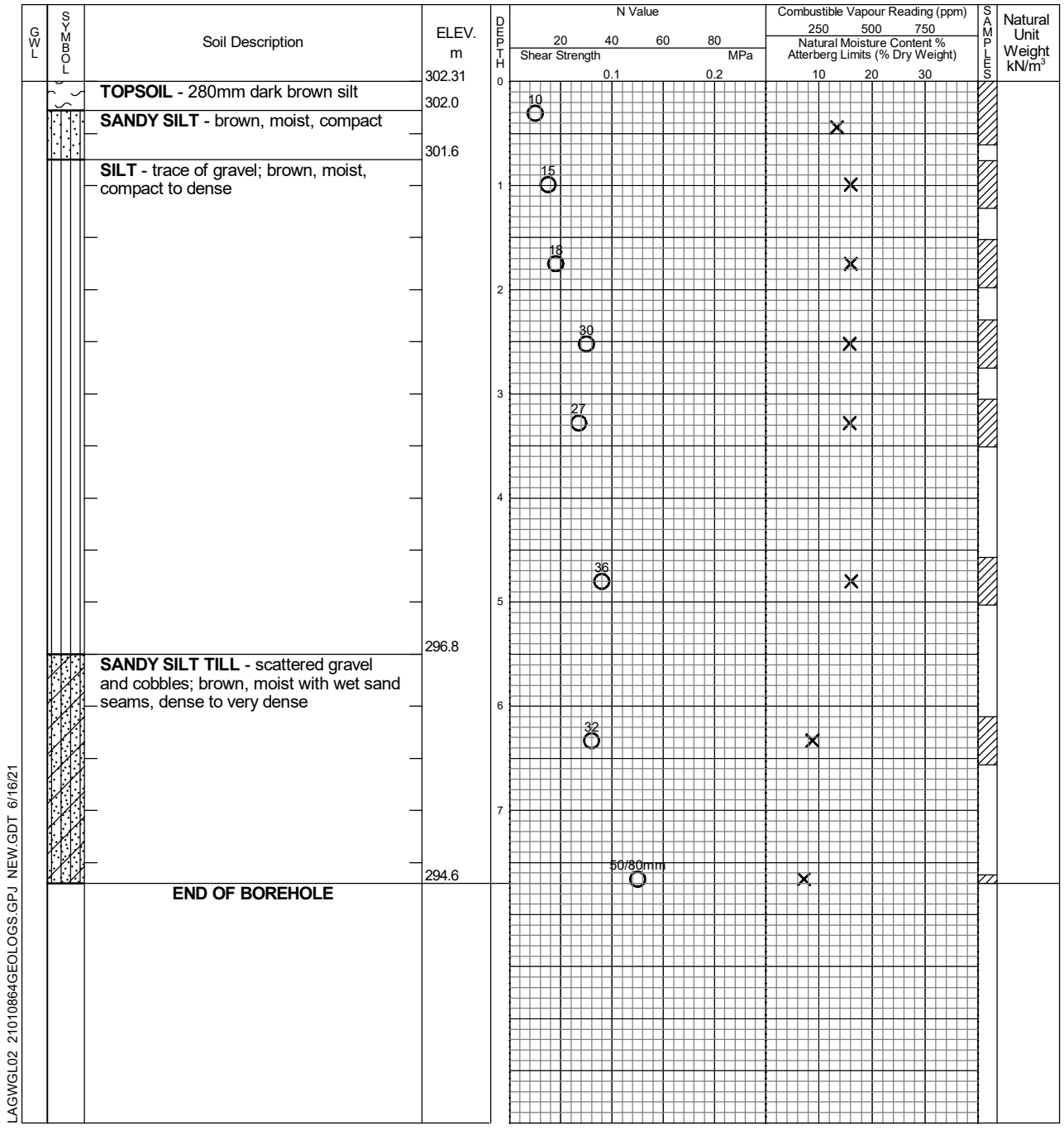
Date Drilled: May 27, 2021

Drill Type: CME 55

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	7.52

Log of Borehole 10

Project No. BRM-21010864-AO

Drawing No. 11

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 28, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

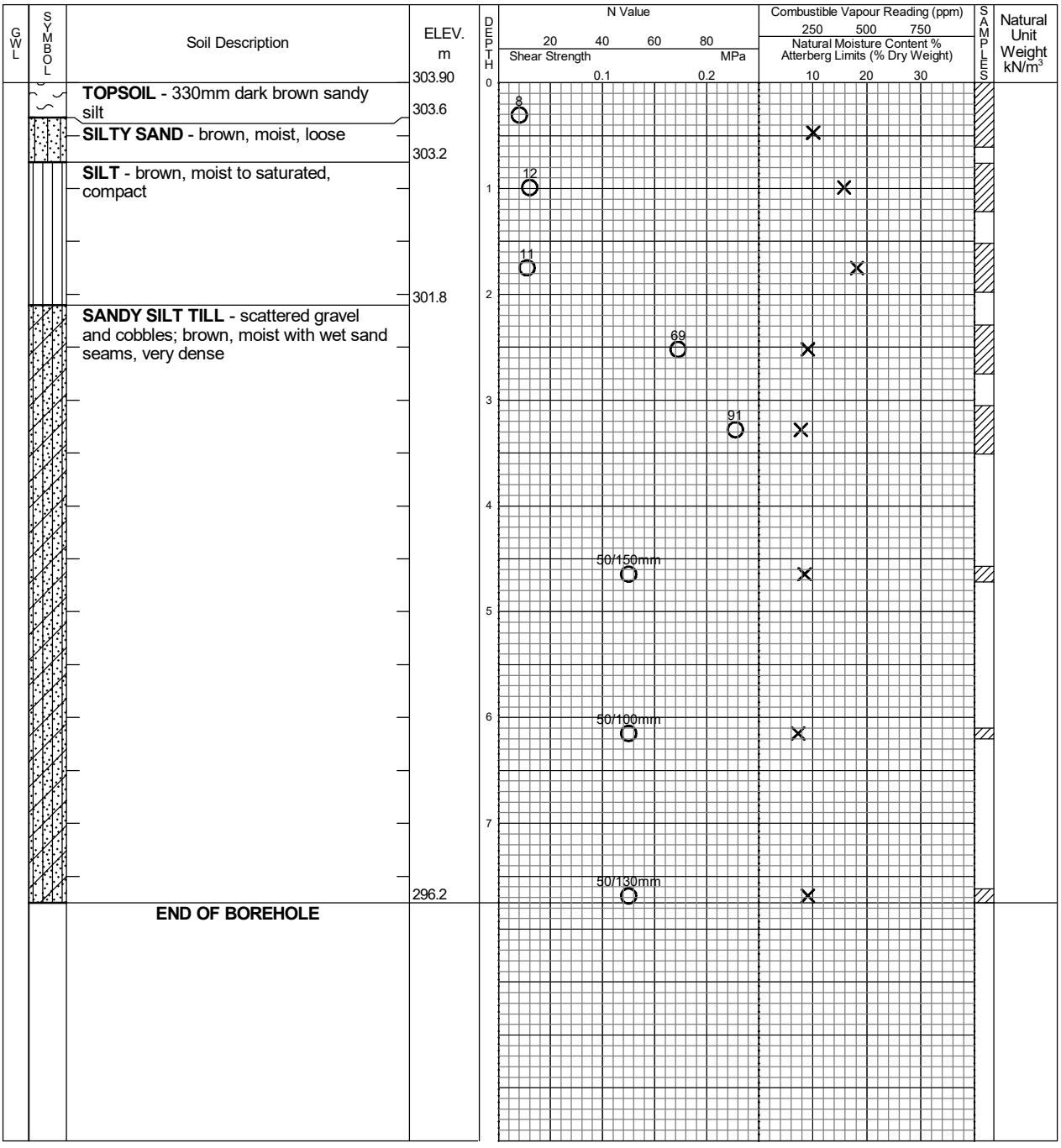
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

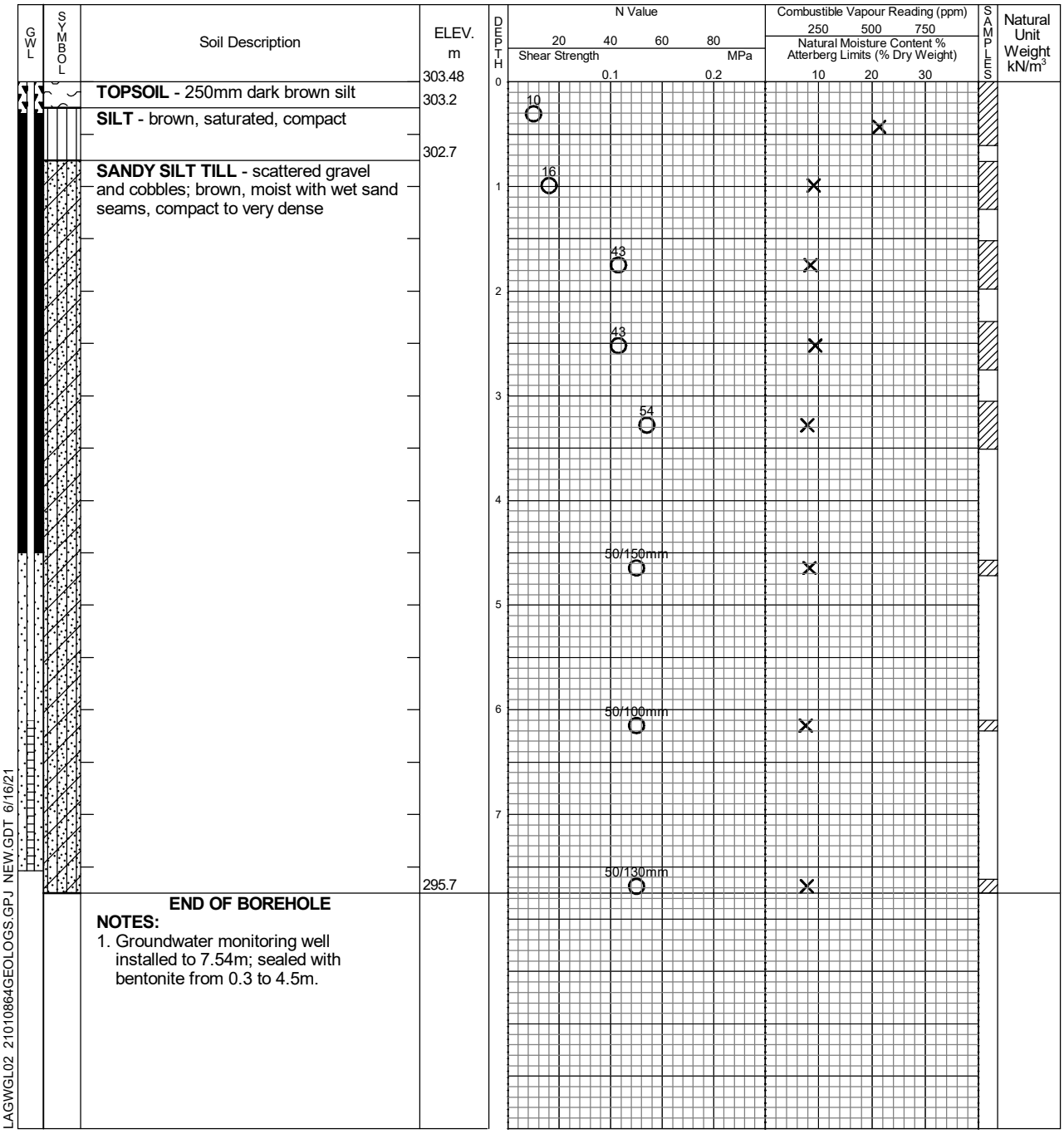
Time	Water Level (m)	Depth to Cave (m)
On completion	7.09	7.24

Log of Borehole 11

Project No. BRM-21010864-AO
Drawing No. 12
Project: Preliminary Geotechnical Investigation - Residential Development
Sheet No. 1 of 1
Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 26, 2021
Drill Type: CME 55
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Time	Water Level (m)	Depth to Cave (m)
On completion	7.47	Borehole
After 12 days	3.41	Well

Log of Borehole 12

Project No. BRM-21010864-AO

Drawing No. 13

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 27, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

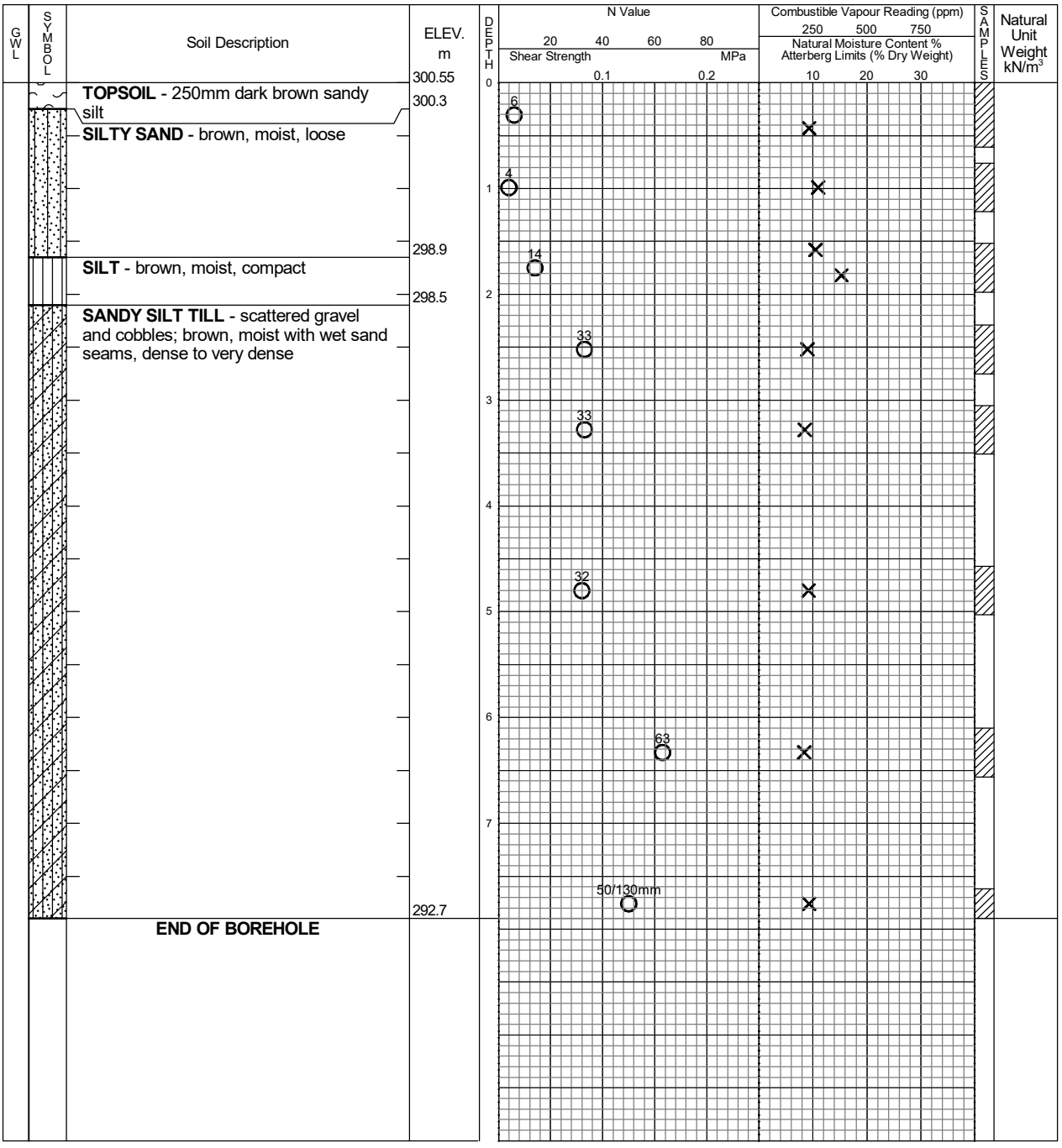
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	7.29	7.52

Log of Borehole 13

Project No. BRM-21010864-AO

Drawing No. 14

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 28, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

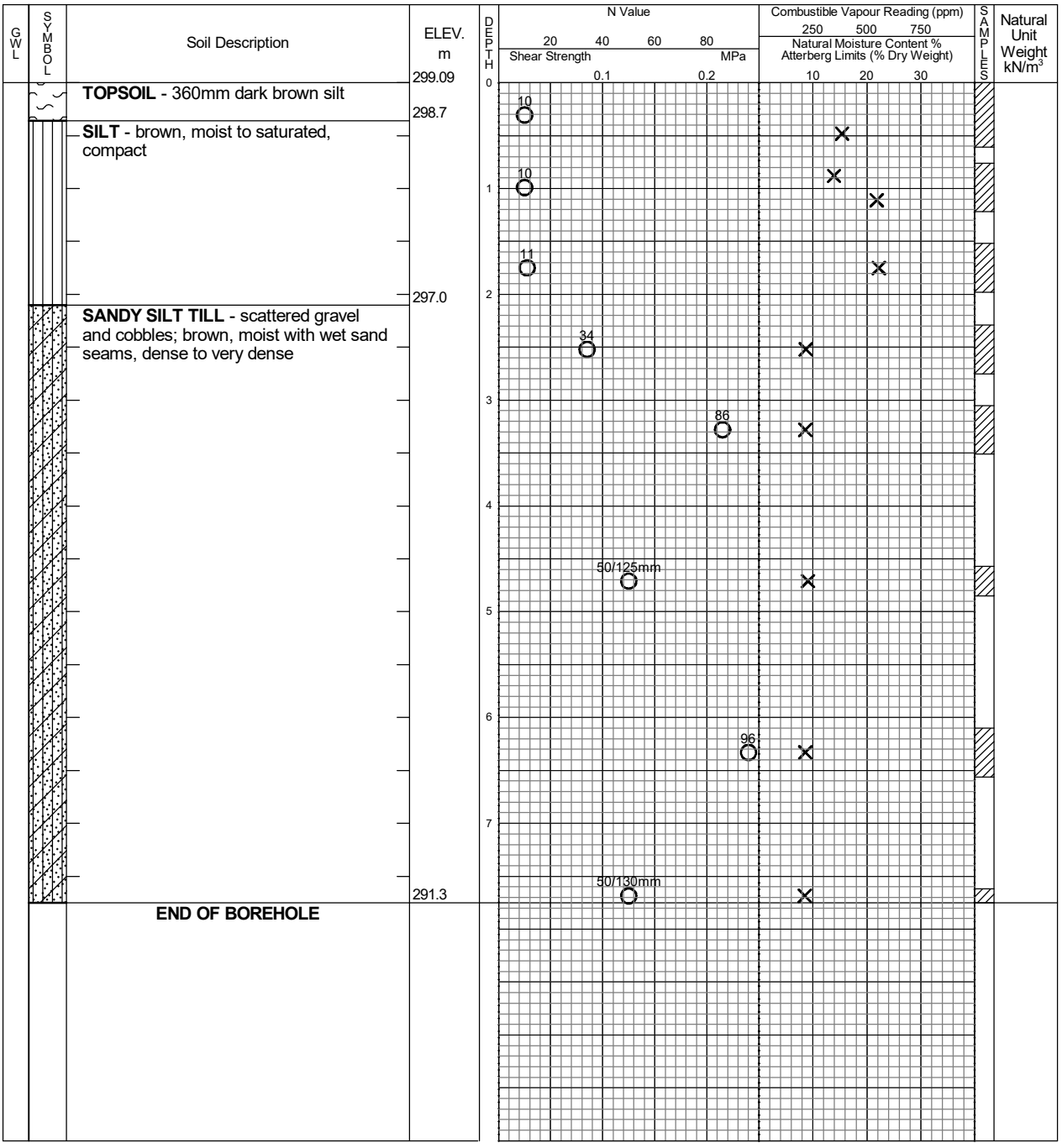
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

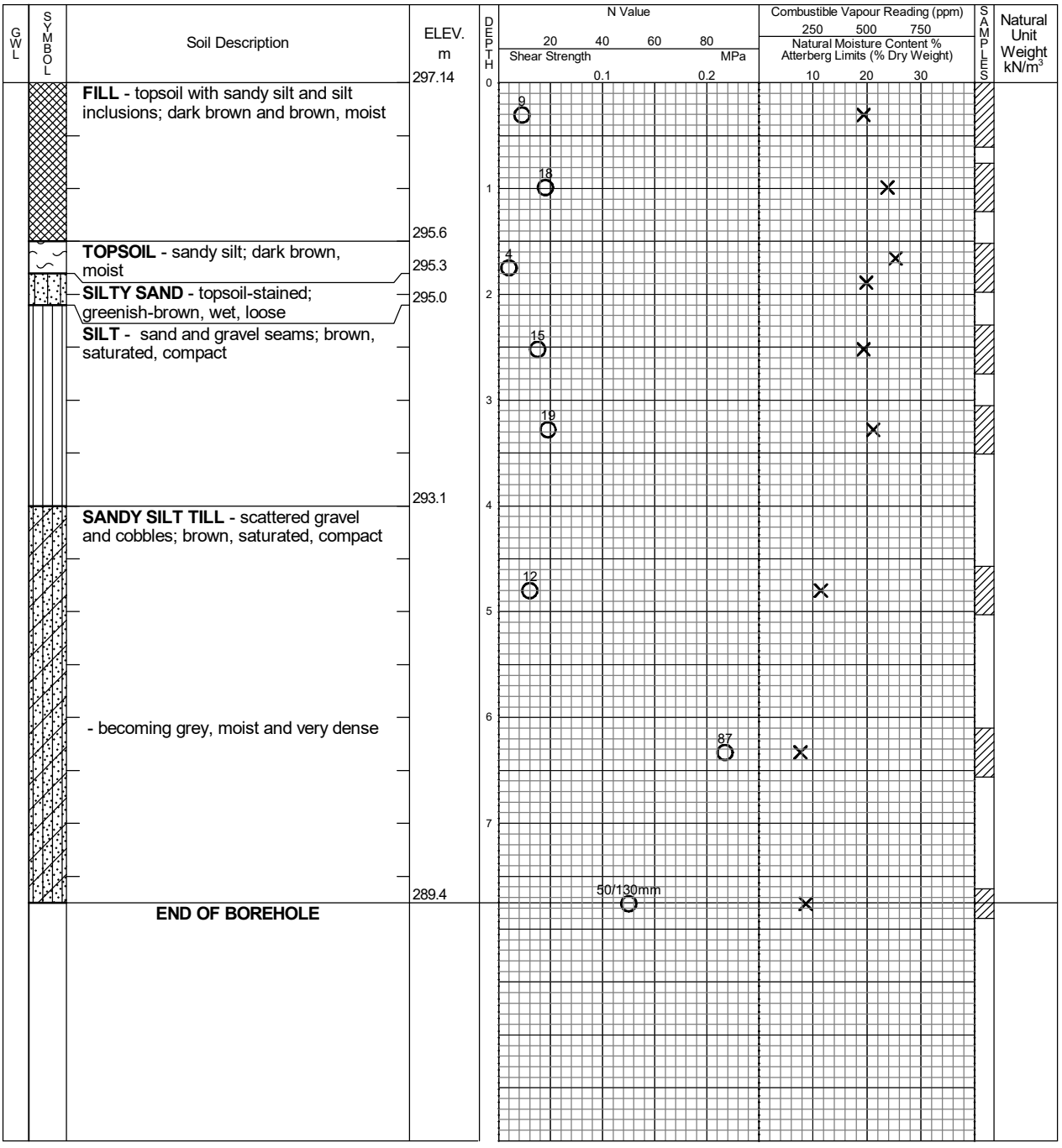
Time	Water Level (m)	Depth to Cave (m)
On completion	7.39	7.34

Log of Borehole 14

Project No. BRM-21010864-AO
Drawing No. 15
Project: Preliminary Geotechnical Investigation - Residential Development
Sheet No. 1 of 1
Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 26, 2021
Drill Type: CME 55
Datum: Geodetic

Auger Sample
SPT (N) Value
Dynamic Cone Test
Shelby Tube
Field Vane Test
Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	4.39	5.59

Log of Borehole 15

Project No. BRM-21010864-AO

Drawing No. 16

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 27, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

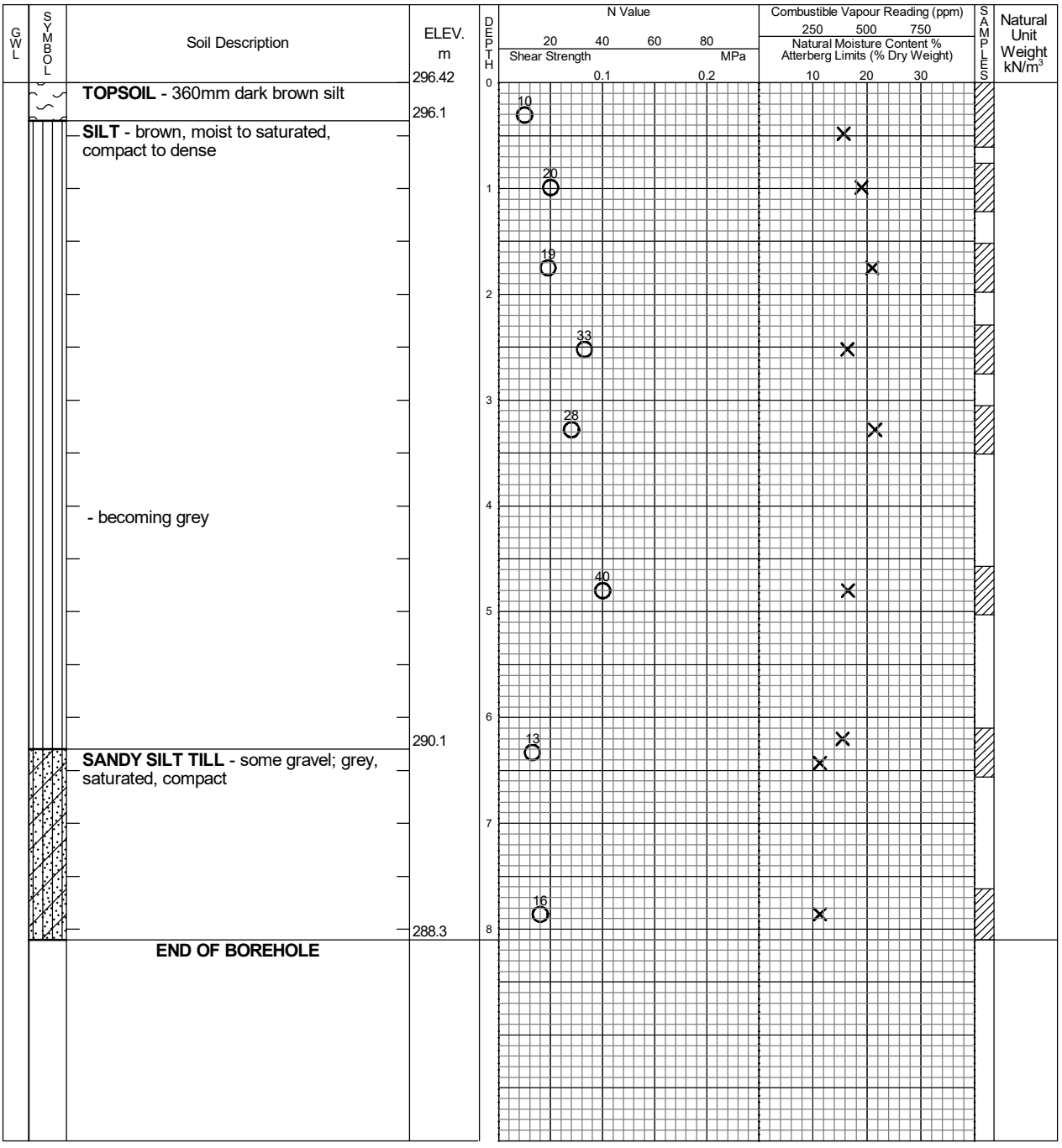
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	6.81	7.44

Log of Borehole 16

Project No. BRM-21010864-AO

Drawing No. 17

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 31, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

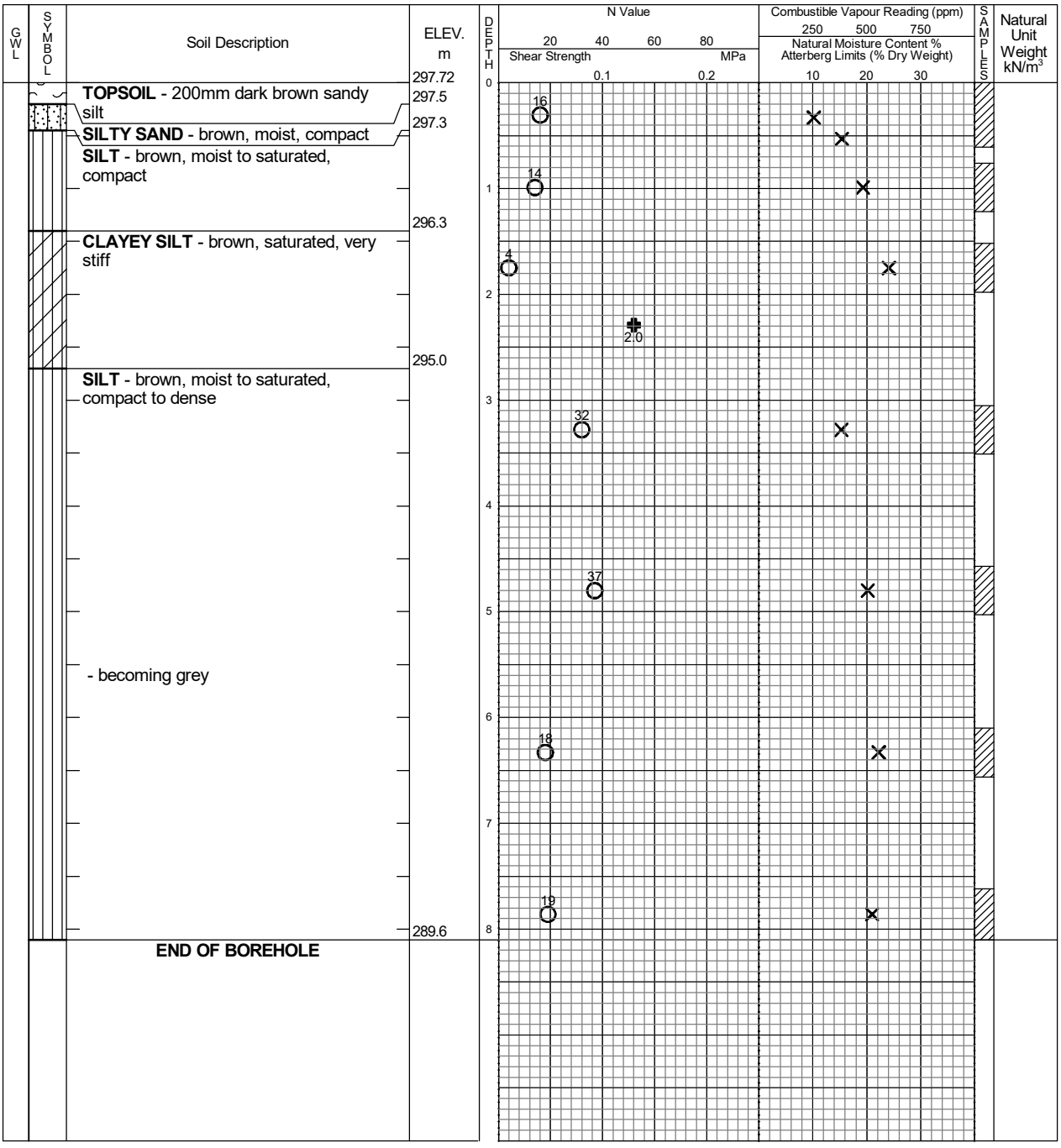
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	4.57	7.62

Log of Borehole 17

Project No. BRM-21010864-AO

Drawing No. 18

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 26, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

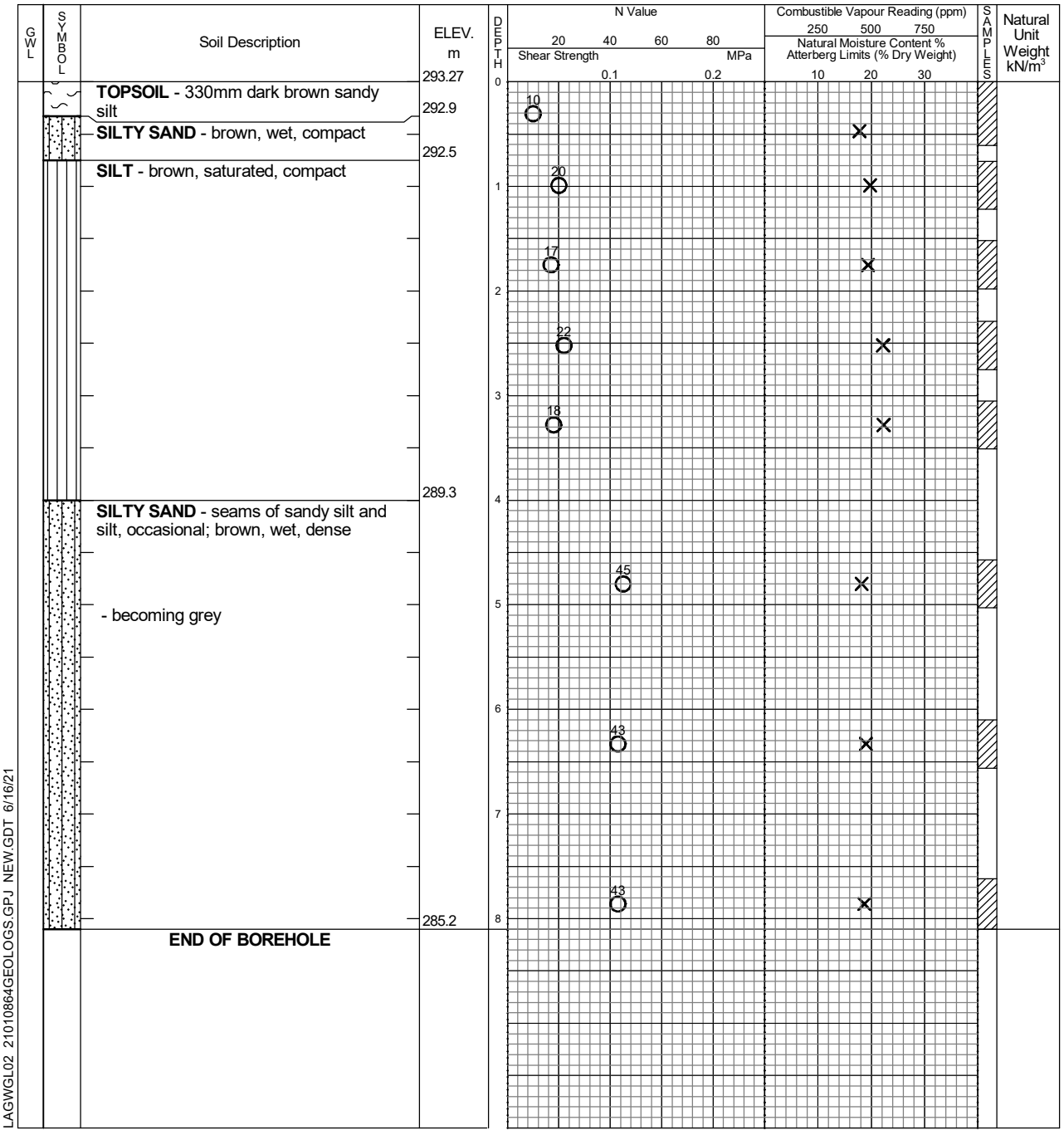
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	1.73	2.97

Log of Borehole 18

Project No. BRM-21010864-AO

Drawing No. 19

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 25, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

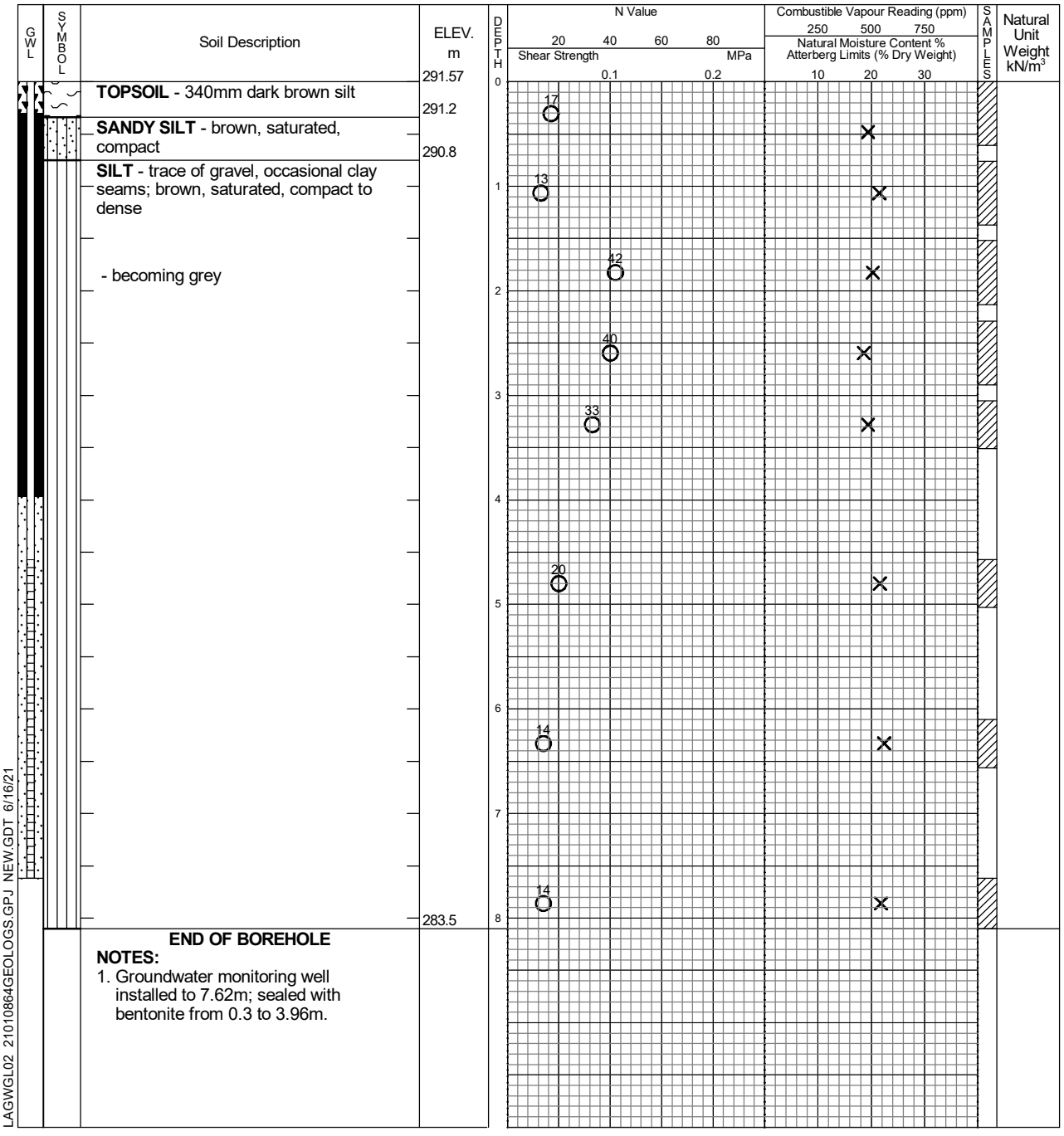
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	7.01	Borehole
After 13 days	0.56	Well

Log of Borehole 19

Project No. BRM-21010864-AO

Drawing No. 20

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 25, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

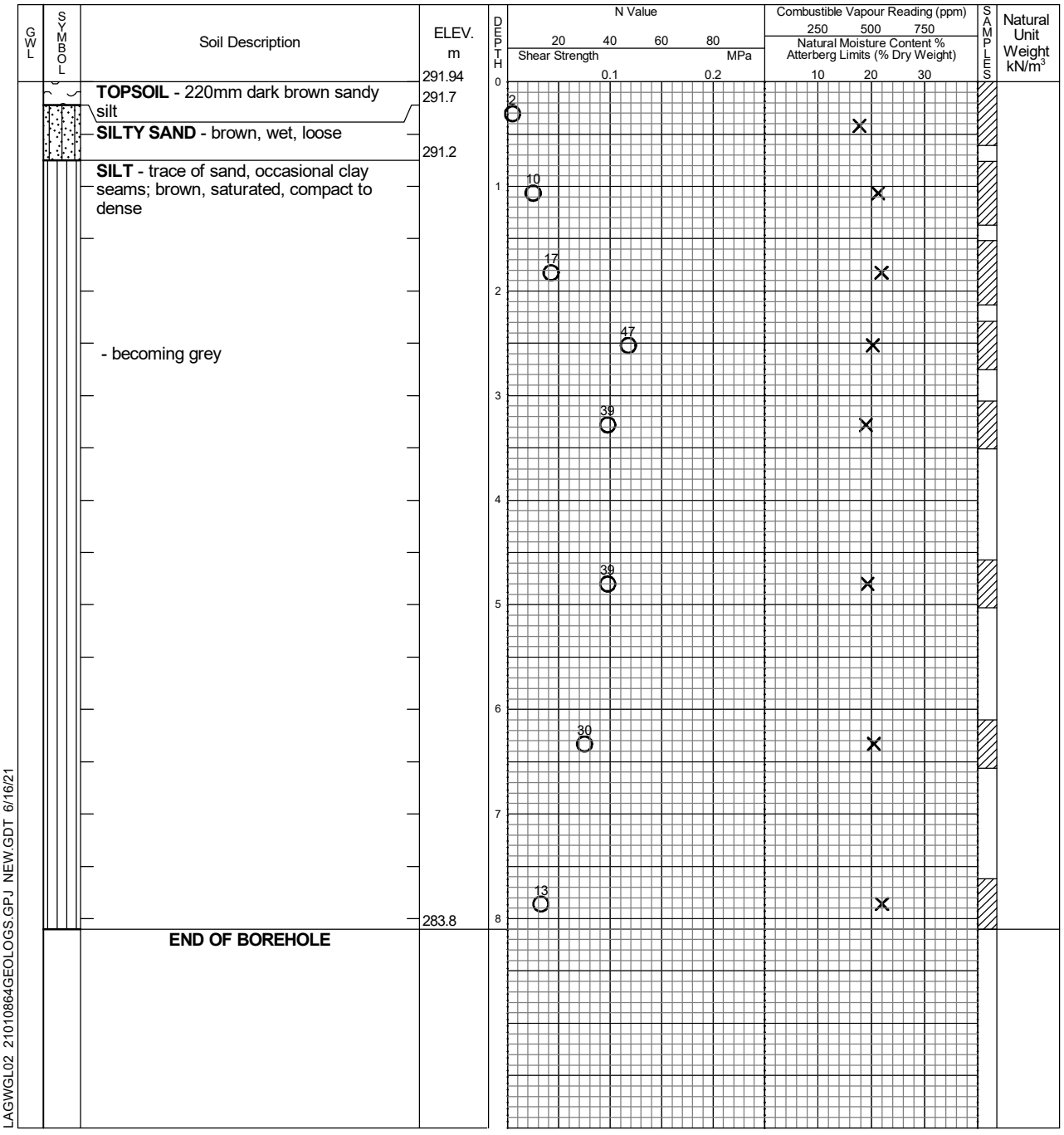
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	1.83	5.49

Log of Borehole 20

Project No. BRM-21010864-AO

Drawing No. 21

Project: Preliminary Geotechnical Investigation - Residential Development

Sheet No. 1 of 1

Location: 15374 and 15450 Woodbine Avenue, Gormley, Ontario

Date Drilled: May 25, 2021

Drill Type: CME 55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test

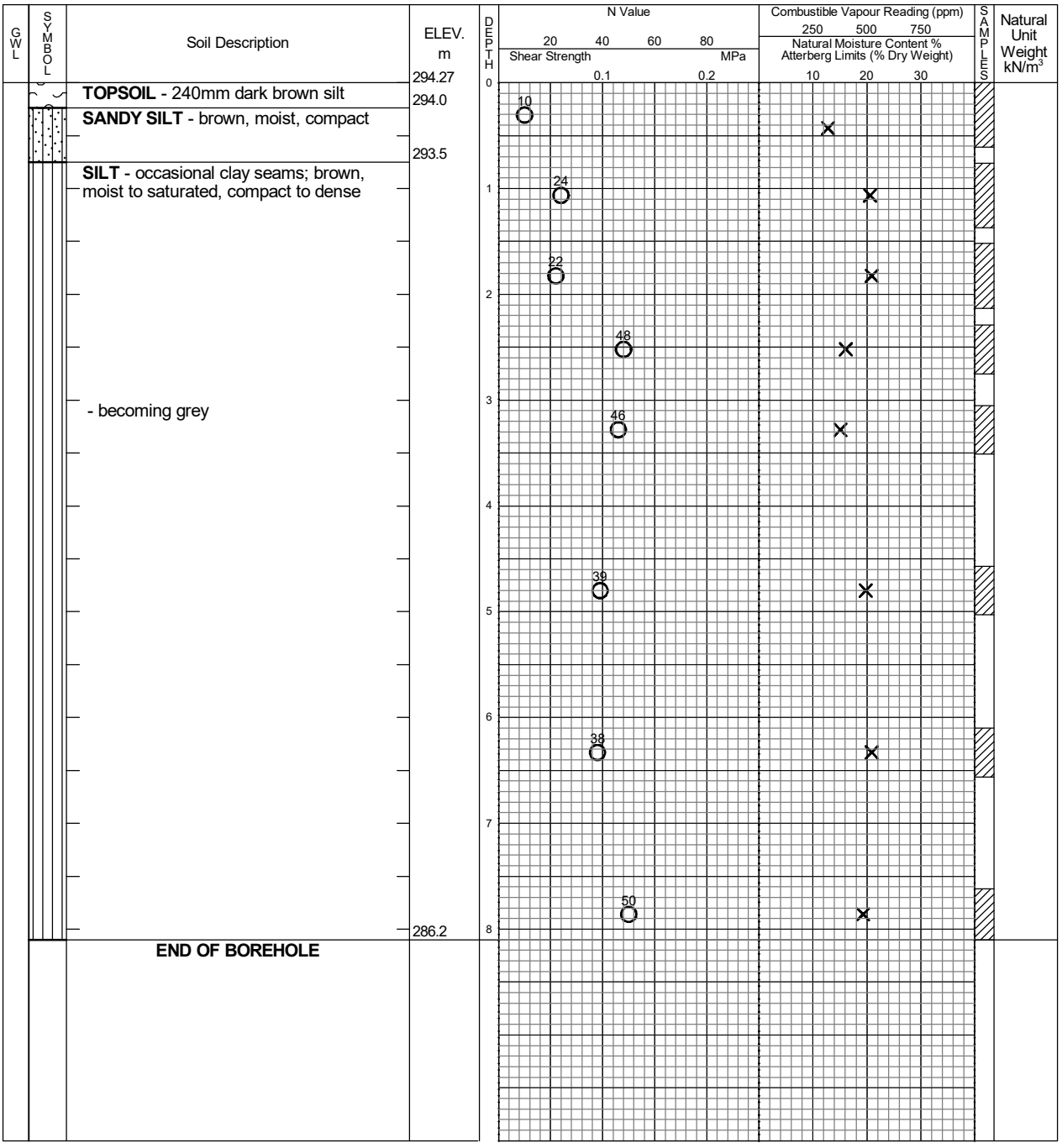
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 21010864GEOLOGS.GPJ NEW.GDT 6/16/21

Time	Water Level (m)	Depth to Cave (m)
On completion	7.31	7.62

Log of BH201

Project No. BRM-21010864-C0 Drawing No. 2

Project: Hydrogeological Investigation Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

Date Drilled: January 11, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		FILL - sandy si, trace organics, trace rootlets; dark brown, moist to very moist	307.21	0
		- becoming organic free	306.5	
		- silt, trace to some clay; brown, very moist		1
		- trace sand seams		2
		CLAYEY SILT - trace sand pockets; brown, very moist, stiff	304.9	
		SILT - trace clay; brown, very moist to saturated, compact	304.2	3
				4
				5
				6
		END OF BOREHOLE	300.5	

NOTES:
1. Groundwater monitoring well installed to about 6.1 m depth.

N Value: 20 40 60 80
Shear Strength: 0.1 0.2 MPa
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

N Value: 4, 5, 4, 14, 23, 21, 16, 15

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH202

Project No. BRM-21010864-C0 | Drawing No. 3

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

Date Drilled: January 13, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (MPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Weight kN/m³
		FILL - silt, some clay, trace sand, trace organics, trace rootlets; dark brown, very moist	300.43	0	6			
		- becoming trace clay, some sand		1	9			
				2	14			
				3	16			
					16			
		SILT - trace to some clay; brown to grey, very moist, compact - becoming very moist to saturated, dilatent	296.6	4	18			
				5	18			
		- becoming grey		6	13			
			293.7					
		END OF BOREHOLE						

NOTES:
1. Groundwater monitoring well installed to about 6.1 m depth.

LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH203

Project No. BRM-21010864-C0 | Drawing No. 4

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

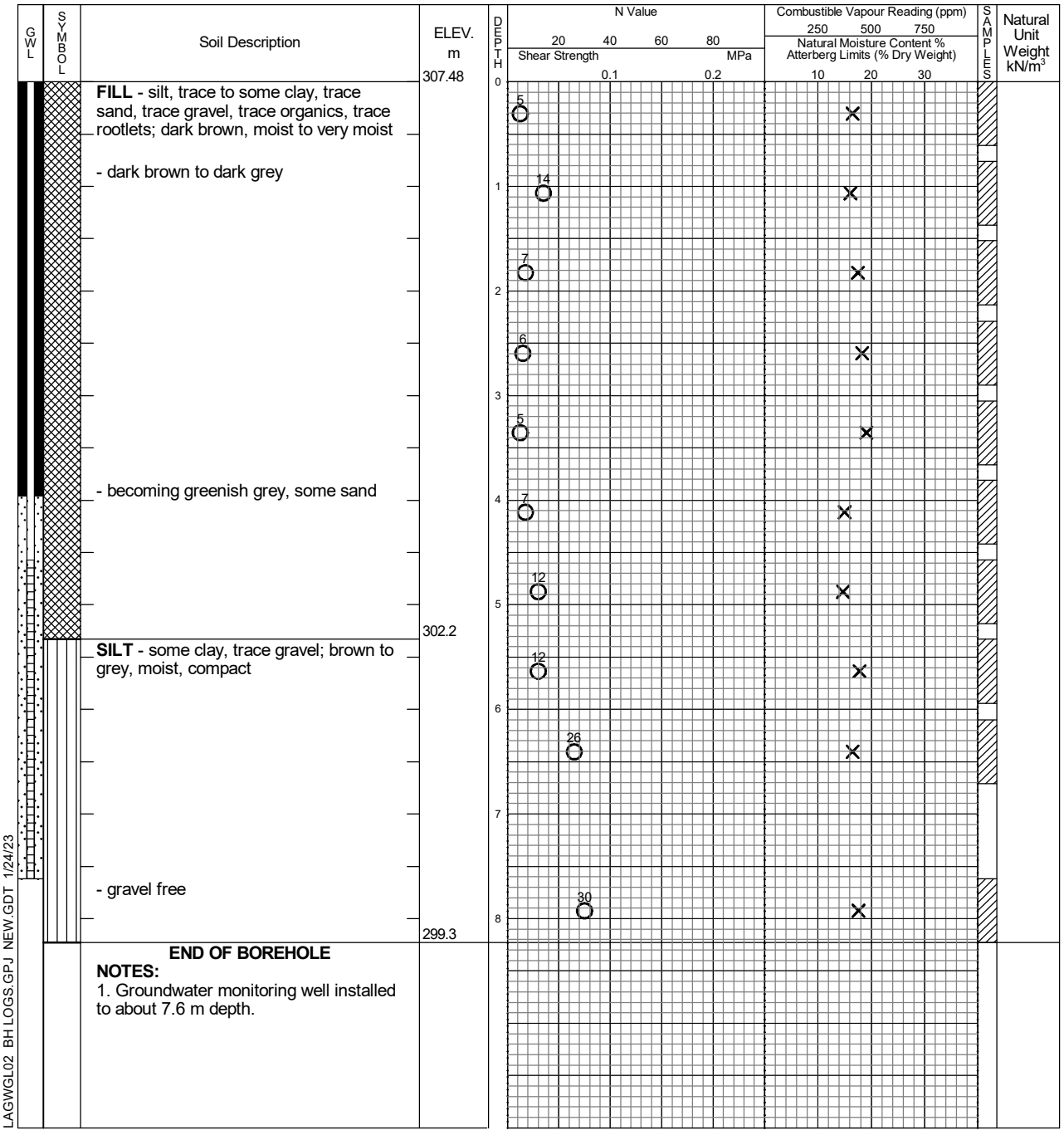
Date Drilled: January 11, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH204

Project No. BRM-21010864-C0 | Drawing No. 5

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

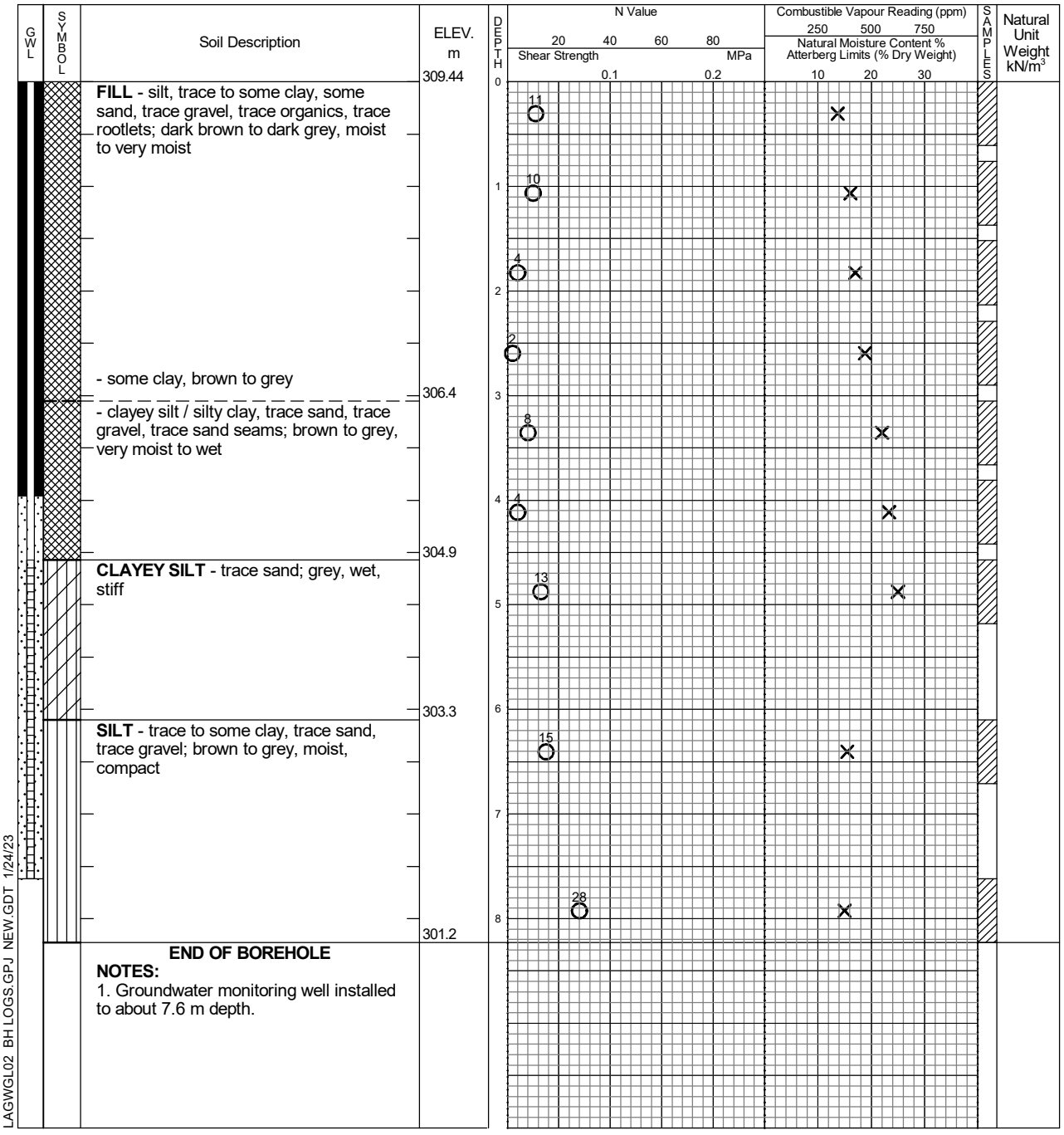
Date Drilled: January 11, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH205

Project No. BRM-21010864-C0 | Drawing No. 6

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

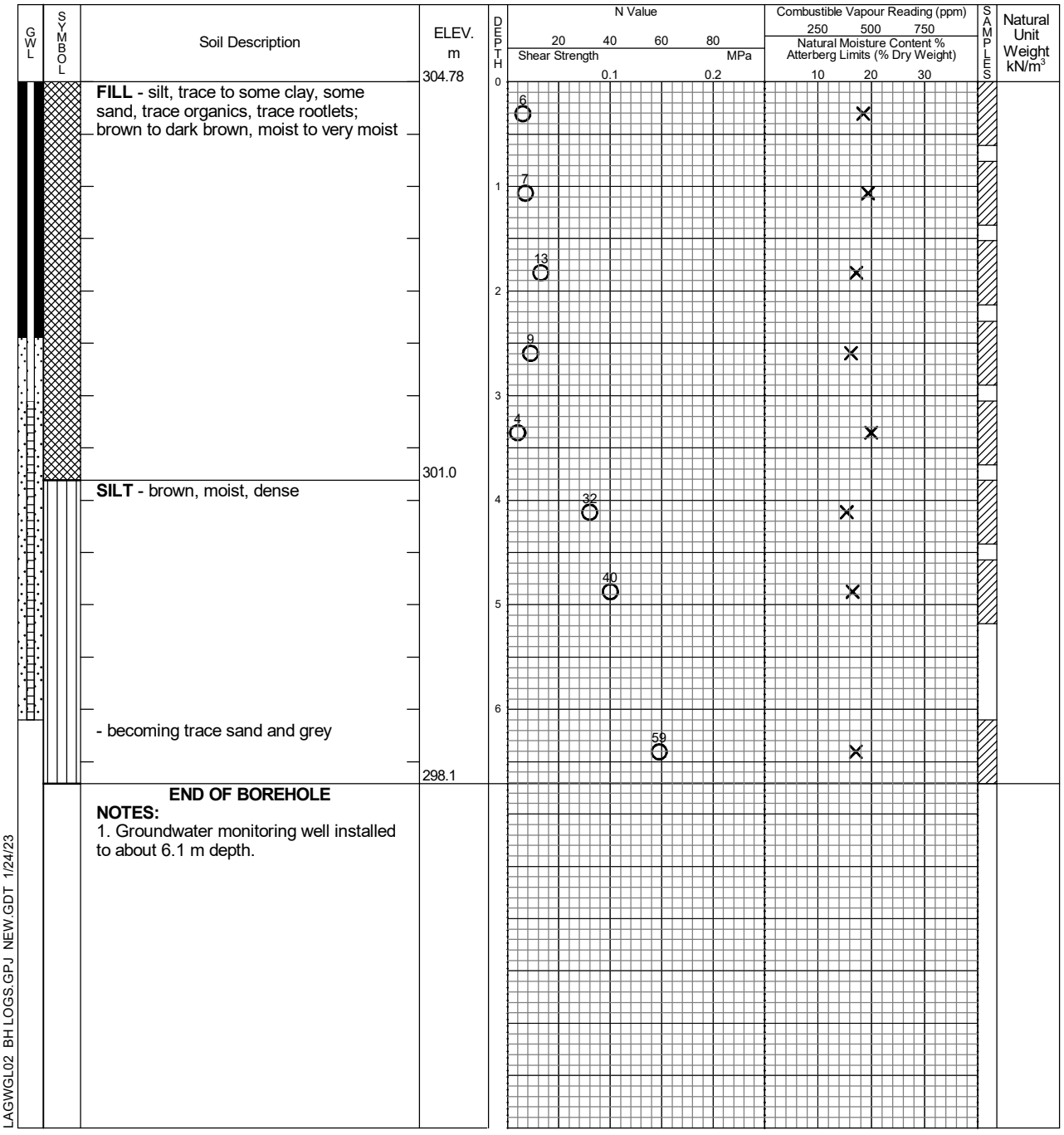
Date Drilled: January 13, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH206

Project No. BRM-21010864-C0 | Drawing No. 7

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

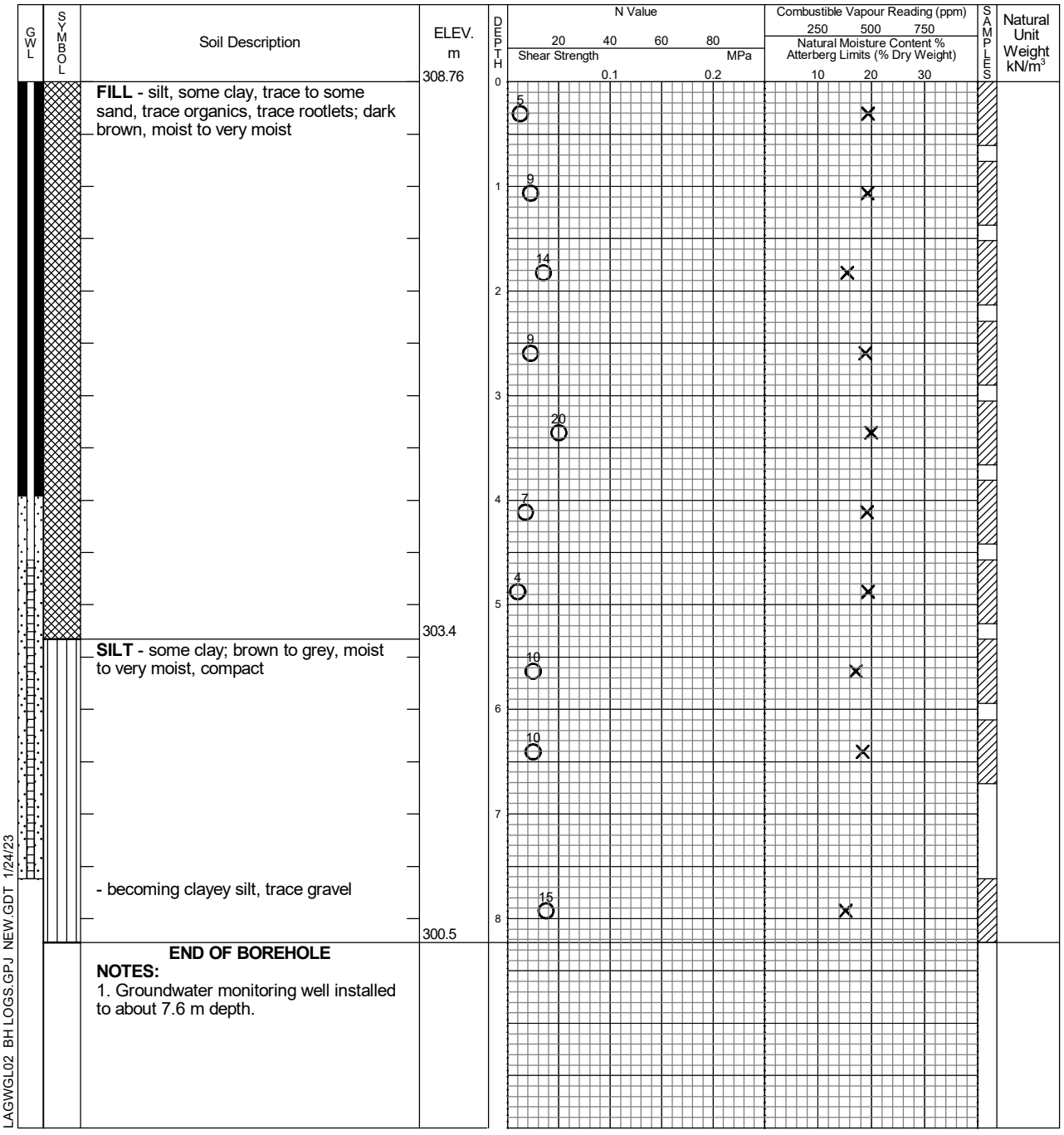
Date Drilled: January 11, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH207

Project No. BRM-21010864-C0 | Drawing No. 8

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

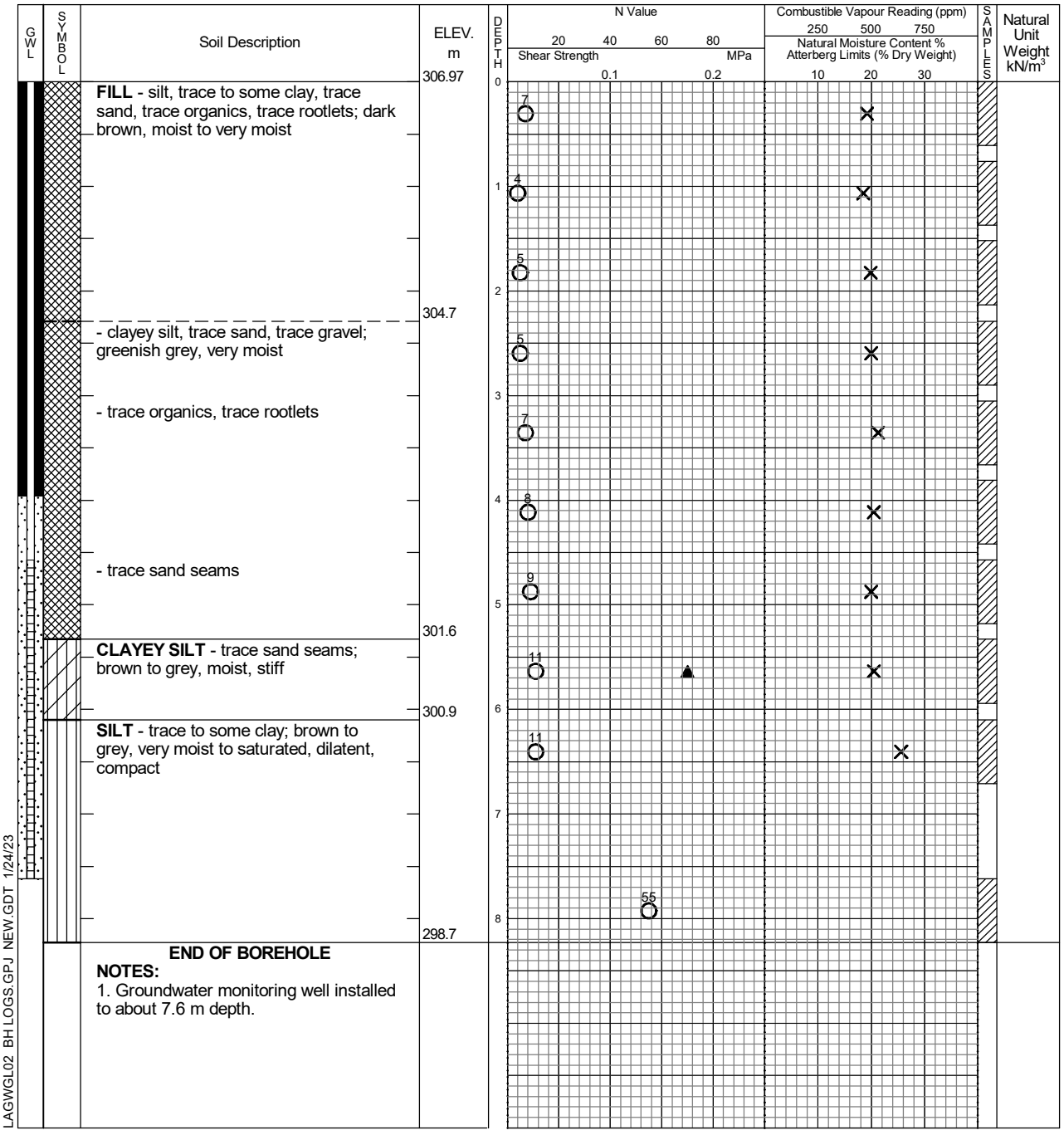
Date Drilled: January 10, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH208

Project No. BRM-21010864-C0 | Drawing No. 9

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

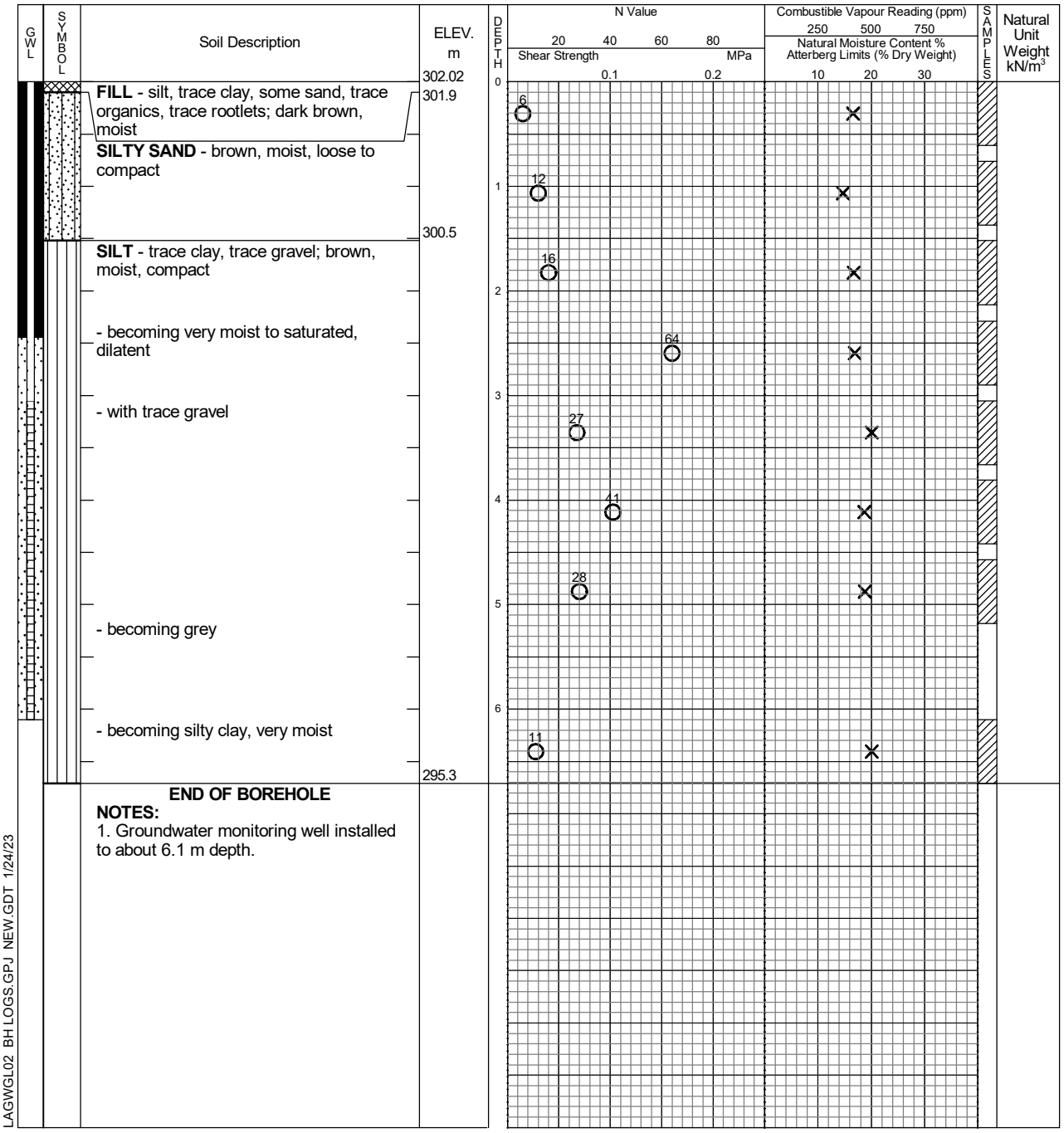
Date Drilled: January 13, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH209

Project No. BRM-21010864-C0 | Drawing No. 10

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

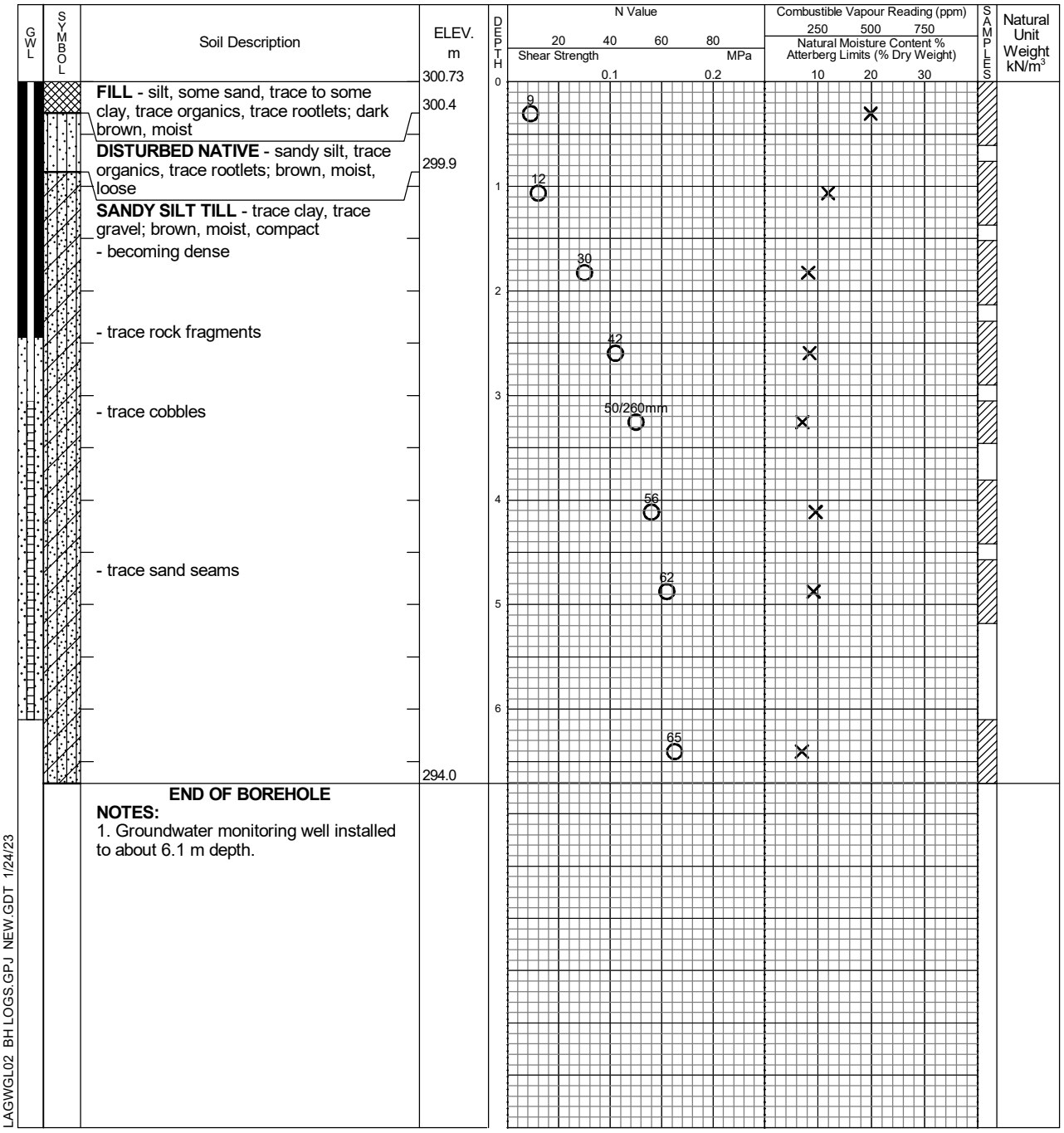
Date Drilled: January 10, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. Groundwater monitoring well installed to about 6.1 m depth.

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Log of BH210

Project No. BRM-21010864-C0 Drawing No. 11

Project: Hydrogeological Investigation Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

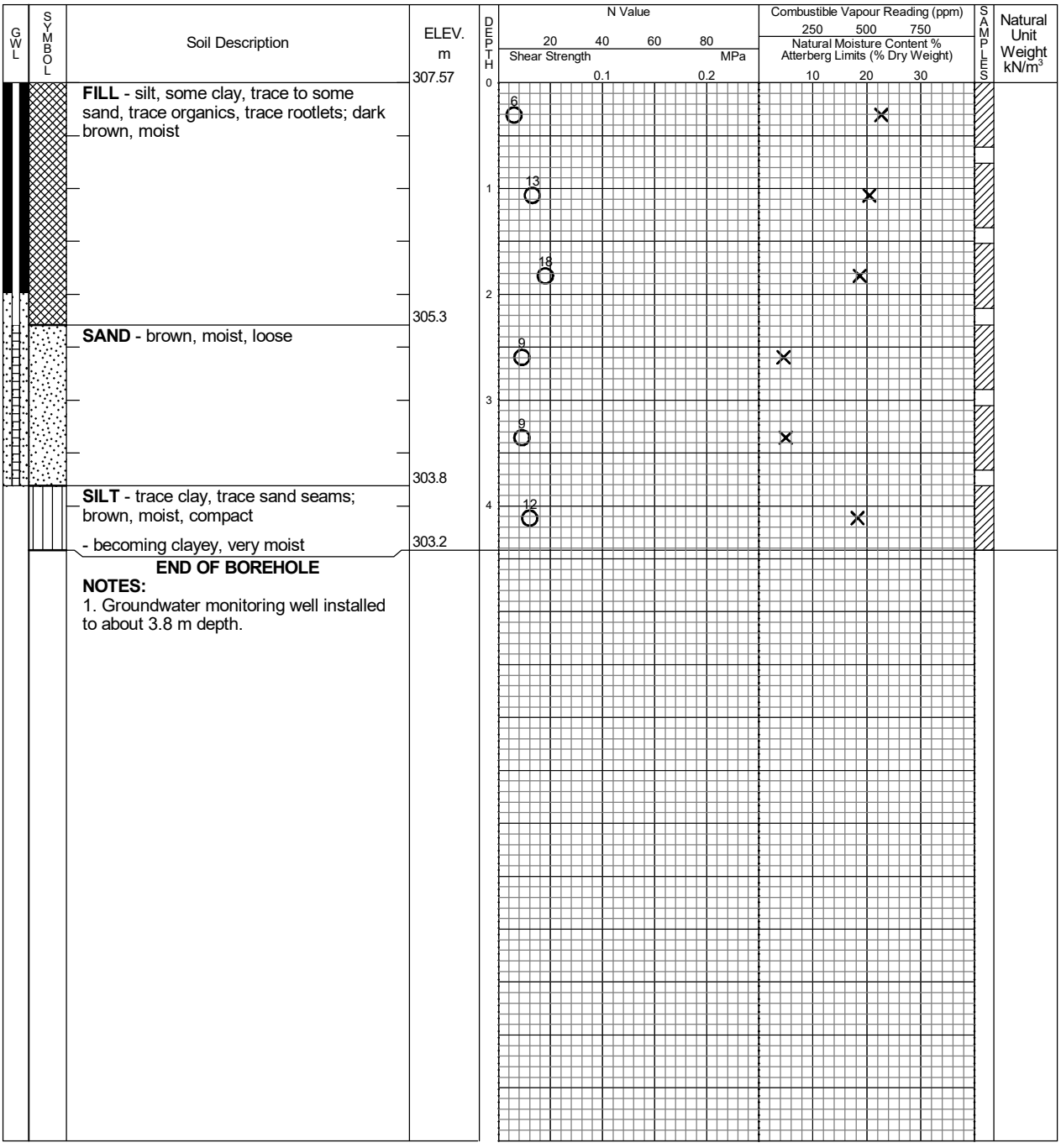
Date Drilled: January 10, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



NOTES:
1. Groundwater monitoring well installed to about 3.8 m depth.

LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH211

Project No. BRM-21010864-C0 | Drawing No. 12

Project: Hydrogeological Investigation | Sheet No. 1 of 1

Location: 15450 Woodbine Avenue, Stouffville, Ontario

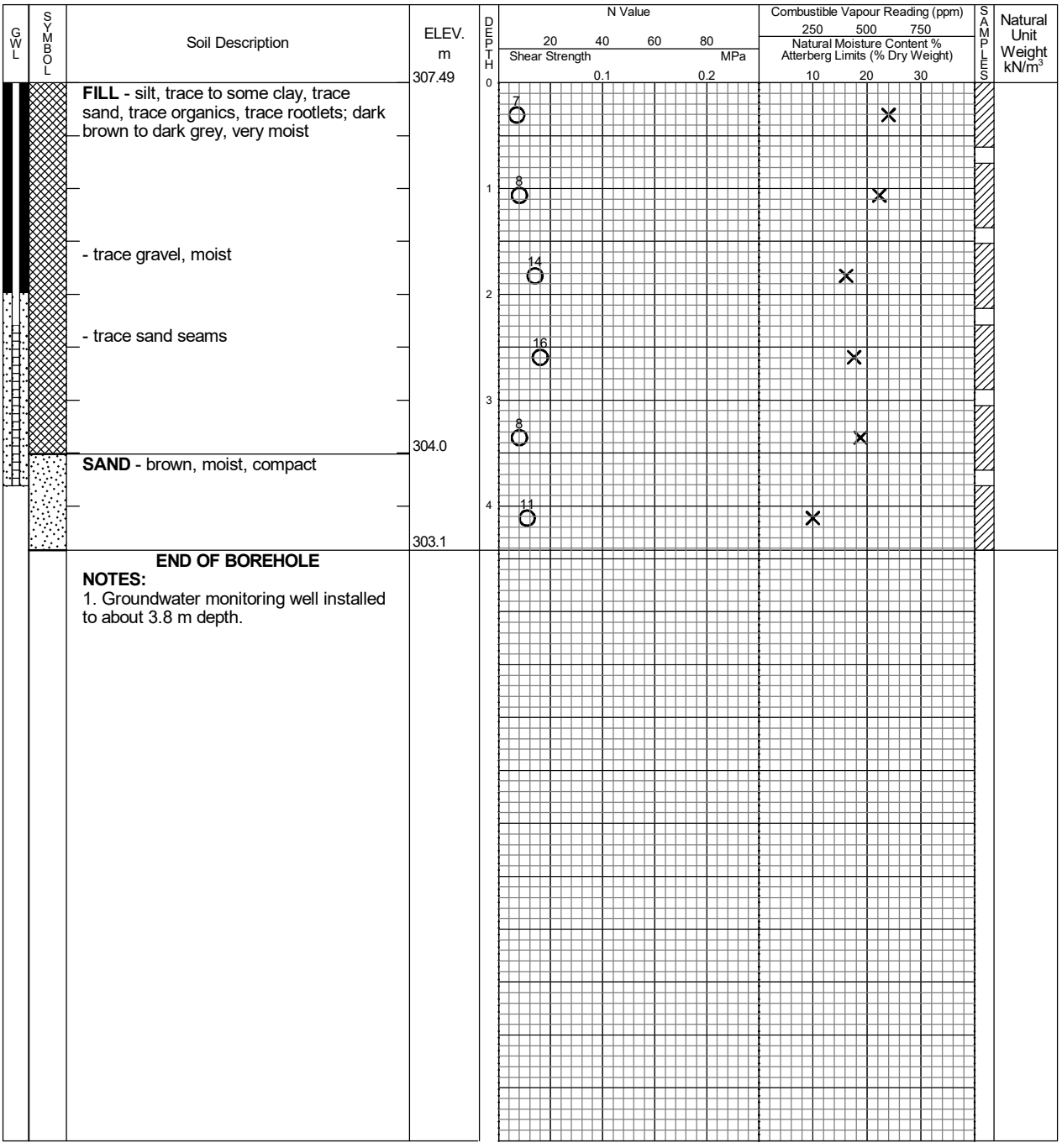
Date Drilled: January 10, 2023

Drill Type: CME 75 Track

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BH LOGS.GPJ NEW.GDT 1/24/23

Time	Water Level (m)	Depth to Cave (m)
On completion	Dry	

Log of BH-301

Project No. BRM-21010864-D0 | Drawing No. 1

Project: Phase Two Environmental Site Assessment | Sheet No. 1 of 1

Location: 15450 Woodbine Ave, Stouffville, Ontario

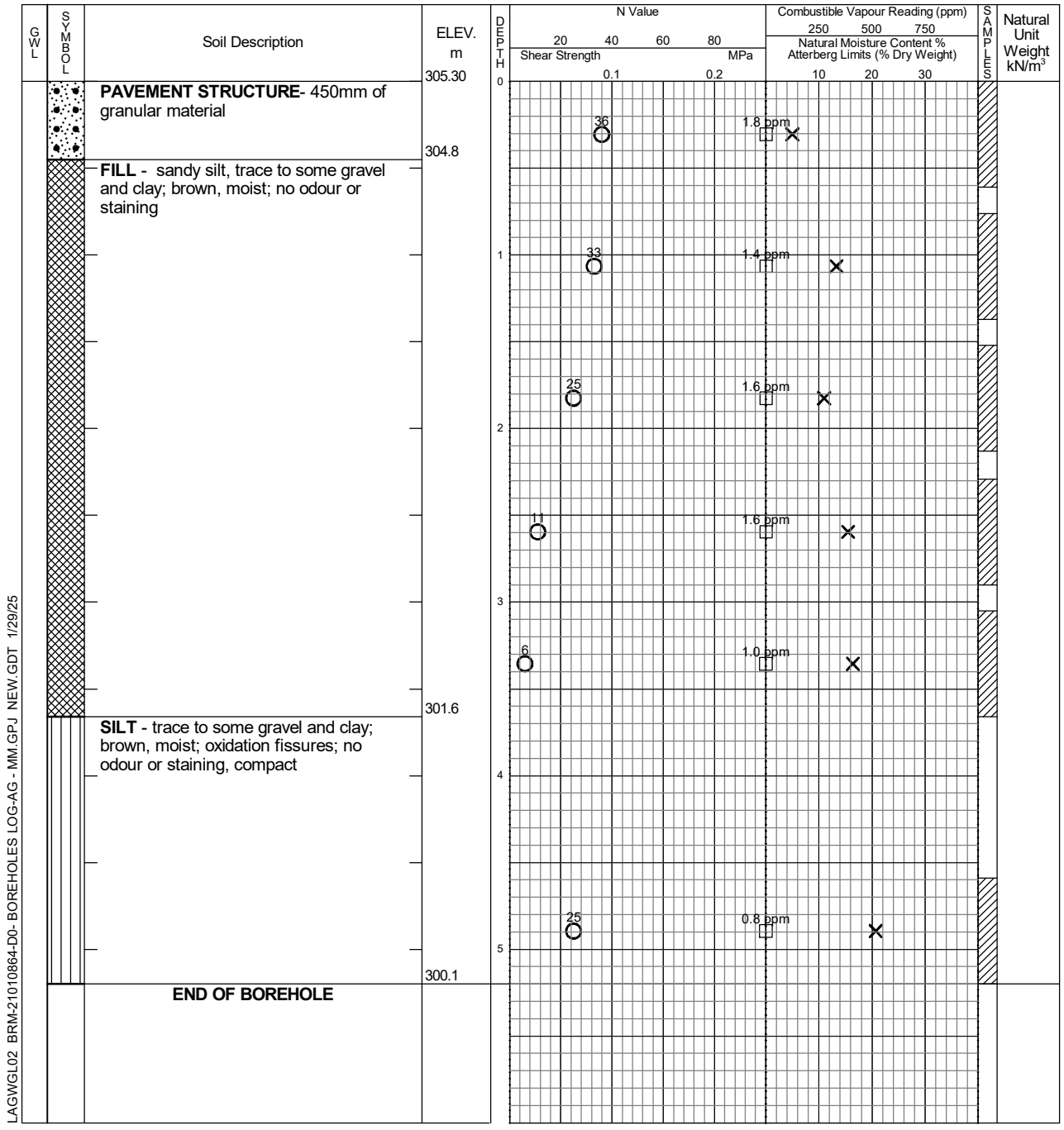
Date Drilled: December 5, 2024

Drill Type: CME55

Datum: Geodetic

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

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



LAGWGL02 BRM-21010864-D0- BOREHOLES LOG-AG - MM.GPJ NEW.GDT 1/29/25

Time	Water Level (m)	Depth to Cave (m)
On Completion	DRY	(Open)

Log of BH-302

Project No. BRM-21010864-D0 Drawing No. 2

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 1

Location: 15450 Woodbine Ave, Stouffville, Ontario

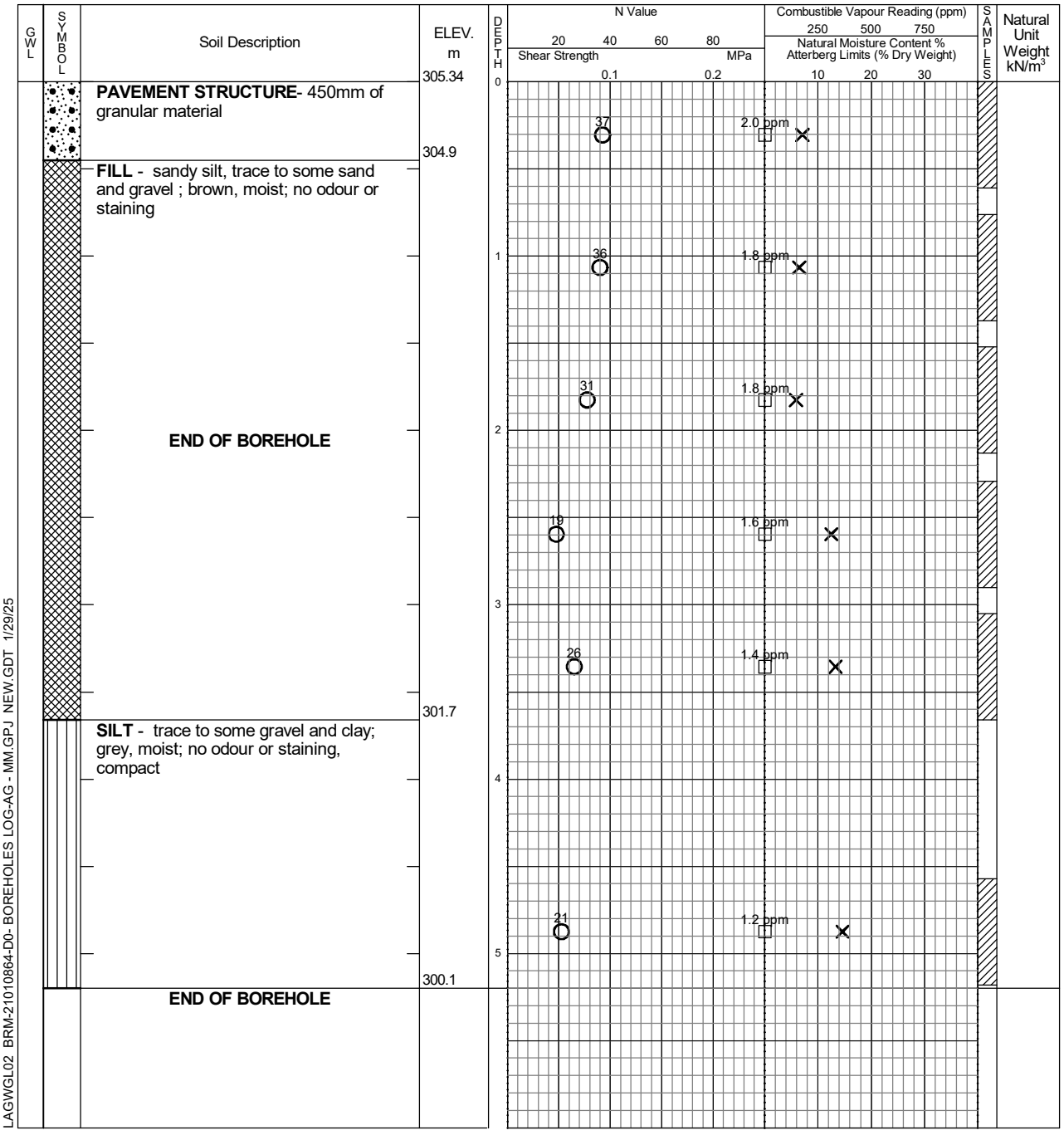
Date Drilled: December 5, 2024

Drill Type: CME55

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BRM-21010864-D0- BOREHOLES LOG-AG - MM.GPJ NEW.GDT 1/29/25

Time	Water Level (m)	Depth to Cave (m)
On Completion	DRY	(Open)

Log of BH-303

Project No. BRM-21010864-D0 Drawing No. 3

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 1

Location: 15450 Woodbine Ave, Stouffville, Ontario

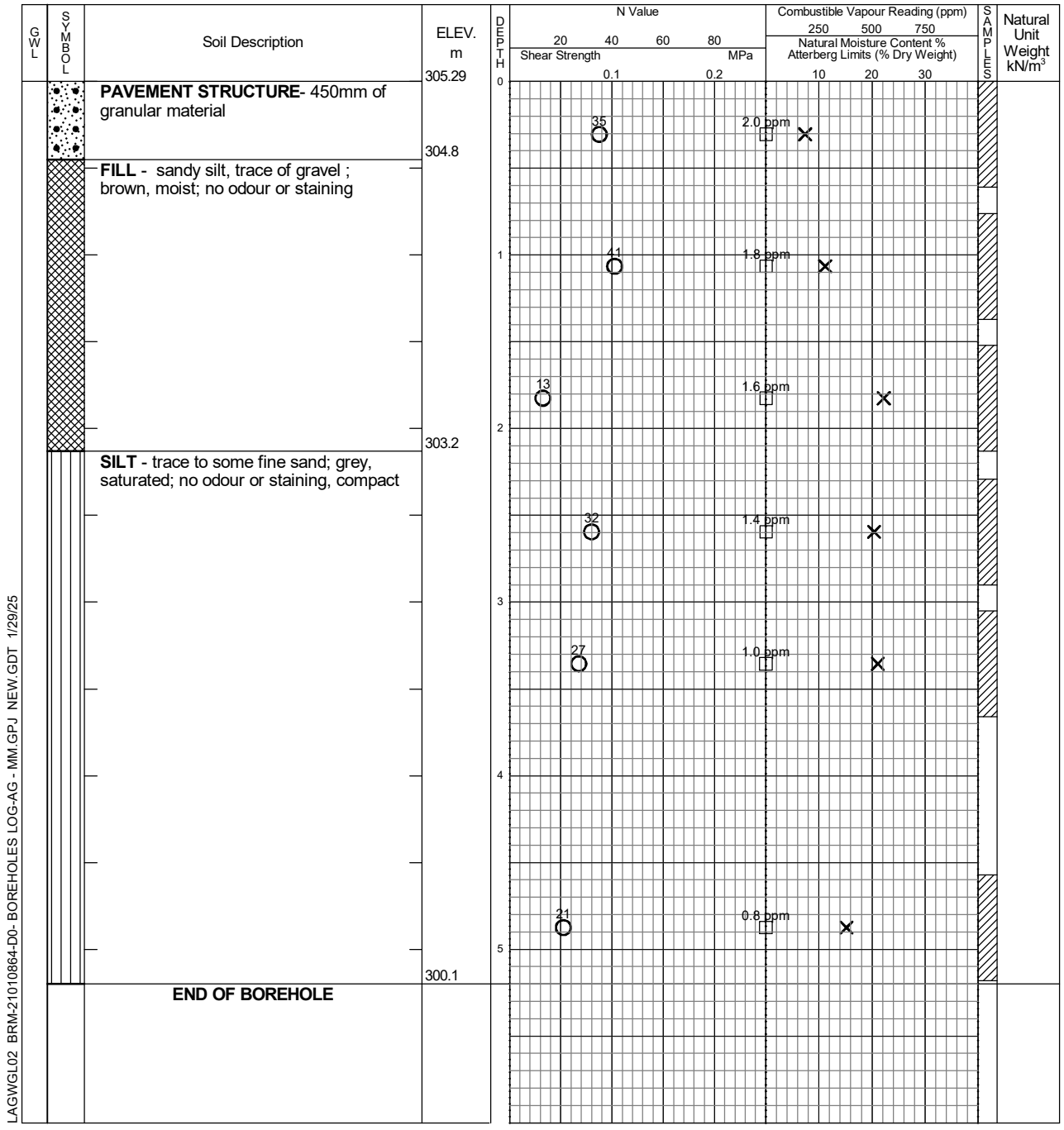
Date Drilled: December 5, 2024

Drill Type: CME55

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BRM-21010864-D0- BOREHOLES LOG-AG - MM.GPJ NEW.GDT 1/29/25

Time	Water Level (m)	Depth to Cave (m)
On Completion	DRY	(Open)

Log of BH-304

Project No. BRM-21010864-D0 | Drawing No. 4

Project: Phase Two Environmental Site Assessment | Sheet No. 1 of 1

Location: 15450 Woodbine Ave, Stouffville, Ontario

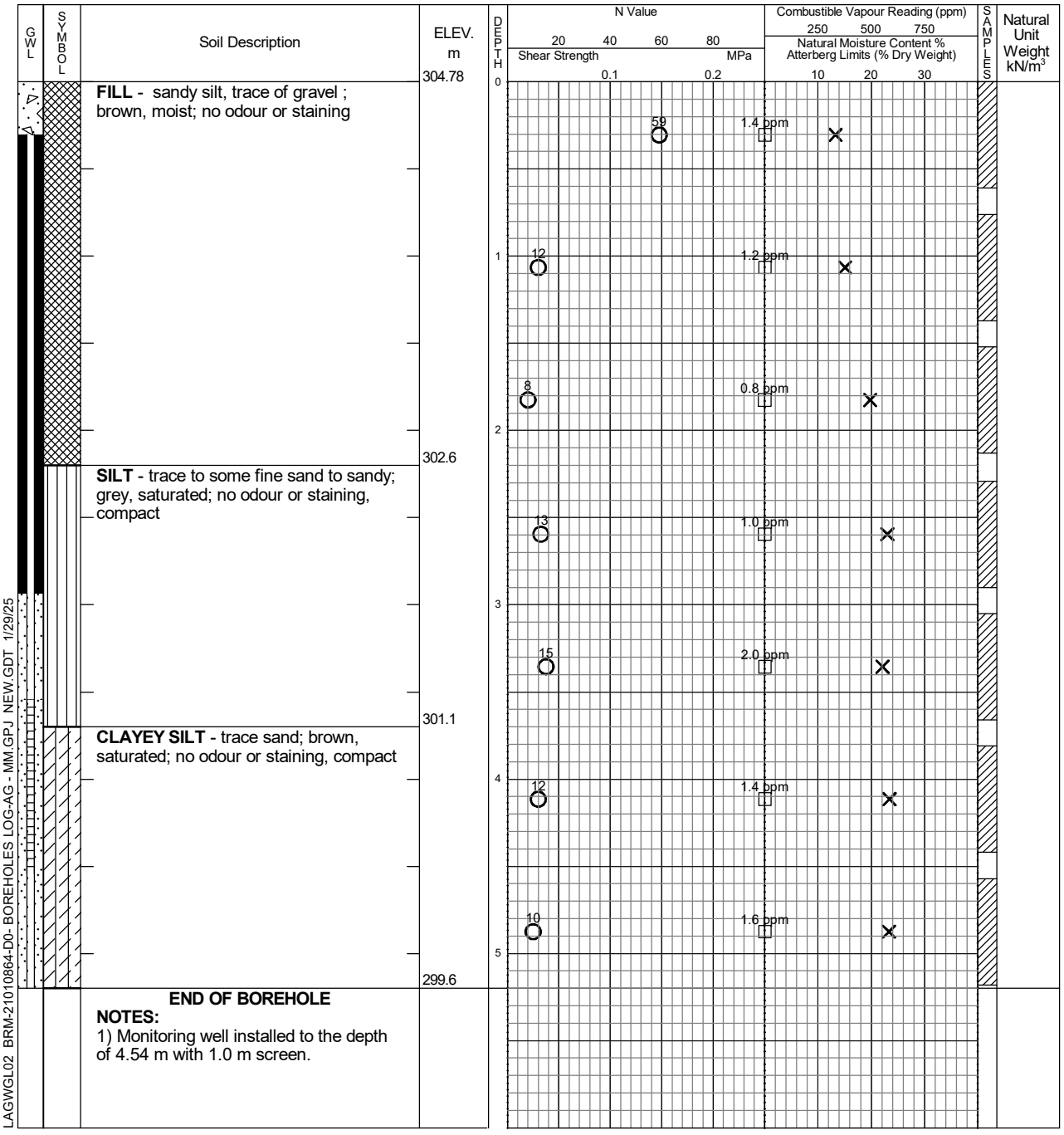
Date Drilled: December 5, 2024

Drill Type: CME55

Datum: Geodetic

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

Combustible Vapour Reading | Natural Moisture | Plastic and Liquid Limit | Undrained Triaxial at % Strain at Failure | Penetrometer



LAGWGL02 BRM-21010864-D0- BOREHOLES LOG-AG - MM.GPJ NEW.GDT 1/29/25

Time	Water Level (m)	Depth to Cave (m)
On Completion	DRY	(Open)
December 9, 2024	DRY	
December 10, 2024	3.68	

Log of BH-305

Project No. BRM-21010864-D0

Drawing No. 5

Project: Phase Two Environmental Site Assessment

Sheet No. 1 of 1

Location: 15450 Woodbine Ave, Stouffville, Ontario

Date Drilled: December 5, 2024

Drill Type: CME55

Datum: Geodetic

Auger Sample

SPT (N) Value

Dynamic Cone Test

Shelby Tube

Field Vane Test (S)

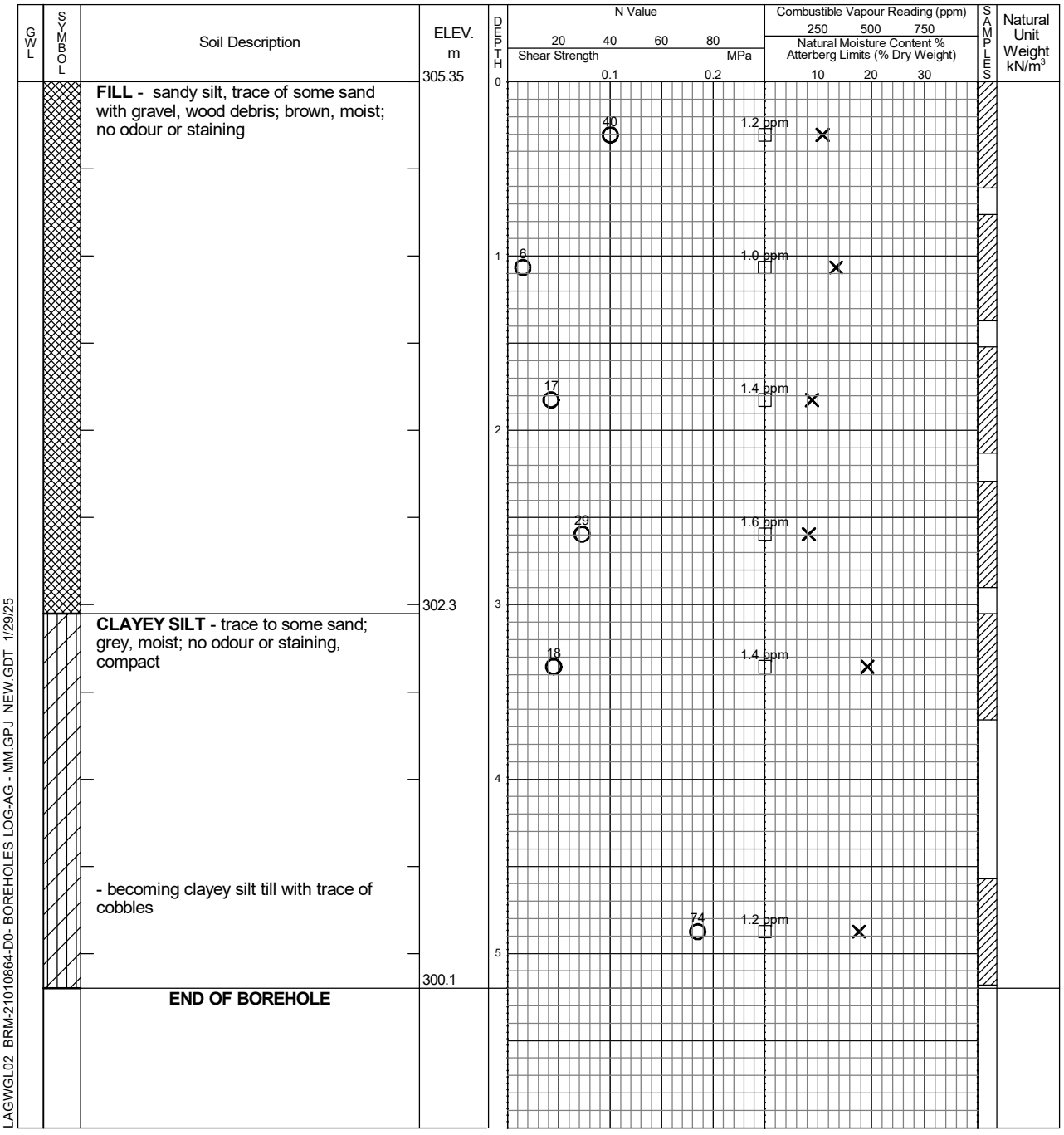
Combustible Vapour Reading

Natural Moisture

Plastic and Liquid Limit

Undrained Triaxial at % Strain at Failure

Penetrometer



LAGWGL02 BRM-21010864-D0- BOREHOLES LOG-AG - MM.GPJ NEW.GDT 1/29/25

Time	Water Level (m)	Depth to Cave (m)
On Completion	DRY	(Open)

Log of BH-306

Project No. BRM-21010864-D0 Drawing No. 6

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 1

Location: 15450 Woodbine Ave, Stouffville, Ontario

Date Drilled: December 5, 2024

Drill Type: CME55

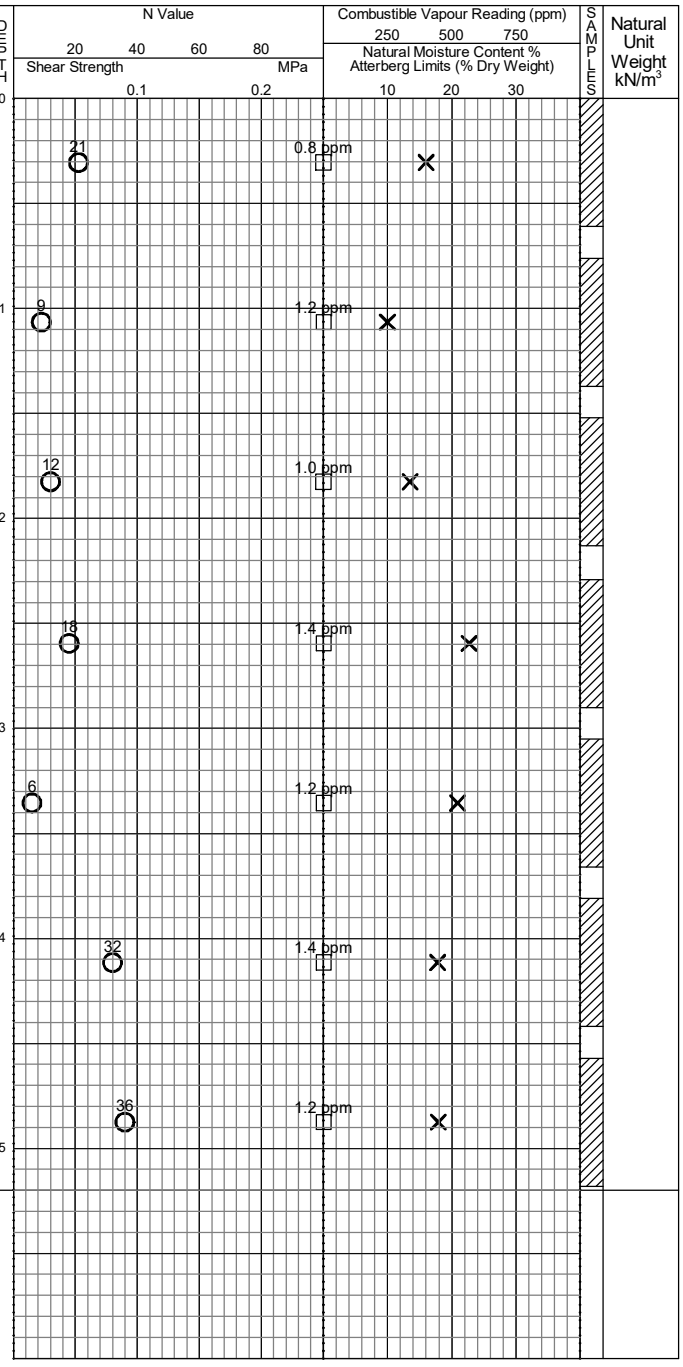
Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m
		FILL - sandy silt with topsoil inclusions, trace to some sand and gravel; brown, moist; no odour or staining	304.96
		- grey sand	
		CLAYEY SILT TILL - trace of gravel; grey, saturated; no odour or staining, compact	302.8
		SILT - some clay, trace sand and gravel, brown, saturated; no odour or staining, dense	301.3
		END OF BOREHOLE	299.8

NOTES:
1) Monitoring well installed to the depth of 4.47 m with 1.0 m screen.



Natural Unit Weight kN/m³

Time	Water Level (m)	Depth to Cave (m)
On Completion	DRY	(Open)
December 9, 2024	2.58	
December 10, 2024	2.83	

Log of BH-307

Project No. BRM-21010864-D0 Drawing No. 7

Project: Phase Two Environmental Site Assessment Sheet No. 1 of 1

Location: 15450 Woodbine Ave, Stouffville, Ontario

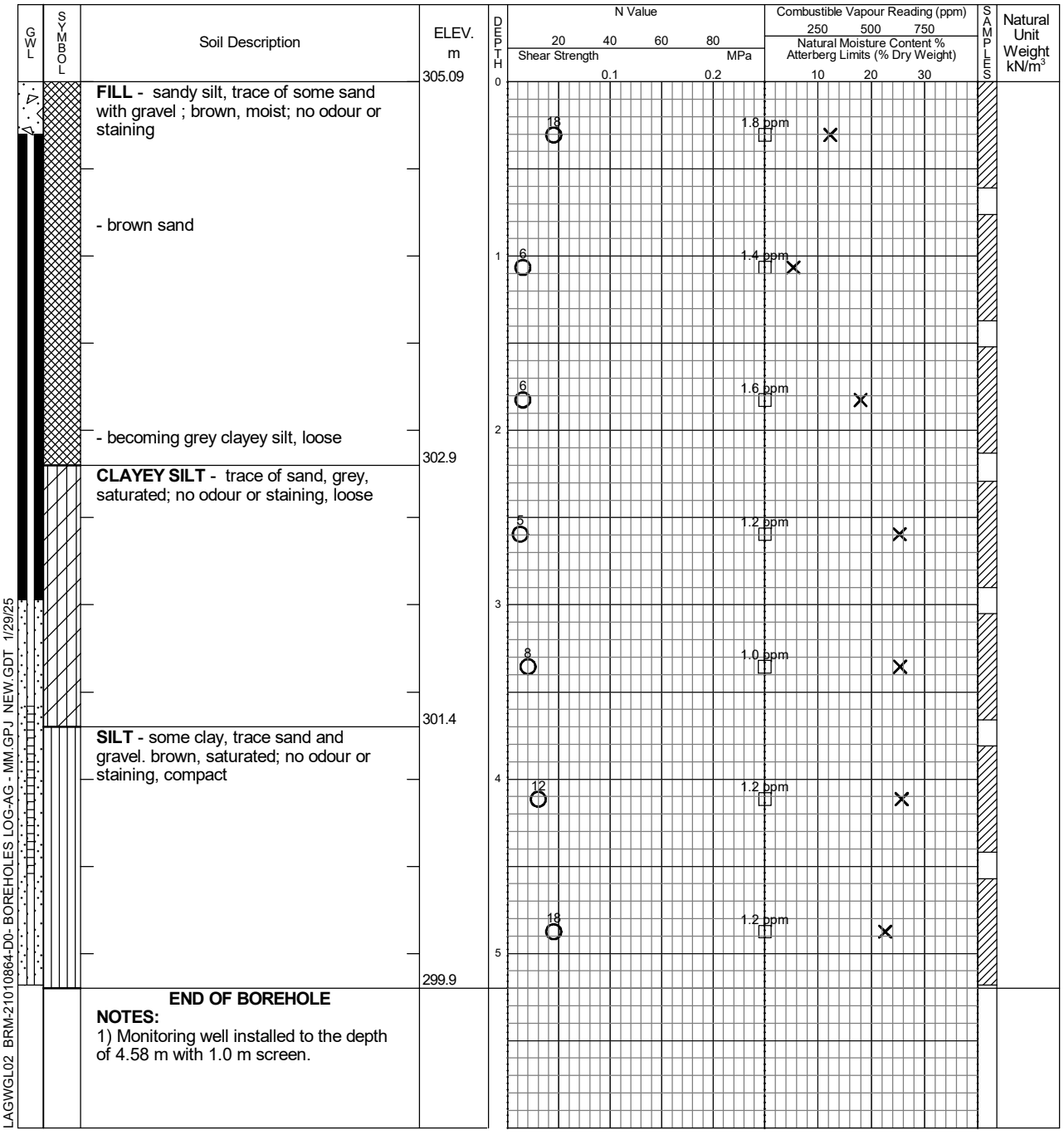
Date Drilled: December 5, 2024

Drill Type: CME55

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 BRM-21010864-D0- BOREHOLES LOG-AG - MM.GPJ NEW.GDT 1/29/25

Time	Water Level (m)	Depth to Cave (m)
On Completion	3.97	(Open)
December 9, 2024	2.78	
December 10, 2024	2.76	

Log of OW1

Project No. GTR-21010884-C1 | Drawing No. 2

Project: Hydrogeological Investigation | Sheet No. 1 of 4

Location: 15450 Woodbine Ave, Stouffville 15450 Woodbine Ave, Stouffville

Date Drilled: April 26, 2024

Drill Type: Versa 1 - Mud Rotary

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
		Native Silts - Sand and Gravel Native sands and gravel on top of sand with silt and some clay Brown Some construction fill on top	303.98	0
		Silty Clay / Clayey Silts some pebbles, trace sands, colour changing from brown to grey	299.4	4.58
		Sand and Gravel Medium fine sand with gravel, trace silts and clays, colour change to Brown	294.8	9.18
		Sandy Clay Softer clay with some sands and gravel bits, grey to brown	290.3	13.68
		Clay Hard clay, trace sand / silt, grey	285.7	18.28

N Value: 20 40 60 80
Shear Strength: 0.1 MPa 0.2
Combustible Vapour Reading (ppm): 250 500 750
Natural Moisture Content % Atterberg Limits (% Dry Weight): 10 20 30
SAMPLES
Natural Unit Weight kN/m³

LAGWGL02 DRAFT BH LOG _ 15450 WOODBINE AVE - PW APRIL 29 2024 - R.GPJ NEW.GDT 11/5/24

Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
On completion	43.54	well
May 22, 2024	43.18	well
May 24, 2024	43.24	well
September 18, 2024	46.30	well
October 1, 2024	45.99	well

Log of OW1

Project No. GTR-21010884-C1 Drawing No. 2

Project: Hydrogeological Investigation Sheet No. 2 of 4

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (MPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Weight kN/m³
			283.98	20	20 40 60 80; Shear Strength 0.1 0.2 MPa	250 500 750; 10 20 30		
				21				
				22				
				23				
				24				
				25				
				26				
				27				
				28				
				29				
				30				
				31				
			272.0	32				
		Silty Sand Fine silt to silty sand, silts to fine to recover sample with mud rotary,		33				
				34				
				35				
				36				
			267.4	37				
		Clay Hard grey clay some silts present at 45.72m to 48.77m, brown, soft - hard		38				
				39				
				40				
				41				
				42				
				43				
				44				

LAGWGL02 DRAFT BH LOG _ 15450 WOODBINE AVE - PW APRIL 29 2024 - R.GPJ NEW.GDT 11/5/24

Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
On completion	43.54	well
May 22, 2024	43.18	well
May 24, 2024	43.24	well
September 18, 2024	46.30	well
October 1, 2024	45.99	well

Log of OW1

Project No. GTR-21010884-C1 Drawing No. 2

Project: Hydrogeological Investigation Sheet No. 3 of 4

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (MPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Weight kN/m³
			259.98	44	N Value: 20 40 60 80; Shear Strength: 0.1 0.2 MPa	Combustible Vapour Reading (ppm): 250 500 750; Natural Moisture Content % / Atterberg Limits (% Dry Weight): 10 20 30		
				45				
				46				
				47				
				48				
			255.2	49				
		Clay / Silty Clay Grey, clay and silt recovered in samples, hard		50				
				51				
				52				
				53				
				54				
				55				
				56				
			247.6	57				
		Silty Sand And Gravel medium to fine sands and silt with gravel Clay still present throughout the samples, Hard - Grey Less fine silts and clays occur at appoximatly 69.80m and continue to decrease to 78.94m.		58				
				59				
				60				
				61				
				62				
				63				
				64				
				65				
				66				
				67				
				68				

LAGWGL02 DRAFT BH LOG _ 15450 WOODBINE AVE - PW APRIL 29 2024 - R.GPJ NEW.GDT 11/5/24

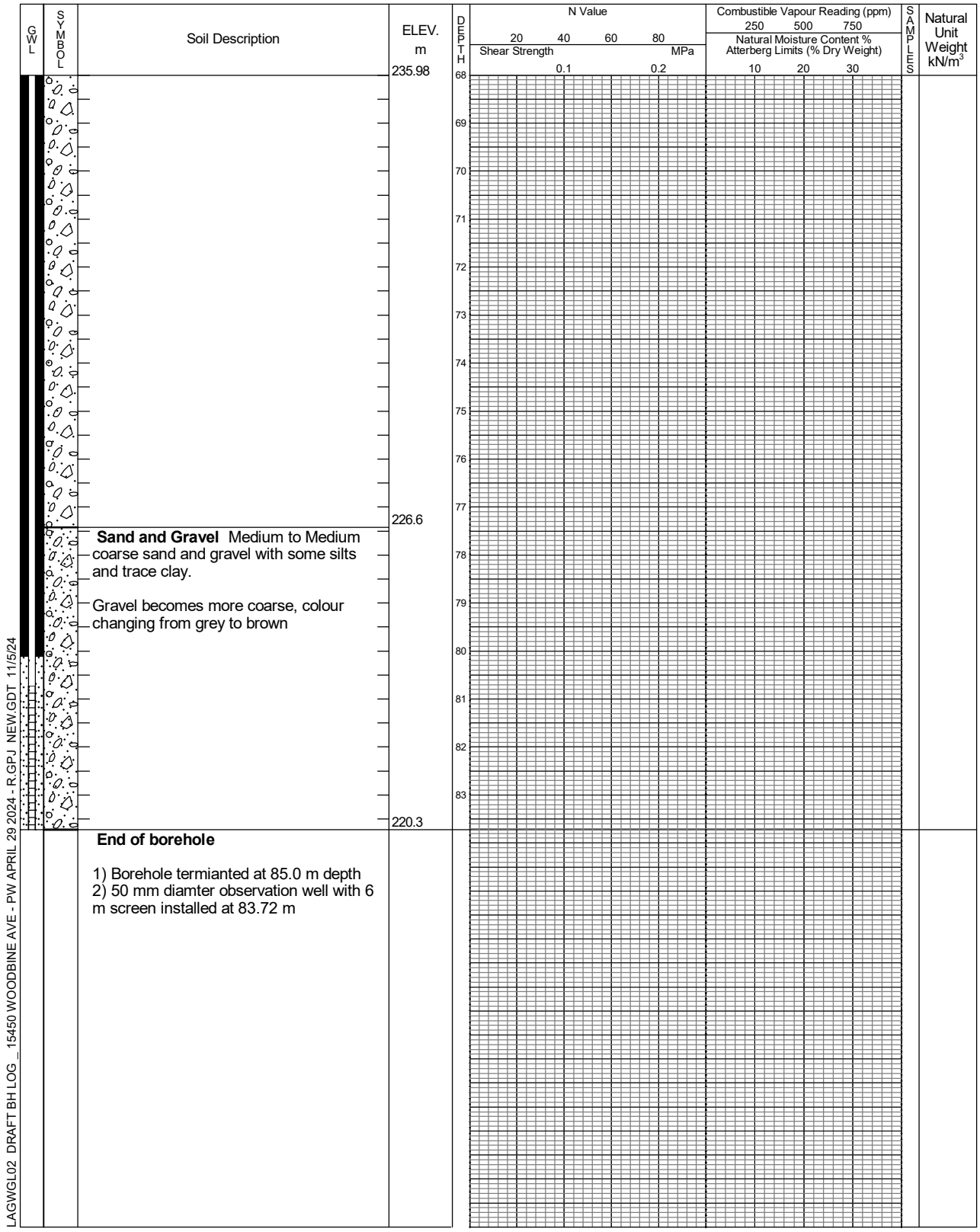
Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
On completion	43.54	well
May 22, 2024	43.18	well
May 24, 2024	43.24	well
September 18, 2024	46.30	well
October 1, 2024	45.99	well

Log of OW1

Project No. GTR-21010884-C1 Drawing No. 2

Project: Hydrogeological Investigation Sheet No. 4 of 4



Time	Water Level (m)	Depth to Cave (m)
On completion	43.54	well
May 22, 2024	43.18	well
May 24, 2024	43.24	well
September 18, 2024	46.30	well
October 1, 2024	45.99	well

Log of OW2

Project No. GTR-21010884-C1 | Drawing No. 3

Project: Hydrogeological Investigation | Sheet No. 1 of 4

Location: 15450 Woodbine Ave, Stouffville 15450 Woodbine Ave, Stouffville

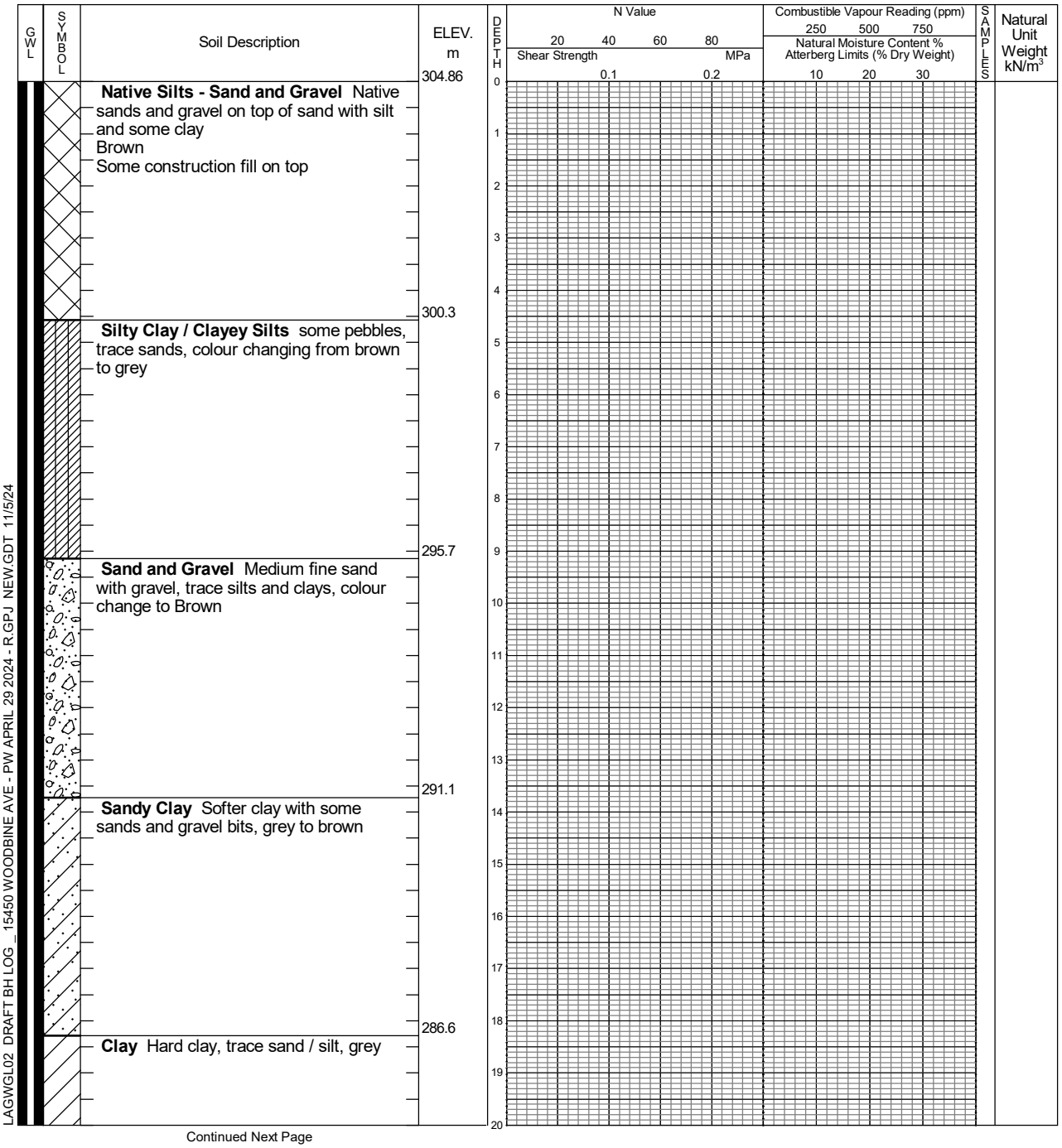
Date Drilled: May 16, 2024

Drill Type: Versa 1 - Mud Rotary

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



LAGWGL02 DRAFT BH LOG _ 15450 WOODBINE AVE - PW APRIL 29 2024 - R.GPJ NEW.GDT 11/5/24

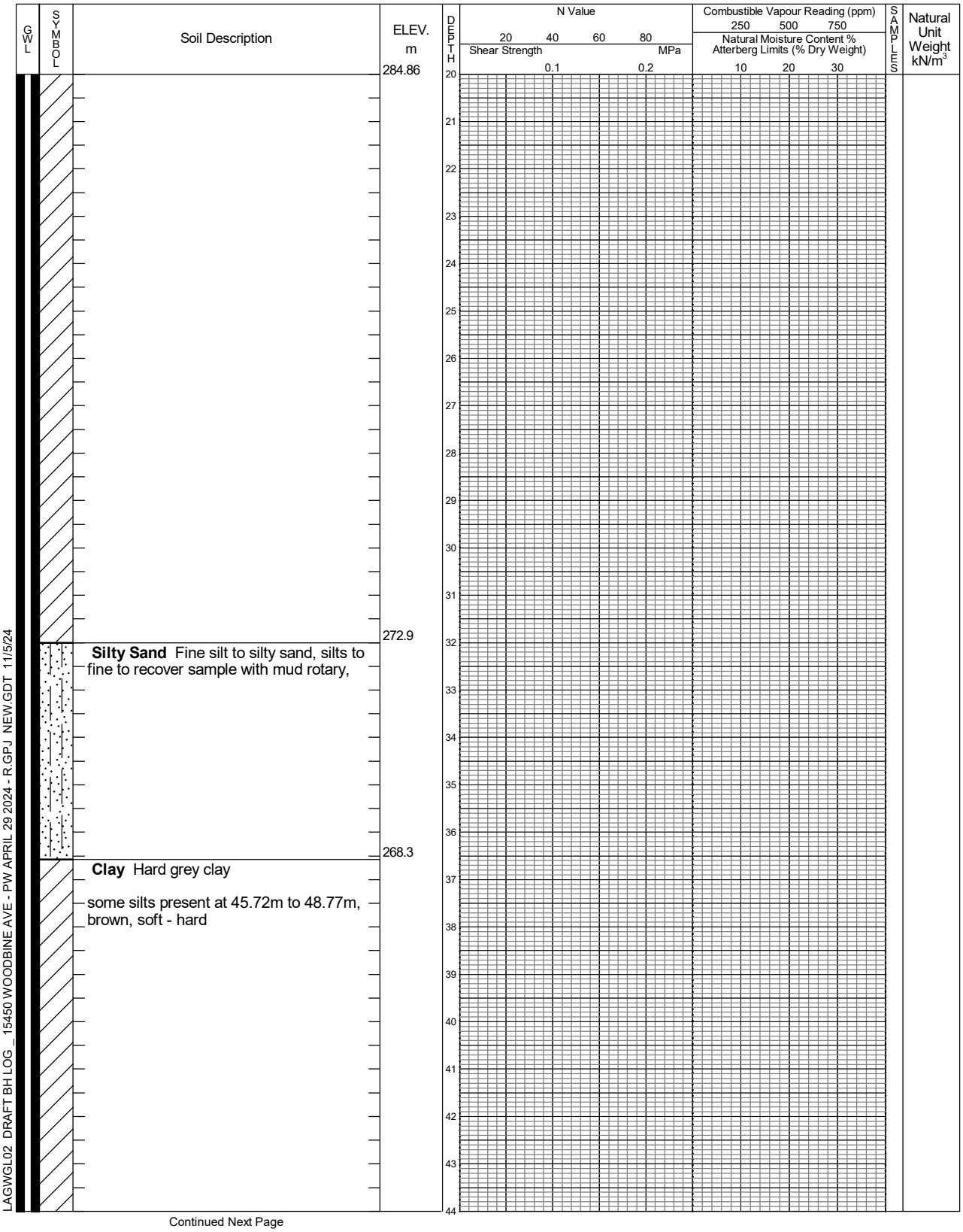
Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.53	well
May 24, 2024	43.56	well
September 18, 2024	45.87	well
October 1, 2024	45.59	well

Log of OW2

Project No. GTR-21010884-C1 Drawing No. 3

Project: Hydrogeological Investigation Sheet No. 2 of 4



Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.53	well
May 24, 2024	43.56	well
September 18, 2024	45.87	well
October 1, 2024	45.59	well

Log of OW2

Project No. GTR-21010884-C1 Drawing No. 3

Project: Hydrogeological Investigation Sheet No. 3 of 4

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (MPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Weight kN/m³
			260.86	44	20 40 60 80; Shear Strength 0.1 0.2 MPa	250 500 750; 10 20 30		
				45				
				46				
				47				
				48				
			256.1	49				
		Clay / Silty Clay Grey, clay and silt recovered in samples, hard		50				
				51				
				52				
				53				
				54				
				55				
				56				
			248.5	57				
		Silty Sand And Gravel medium to fine sands and silt with gravel Clay still present throughout the samples, Hard - Grey Less fine silts and clays occur at appoximatly 69.80m and continue to decrease to 78.94m.		58				
				59				
				60				
				61				
				62				
				63				
				64				
				65				
				66				
				67				
				68				

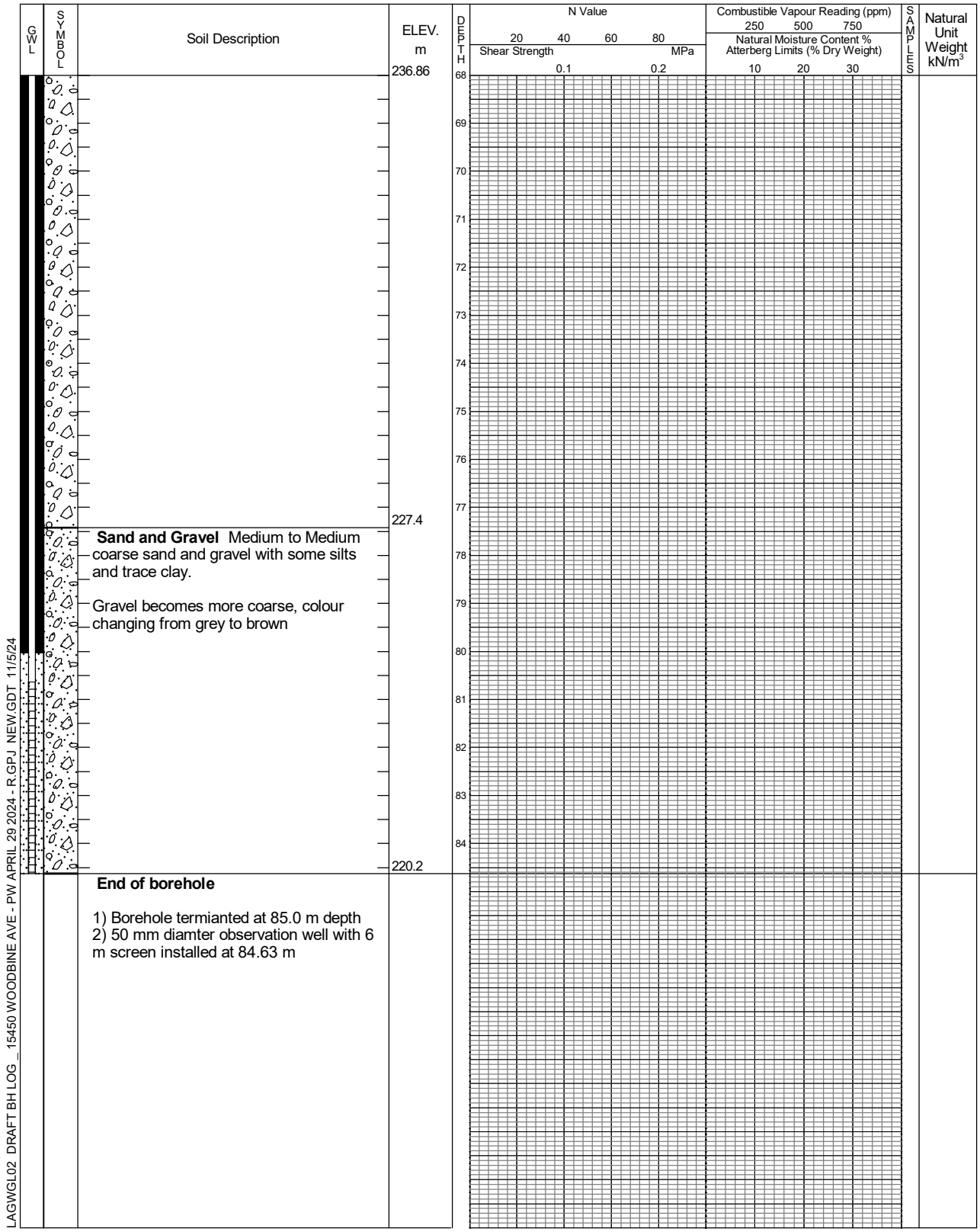
Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.53	well
May 24, 2024	43.56	well
September 18, 2024	45.87	well
October 1, 2024	45.59	well

Log of OW2

Project No. GTR-21010884-C1 Drawing No. 3

Project: Hydrogeological Investigation Sheet No. 4 of 4



Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.53	well
May 24, 2024	43.56	well
September 18, 2024	45.87	well
October 1, 2024	45.59	well

Log of PW

Project No. GTR-21010884-C1

Drawing No. 1

Project: Hydrogeological Investigation

Sheet No. 1 of 4

Location: 15450 Woodbine Ave, Stouffville 15450 Woodbine Ave, Stouffville

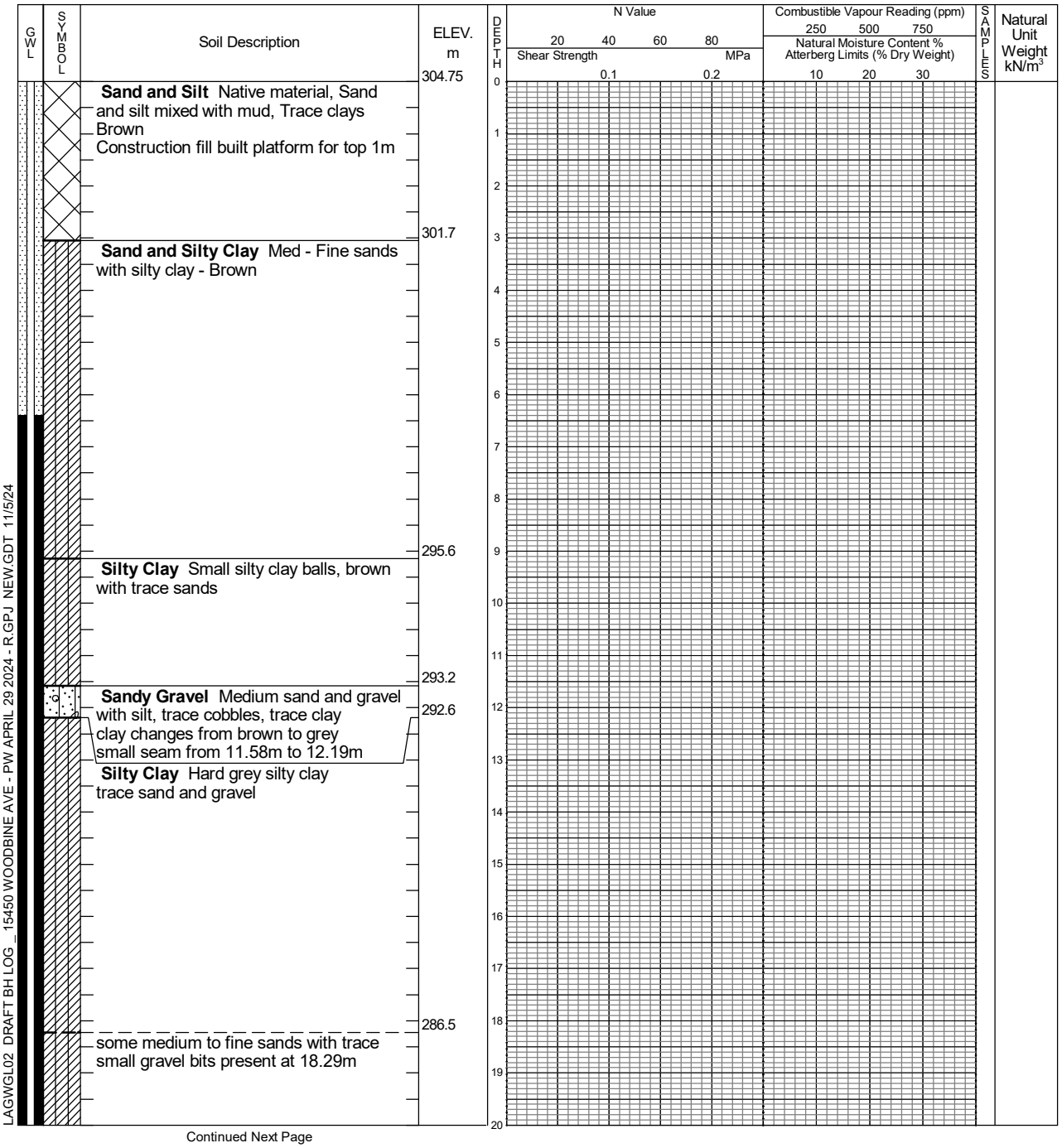
Date Drilled: May 8, 2024

Drill Type: Versa 1 - Mud Rotary

Datum: Geodetic

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

Combustible Vapour Reading
Natural Moisture
Plastic and Liquid Limit
Undrained Triaxial at % Strain at Failure
Penetrometer



Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.52	well
May 24, 2024	43.56	well
September 18, 2024	45.97	well
October 1, 2024	45.66	well

Log of PW

Project No. GTR-21010884-C1 Drawing No. 1

Project: Hydrogeological Investigation Sheet No. 2 of 4

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (MPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Weight kN/m³
			284.75	20	20 40 60 80; Shear Strength 0.1 0.2 MPa	250 500 750; 10 20 30		
				21				
				22				
				23				
				24				
				25				
				26				
				27				
				28				
				29				
				30				
				31				
				32				
				33				
				34				
				35				
				36				
				37				
				38				
				39				
			265.1	40				
		Clay with sand and gravel (medium sand with trace gravels)		41				
				42				
				43				
				44				

Continued Next Page

LAGWGL02 DRAFT BH LOG _ 15450 WOODBINE AVE - PW APRIL 29 2024 - R.GPJ NEW.GDT 11/5/24

Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.52	well
May 24, 2024	43.56	well
September 18, 2024	45.97	well
October 1, 2024	45.66	well

Log of PW

Project No. GTR-21010884-C1 Drawing No. 1

Project: Hydrogeological Investigation Sheet No. 3 of 4

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value / Shear Strength (MPa)	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	SAMPLES	Natural Unit Weight kN/m³
			260.75	44	20 40 60 80 / 0.1 0.2	250 500 750 / 10 20 30		
				45				
				46				
				47				
				48				
				49				
				50				
				51				
				52				
				53				
				54				
				55				
				56				
				57				
			246.8	58				
		Silty Sandy Clay silty sand with clay Hard grey clay some gravel present		59				
				60				
				61				
				62				
				63				
				64				
				65				
				66				
			237.7	67				
		Silty Clay Hard grey clay with sand, trace gravels		68				

Continued Next Page

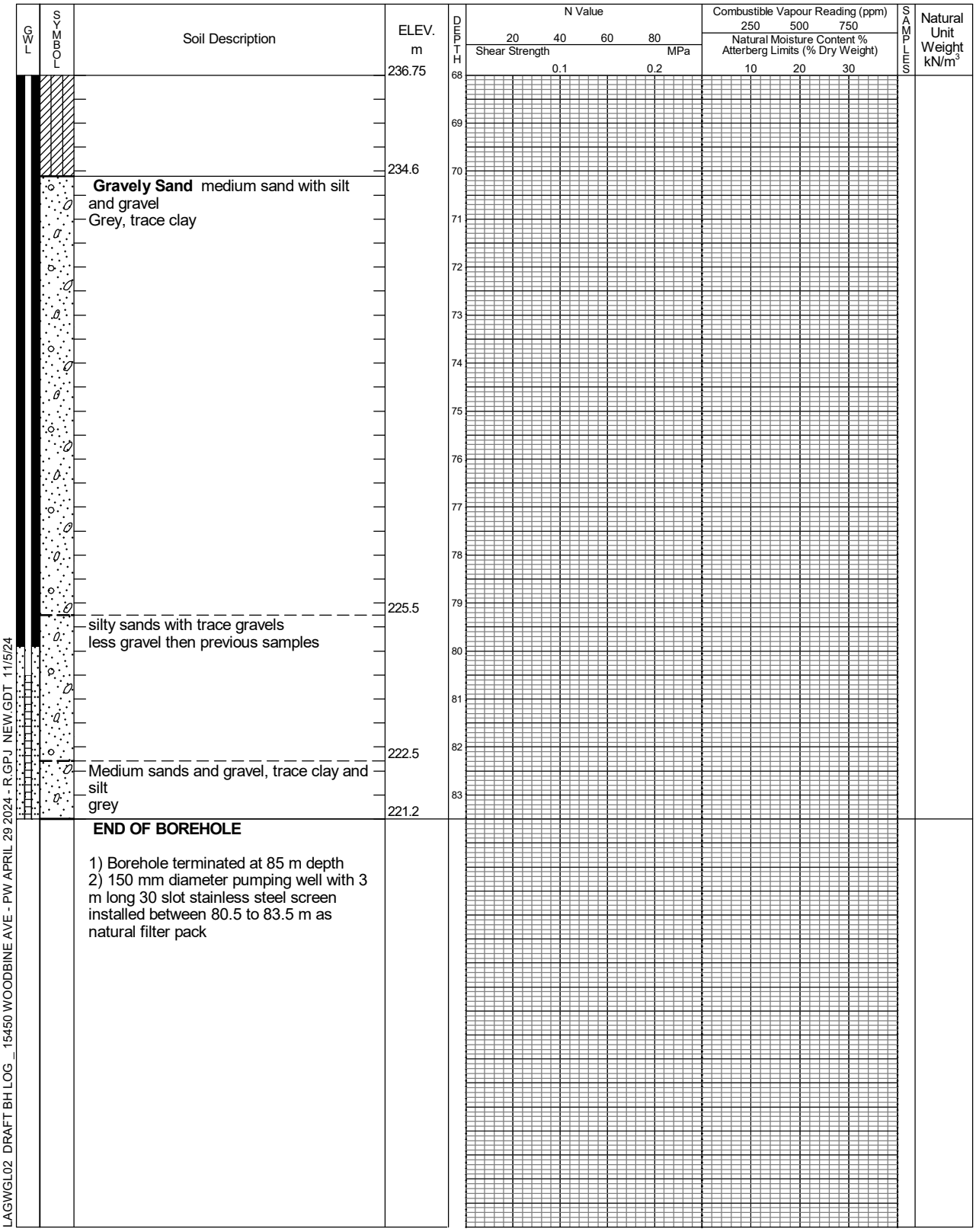
LAGWGL02 DRAFT BH LOG _ 15450 WOODBINE AVE - PW APRIL 29 2024 - R.GPJ NEW.GDT 11/5/24

Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.52	well
May 24, 2024	43.56	well
September 18, 2024	45.97	well
October 1, 2024	45.66	well

Log of PW

Project No. GTR-21010884-C1 Drawing No. 1

Project: Hydrogeological Investigation Sheet No. 4 of 4



Time	Water Level (m)	Depth to Cave (m)
On completion	44.5	well
May 22, 2024	43.52	well
May 24, 2024	43.56	well
September 18, 2024	45.97	well
October 1, 2024	45.66	well

exp Services Inc.
1595 Clark Boulevard, Brampton
Ontario, Canada, L6T 4V1
Telephone: (905) 793-9800
Fax: (905) 793-0641

Grain Size Analysis & Hydrometer Test Report

ST08

Sample Test No.: 462907-2 **Report No.:** 1 **Date Reported:** 17-Dec-24

Project No.: gtr-21010864-c1 10
Project Name: CO#3

Grain Size Proportion (%)

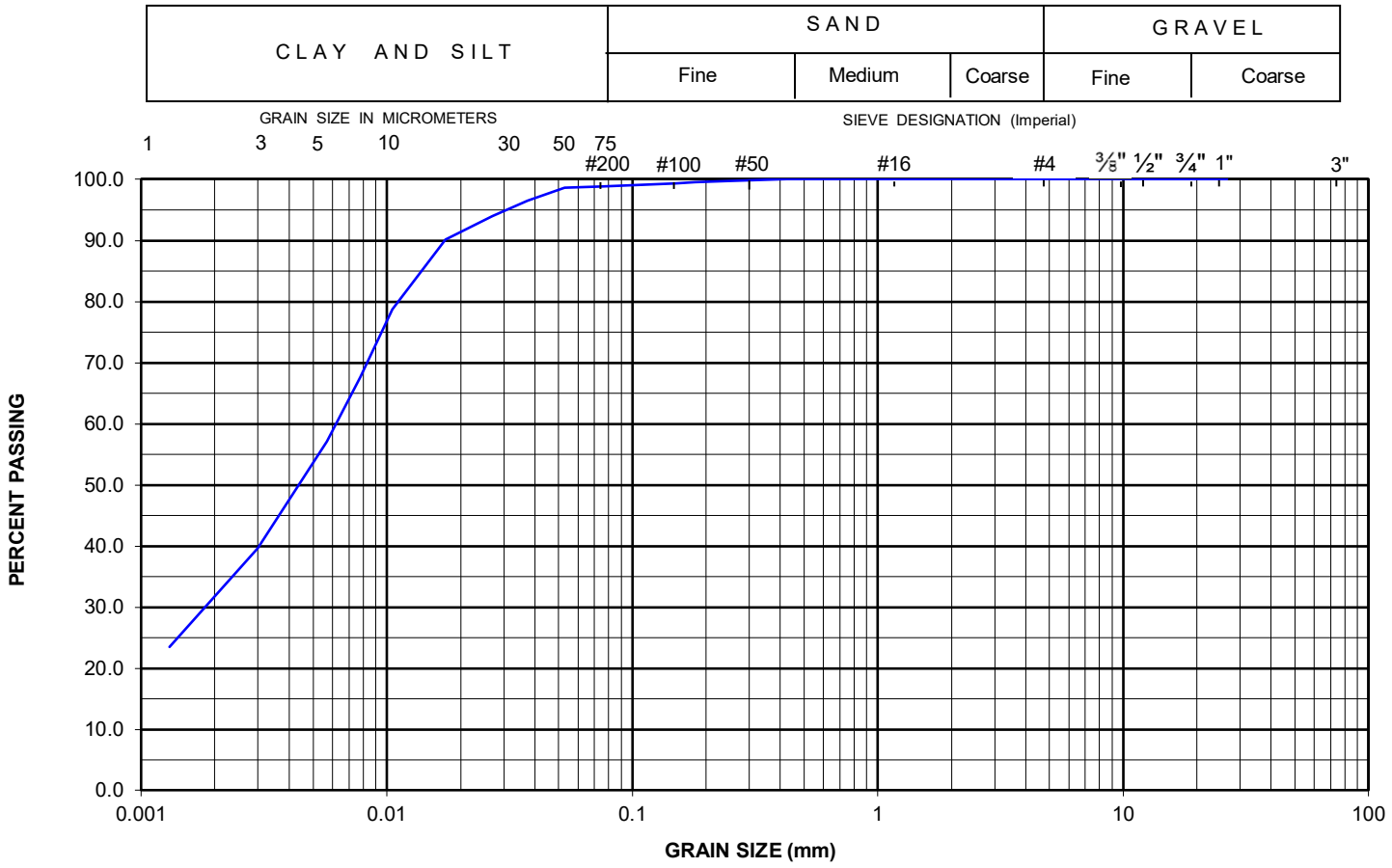
Gravel (> 4.75mm):	
Sand (> 75µm, < 4.75mm):	**1.2**
Silt (> 2µm), < 75µm):	**68.6**
Clay (< 2µm):	**30.2**
Total:	**100.0**

Sample Information

Location:	BH 304
Sample Method:	SS
Sample No.:	6
Depth:	3.8 - 4.4 m
Sample Description:	Clayey Silt, trace Sand; Brown
Sampled By:	A. G.
Sampling Date:	2024-12-05
Date Received:	2024-12-12
Client Sample ID:	
Comments:	

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
26.5	100.0	**0.0374**	96.6
22.4	100.0	**0.0269**	94.0
19	100.0	**0.0173**	90.2
16	100.0	**0.0105**	78.8
13.2	100.0	**0.0078**	67.7
12.5	100.0	**0.0057**	57.2
9.5	100.0	**0.0030**	39.7
6.7	100.0	**0.0013**	23.5
4.75	100.0		
2	100.0		
0.85	100.0		
0.425	100.0		
0.25	99.8		
0.18	99.6		
0.15	99.4		
0.075	98.8		
0.053	98.6		

UNIFIED SOIL CLASSIFICATION SYSTEM



Project Manager: Nataliya Tkach **Approved By:** *Original Signed By* **Date Approved:** 17-Dec-24
Arcadio Petrola,

exp Services Inc.
1595 Clark Boulevard, Brampton
Ontario, Canada, L6T 4V1
Telephone: (905) 793-9800
Fax: (905) 793-0641

Grain Size Analysis & Hydrometer Test Report

ST08

Sample Test No.: 462909-2 **Report No.:** 2 **Date Reported:** 17-Dec-24

Project No.: gtr-21010864-c1 10
Project Name: CO#3

Grain Size Proportion (%)

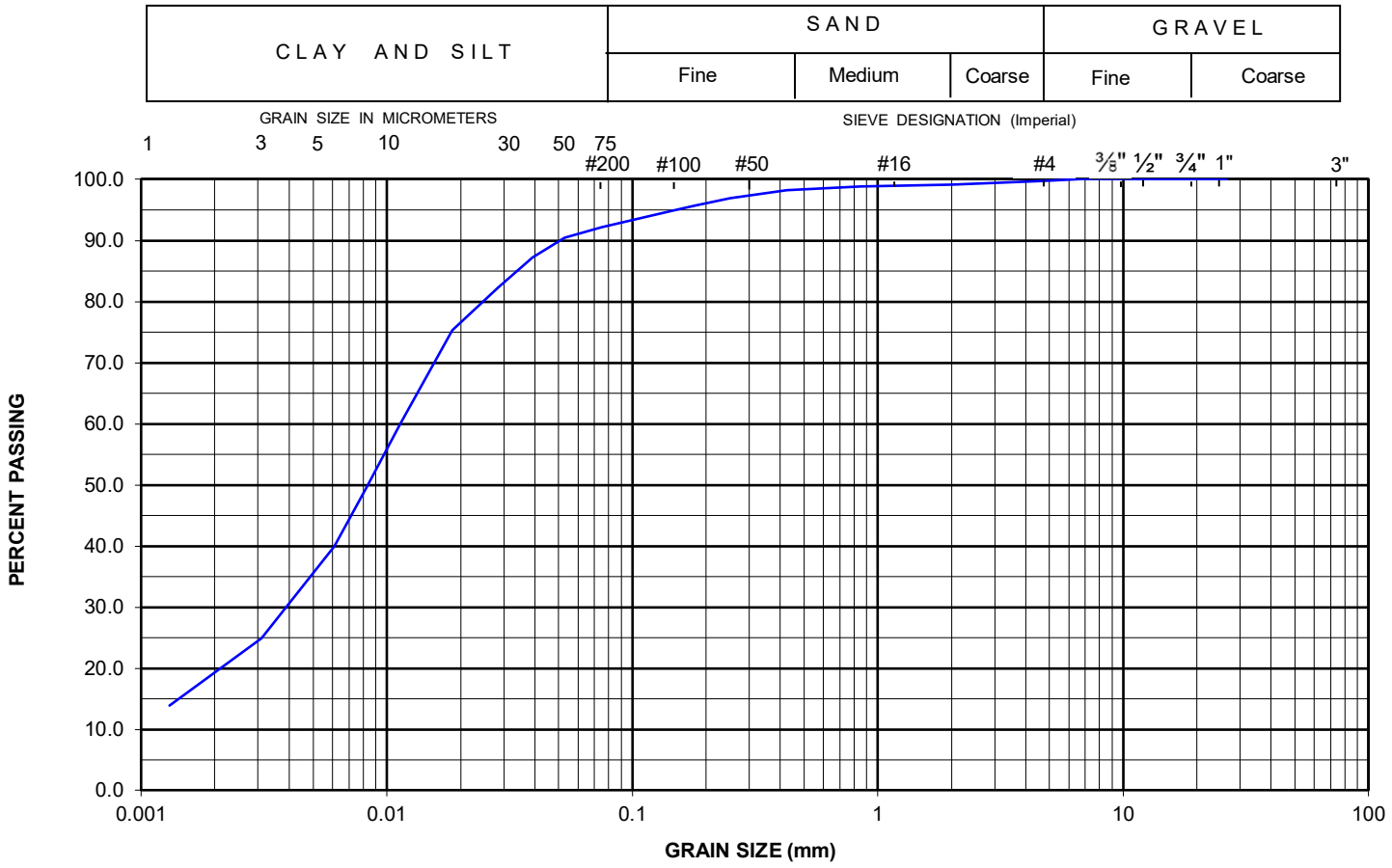
Gravel (> 4.75mm):	**0.3**
Sand (> 75µm, < 4.75mm):	**7.5**
Silt (> 2µm), < 75µm):	**74.0**
Clay (< 2µm):	**18.2**
Total:	**100.0**

Sample Information

Location:	BH 306
Sample Method:	SS
Sample No.:	6
Depth:	3.8 - 4.4 m
Sample Description:	Silt, some Clay, trace Sand and Gravel; Brown
Sampled By:	A. G.
Sampling Date:	2024-12-05
Date Received:	2024-12-12
Client Sample ID:	
Comments:	

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
26.5	100.0	**0.0284**	82.3
22.4	100.0	**0.0185**	75.3
19	100.0	**0.0113**	59.9
16	100.0	**0.0083**	49.8
13.2	100.0	**0.0061**	40.0
9.5	100.0	**0.0031**	24.9
6.7	100.0	**0.0013**	13.9
4.75	99.7		
2	99.2		
0.85	98.8		
0.425	98.3		
0.25	96.9		
0.18	95.8		
0.15	95.0		
0.075	92.2		
0.053	90.5		
0.0391	87.3		

UNIFIED SOIL CLASSIFICATION SYSTEM



Project Manager: Nataliya Tkach **Approved By:** *Original Signed By* **Date Approved:** 17-Dec-24
Arcadio Petrola,

exp Services Inc.
1595 Clark Boulevard, Brampton
Ontario, Canada, L6T 4V1
Telephone: (905) 793-9800
Fax: (905) 793-0641

Grain Size Analysis & Hydrometer Test Report

ST08

Sample Test No.: 462910-2 **Report No.:** 3 **Date Reported:** 17-Dec-24

Project No.: gtr-21010864-c1 10
Project Name: CO#3

Grain Size Proportion (%)

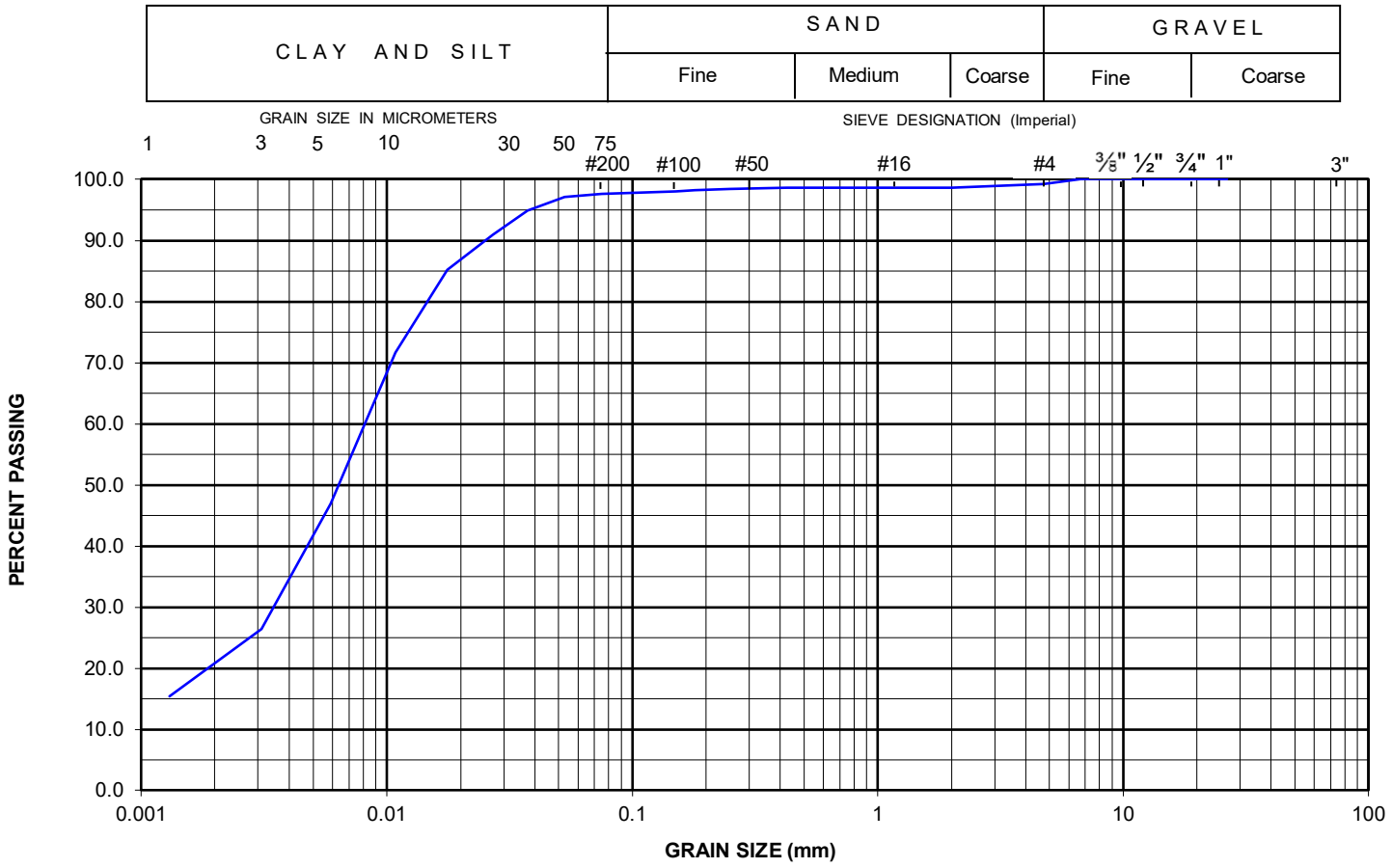
Gravel (> 4.75mm):	**0.7**
Sand (> 75µm, < 4.75mm):	**1.6**
Silt (> 2µm), < 75µm):	**78.0**
Clay (< 2µm):	**19.7**
Total:	**100.0**

Sample Information

Location: BH 307
Sample Method: SS
Sample No.: 6
Depth: 3.8 - 4.4 m
Sample Description: Silt, some Clay, trace Sand and Gravel; Brown
Sampled By: A. G.
Sampling Date: 2024-12-05
Date Received: 2024-12-12
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
26.5	100.0	**0.0375**	94.9
22.4	100.0	**0.0271**	91.0
19	100.0	**0.0176**	85.2
16	100.0	**0.0108**	71.7
13.2	100.0	**0.0080**	59.5
12.5	100.0	**0.0059**	47.0
9.5	100.0	**0.0031**	26.4
6.7	100.0	**0.0013**	15.4
4.75	99.3		
2	98.6		
0.85	98.6		
0.425	98.6		
0.25	98.4		
0.18	98.3		
0.15	98.1		
0.075	97.7		
0.053	97.1		

UNIFIED SOIL CLASSIFICATION SYSTEM



Project Manager: Nataliya Tkach **Approved By:** *Original Signed By* **Date Approved:** 17-Dec-24
Arcadio Petrola,

Appendix E – Groundwater Elevation Summary Table and Hydrographs

TABLE E1: Groundwater Elevation Summary

15450 Woodbine Avenue, Stouffville, ON

GTR-21010864-C2

Monitoring Well ID	Ground Surface Elevation (masl)	Stick Up (m)	Approximate Full Well Depth (mbTOP)	Approximate Full Well Depth (mbgs)	Minimum GW Elevation (masl)	Maximum GW Elevation (masl)	Depth	26-May-21	7-Jun-21	1-Feb-23	2-Feb-23	7-Feb-23	21-Feb-23	28-Feb-23	2-Mar-23	29-Mar-23	26-Apr-23	29-May-23	30-Jun-23	26-Jul-23	10-May-24	22-May-24	24-May-24	18-Sep-24	1-Oct-24	9-Dec-24	10-Dec-24	15-Aug-25
BH201	307.21	0.89	7.0	6.1	302.55	305.31	mbTOP	ND	ND	-	Dry	Dry	5.55	4.39	4.13	-	-	-	-	-	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	4.66	3.50	3.24	1.90	3.04	2.78	2.48	2.77	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	302.55	303.71	303.97	305.31	304.17	304.43	304.73	304.44	-	-	-	-	-	-	-	-
BH202	300.43	0.83	6.9	6.1	297.03	299.24	mbTOP	ND	ND	-	4.24	3.98	2.52	2.80	2.56	-	-	-	-	-	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	3.40	3.15	1.69	1.97	1.73	1.53	1.28	1.19	1.22	1.23	-	-	-	-	-	-	-	-
							masl	-	-	-	297.03	297.28	298.74	298.46	298.70	298.90	299.15	299.24	299.21	299.20	-	-	-	-	-	-	-	-
BH203	307.48	0.84	8.4	7.6			mbTOP	ND	ND	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH204	309.44	0.76	8.4	7.6	301.87	305.93	mbTOP	ND	ND	Dry	Dry	Dry	Dry	Dry	8.32	-	-	-	-	-	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	-	-	7.57	3.51	3.68	3.91	4.61	4.82	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	-	-	301.87	305.93	305.76	305.53	304.83	304.62	-	-	-	-	-	-	-	-
BH205	304.78	0.75	6.8	6.1	299.25	302.27	mbTOP	ND	ND	Dry	Dry	Dry	3.26	6.28	3.46	Dry	Dry	Dry	Dry	Dry	Decommission	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	2.51	5.53	2.71	-	-	-	-	-	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	302.27	299.25	302.07	-	-	-	-	-	-	-	-	-	-	-	-	-
BH206	308.76	0.87	8.5	7.6			mbTOP	ND	ND	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH207	306.97	0.90	8.5	7.6	300.14	302.15	mbTOP	ND	ND	Dry	Dry	Dry	Dry	Dry	Dry	-	-	-	-	-	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	6.83	5.11	4.82	5.24	5.75	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	-	-	-	300.14	301.86	302.15	301.73	301.22	-	-	-	-	-	-	-	-
BH208	302.02	0.93	7.0	6.1	297.71	300.75	mbTOP	ND	ND	na	5.24	5.17	2.87	NM	3.01	-	-	-	-	-	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	4.31	4.24	1.94	-	2.08	1.27	1.51	1.62	1.58	1.56	-	-	-	-	-	-	-	-
							masl	-	-	-	297.71	297.78	300.08	-	299.94	300.75	300.51	300.40	300.44	300.46	-	-	-	-	-	-	-	-
BH209	300.73	0.91	7.0	6.1	296.92	298.18	mbTOP	ND	ND	6.58	Dry	Dry	4.51	4.72	4.69	-	-	-	-	-	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	5.68	-	-	3.61	3.81	3.79	2.77	2.55	2.58	3.46	3.76	-	-	-	-	-	-	-	-
							masl	-	-	295.05	-	-	297.12	296.92	296.94	297.96	298.18	298.15	297.27	296.97	-	-	-	-	-	-	-	-
BH210	307.57	0.97	4.9	3.9	303.67	303.67	mbTOP	ND	ND	Dry	Dry	Dry	Dry	Dry	4.86	Dry	Dry	Dry	Dry	Dry	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	Dry	Dry	Dry	Dry	Dry	3.90	Dry	Dry	Dry	Dry	Dry	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	-	-	303.67	-	-	-	-	-	-	-	-	-	-	-	-	-
BH211	307.49	0.76	4.7	3.9	303.56	303.56	mbTOP	ND	ND	Dry	Dry	Dry	Dry	Dry	4.69	Dry	Dry	Dry	Dry	Dry	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	Dry	Dry	Dry	Dry	Dry	3.93	Dry	Dry	Dry	Dry	Dry	-	-	-	-	-	-	-	-
							masl	-	-	-	-	-	-	-	303.56	-	-	-	-	-	-	-	-	-	-	-	-	-
PW	304.75	0.55	84.8	84.25	258.78	261.23	mbTOP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NM	44.07	44.11	46.44	46.13	NA	NA	NA
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.52	43.56	45.97	45.66	-	-	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	261.23	261.19	258.78	259.09	-	-	-
OW1	303.97	0.83	84.55	83.72	257.67	260.79	mbTOP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	44.37	44.01	44.07	-	-	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	43.54	43.18	43.24	46.30	45.99	-	-	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	260.43	260.79	260.73	257.67	257.98	-	-	-
OW2	304.86	0.91	85.54	84.63	258.99	261.33	mbTOP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	44.44	44.47	46.78	46.50	Decommisioned	Decommisioned	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.53	43.56	45.87	45.59	-	-	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	261.33	261.30	258.99	259.27	-	-	-
INF 304	304.78	0.98	5.52	4.54	301.10	301.10	mbTOP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Dry	4.66	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.68	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	301.10	-
INF 306	304.96	0.97	5.44	4.47	302.13	302.38	mbTOP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.55	3.80	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.58	2.83	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	302.38	302.13	-
INF 307	305.09	0.98	5.56	4.58	302.31	302.33	mbTOP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.76	3.74	Decommisioned
							mbgs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.78	2.76	-
							masl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	302.31	302.33	-
BH6	301.43	1.24	7.99	6.75	294.79	294.79	mbTOP	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	7.88
							mbgs	1.37	1.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.64
							masl	300.06	299.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	294.79
BH11	303.48	1.10	8.76	7.66	298.48	298.48	mbTOP	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	6.10
							mbgs	7.47	3.41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.00
							masl	296.01	300.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	298.48
BH18	291.57	1.02	8.36	7.34	289.33	289.33	mbTOP	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	3.26
							mbgs	7.01	0.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.24
							masl	284.56	291.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	289.33

Notes:

mbTOP - meters below top of the pipe

mbgs - meters below ground surface

masl - meters above mean sea level

NA - Not available

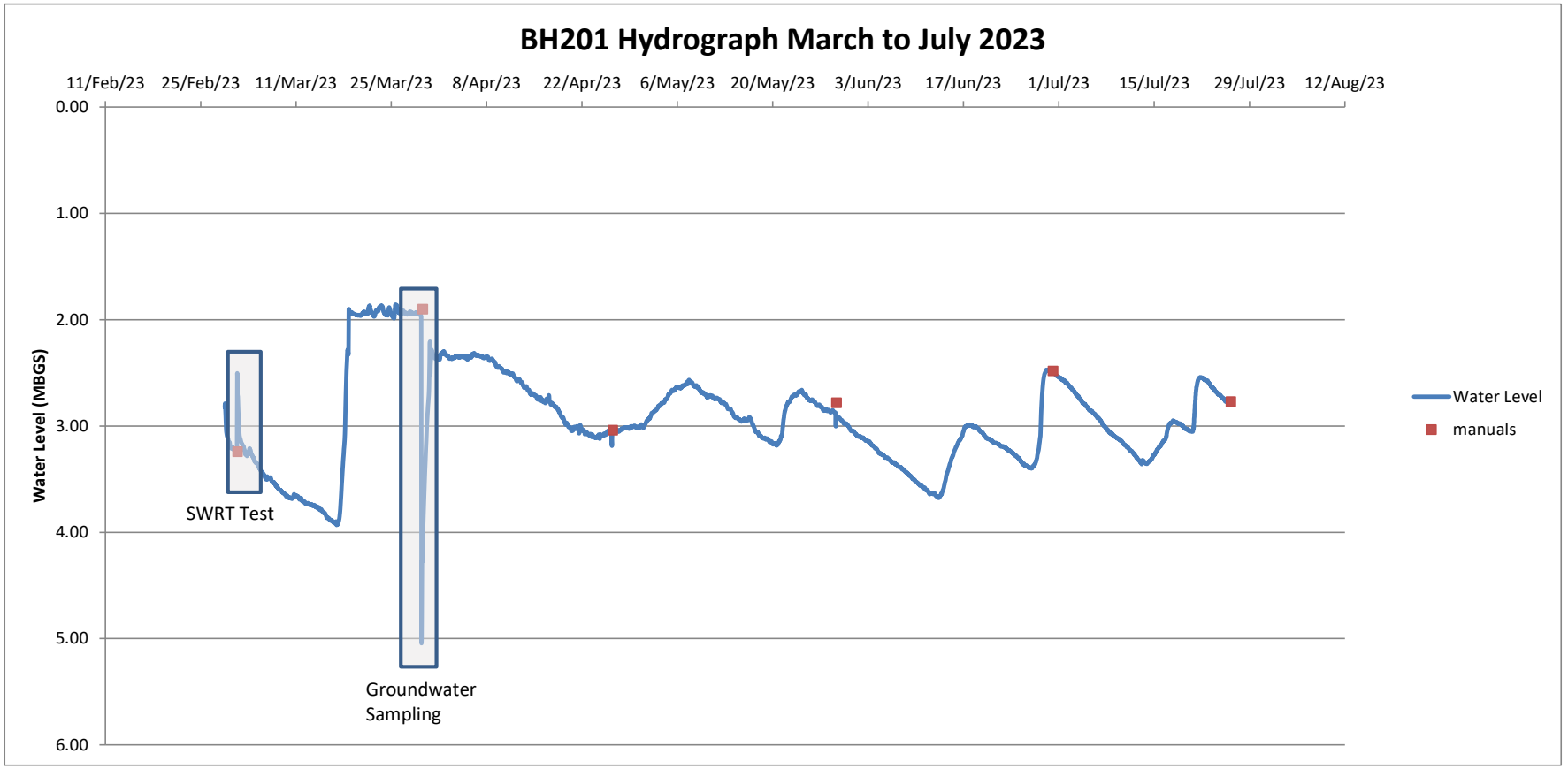
NM - Not measured

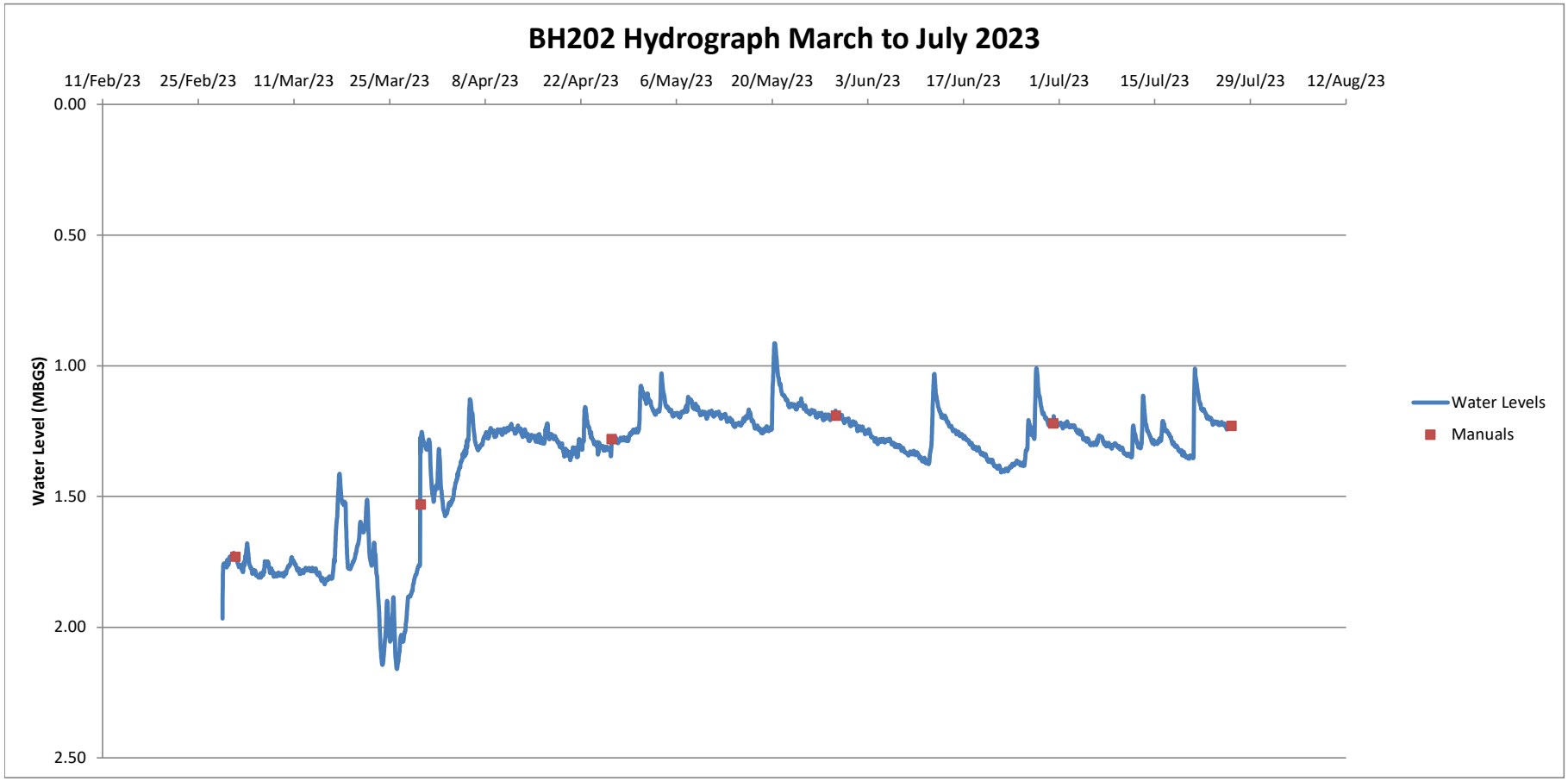
ND - Not Drilled

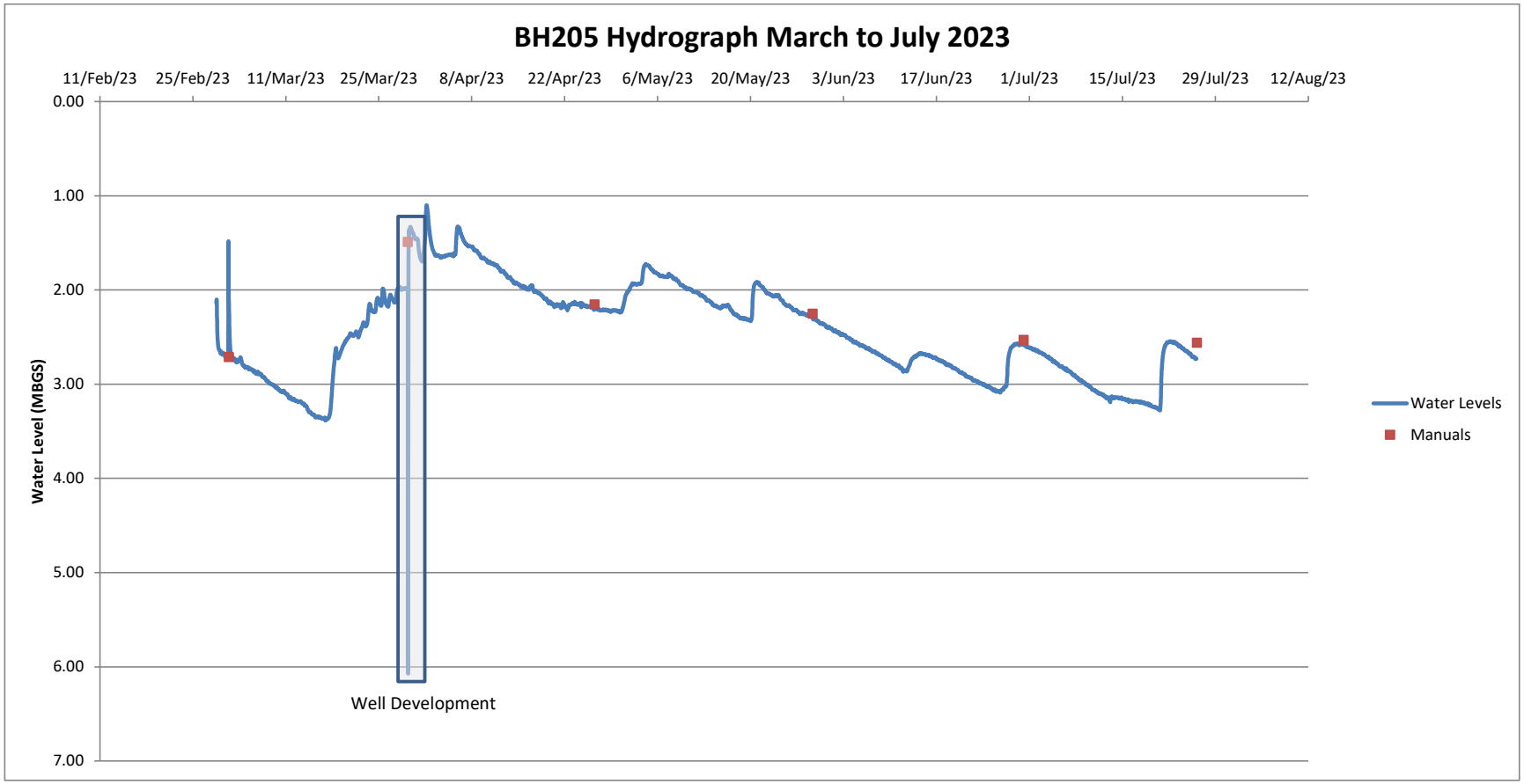
Infiltration test wells (Old septic tank)

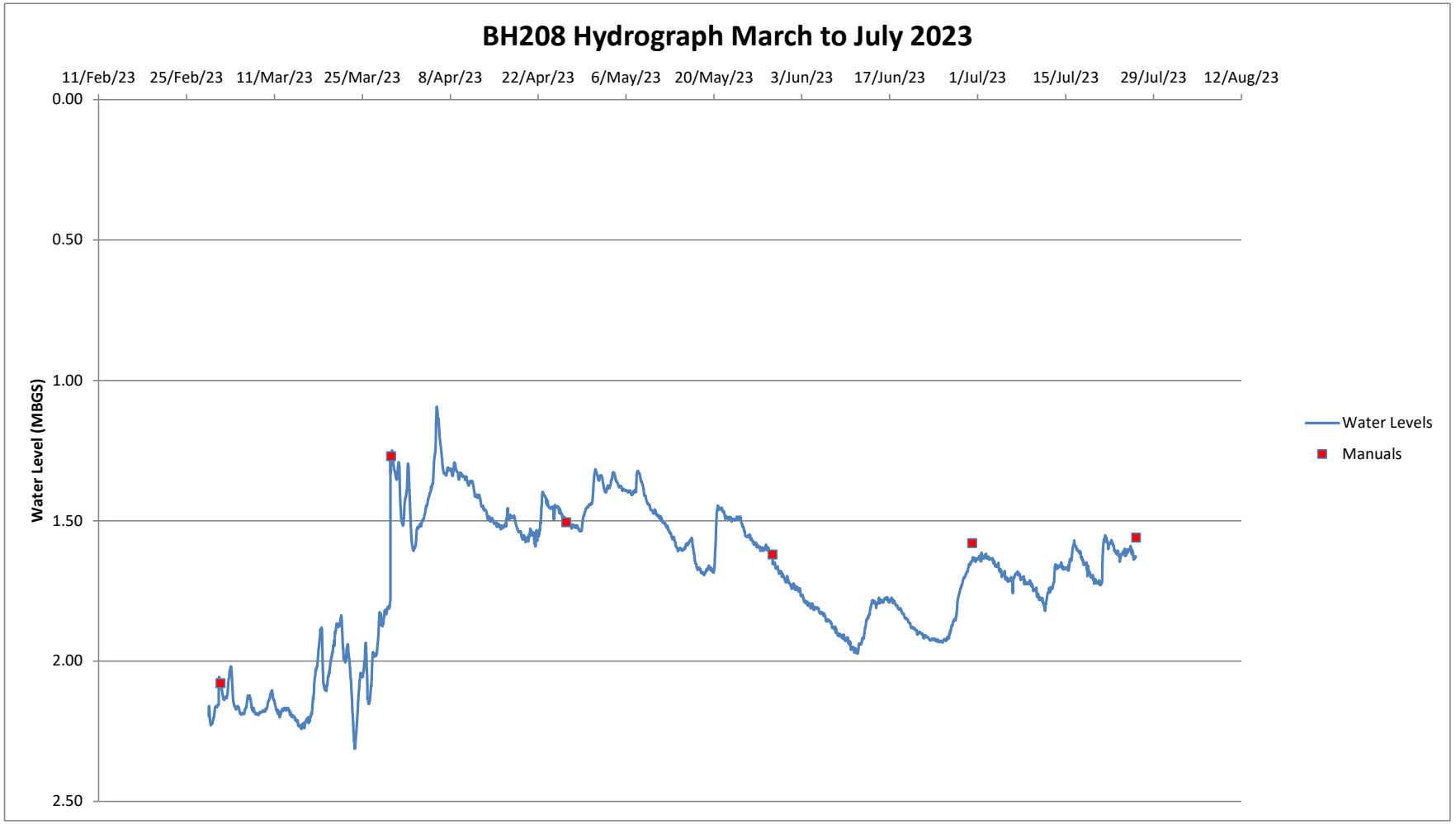
Infiltration test wells (New Septic tank)

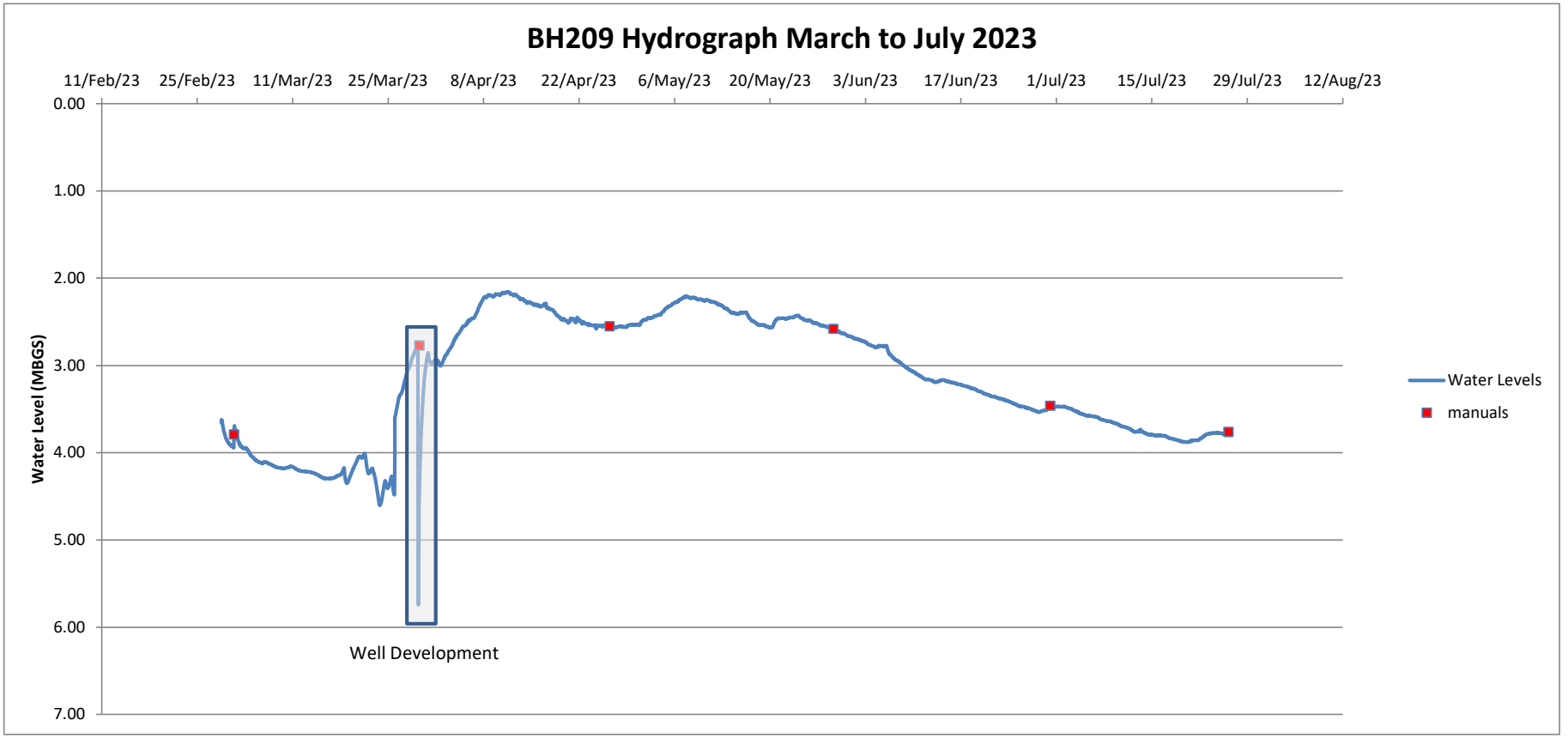
	Min. GW Elev.	Max. Gw Elev.
Shallow Wells	289.33	305.93
Deep Wells	257.67	261.334


BH201 Hydrograph March to July 2023
11/Feb/23
25/Feb/23
11/Mar/23
25/Mar/23
8/Apr/23
22/Apr/23
6/May/23
20/May/23
3/Jun/23
17/Jun/23
1/Jul/23
15/Jul/23
29/Jul/23
12/Aug/23
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Water Level (MBGS)
SWRT Test
Groundwater Sampling
Water Level
manuals

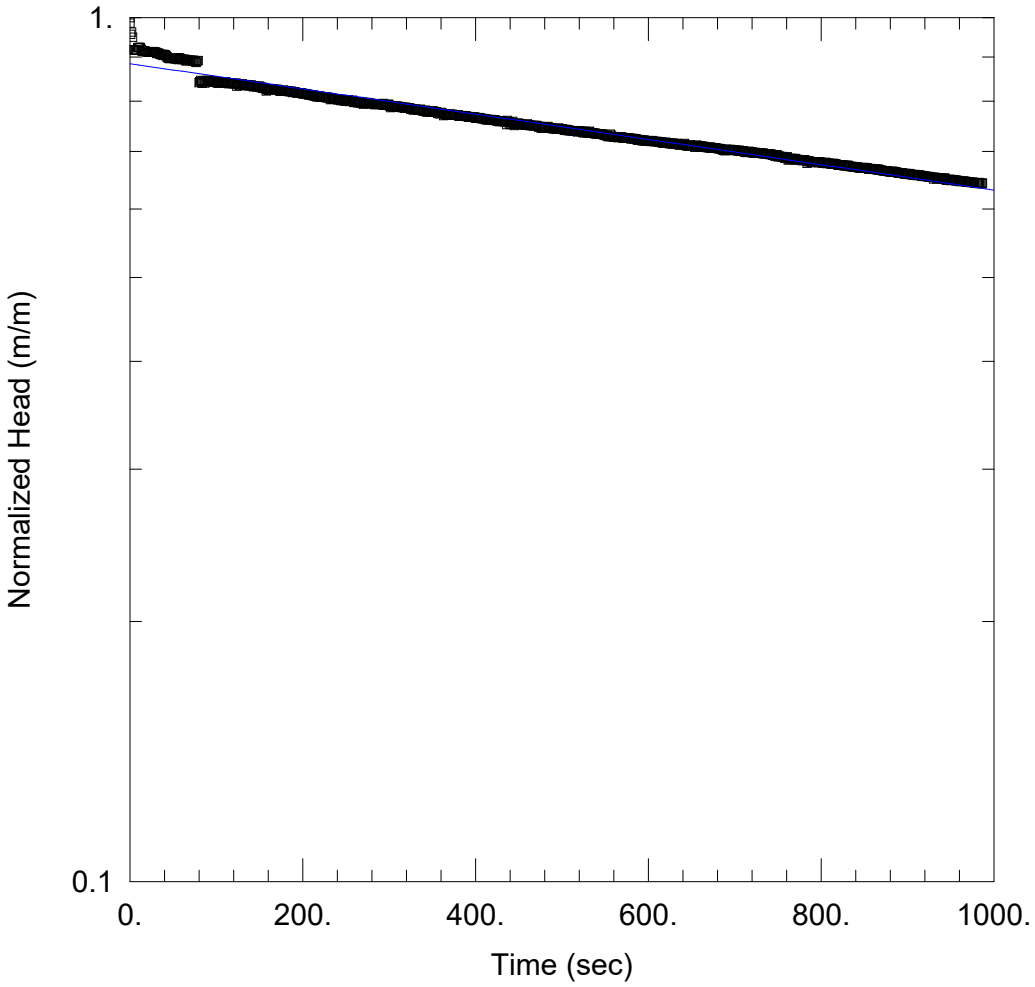

BH202 Hydrograph March to July 2023
11/Feb/23
25/Feb/23
11/Mar/23
25/Mar/23
8/Apr/23
22/Apr/23
6/May/23
20/May/23
3/Jun/23
17/Jun/23
1/Jul/23
15/Jul/23
29/Jul/23
12/Aug/23
0.00
0.50
1.00
1.50
2.00
2.50
Water Level (MBGS)
Water Levels
Manuals


BH205 Hydrograph March to July 2023
11/Feb/23
25/Feb/23
11/Mar/23
25/Mar/23
8/Apr/23
22/Apr/23
6/May/23
20/May/23
3/Jun/23
17/Jun/23
1/Jul/23
15/Jul/23
29/Jul/23
12/Aug/23
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
Water Level (MBGS)
Well Development
Water Levels
Manuals


BH208 Hydrograph March to July 2023
11/Feb/23
25/Feb/23
11/Mar/23
25/Mar/23
8/Apr/23
22/Apr/23
6/May/23
20/May/23
3/Jun/23
17/Jun/23
1/Jul/23
15/Jul/23
29/Jul/23
12/Aug/23
0.00
0.50
1.00
1.50
2.00
2.50
Water Level (MBGS)
Water Levels
Manuals


BH209 Hydrograph March to July 2023
11/Feb/23
25/Feb/23
11/Mar/23
25/Mar/23
8/Apr/23
22/Apr/23
6/May/23
20/May/23
3/Jun/23
17/Jun/23
1/Jul/23
15/Jul/23
29/Jul/23
12/Aug/23
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
Water Level (MBGS)
Well Development
Water Levels
manuals

Appendix F – SWRT Procedures and Results



WELL TEST ANALYSIS

Data Set:
Date: 03/09/23 Time: 13:10:51

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Treasure Hill
Project: BRM-21010864-C0
Location: 15450 Woodbine Ave, Stouffvill
Test Well: BH201
Test Date: March 2, 2023

AQUIFER DATA

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

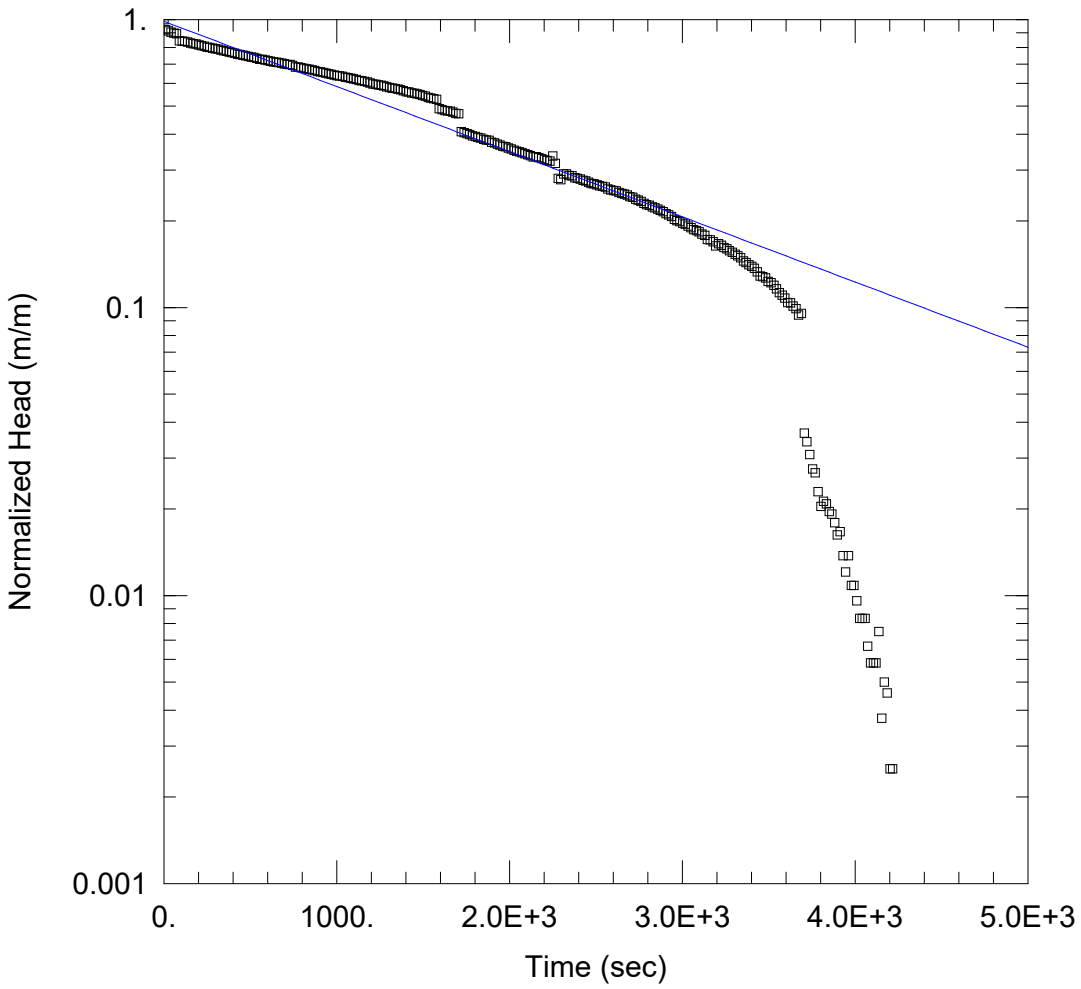
WELL DATA (BH201)

Initial Displacement: 0.24 m
Total Well Penetration Depth: 3.21 m
Casing Radius: 0.025 m
Static Water Column Height: 2.8 m
Screen Length: 3. m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 1.991E-7 m/sec y0 = 0.2122 m



WELL TEST ANALYSIS

Data Set:
Date: 03/09/23 Time: 13:42:50

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Treasure Hill
Project: BRM-21010864-C0
Location: 15450 Woodbine Ave, Stouffvill
Test Well: BH201
Test Date: March 2, 2023

AQUIFER DATA

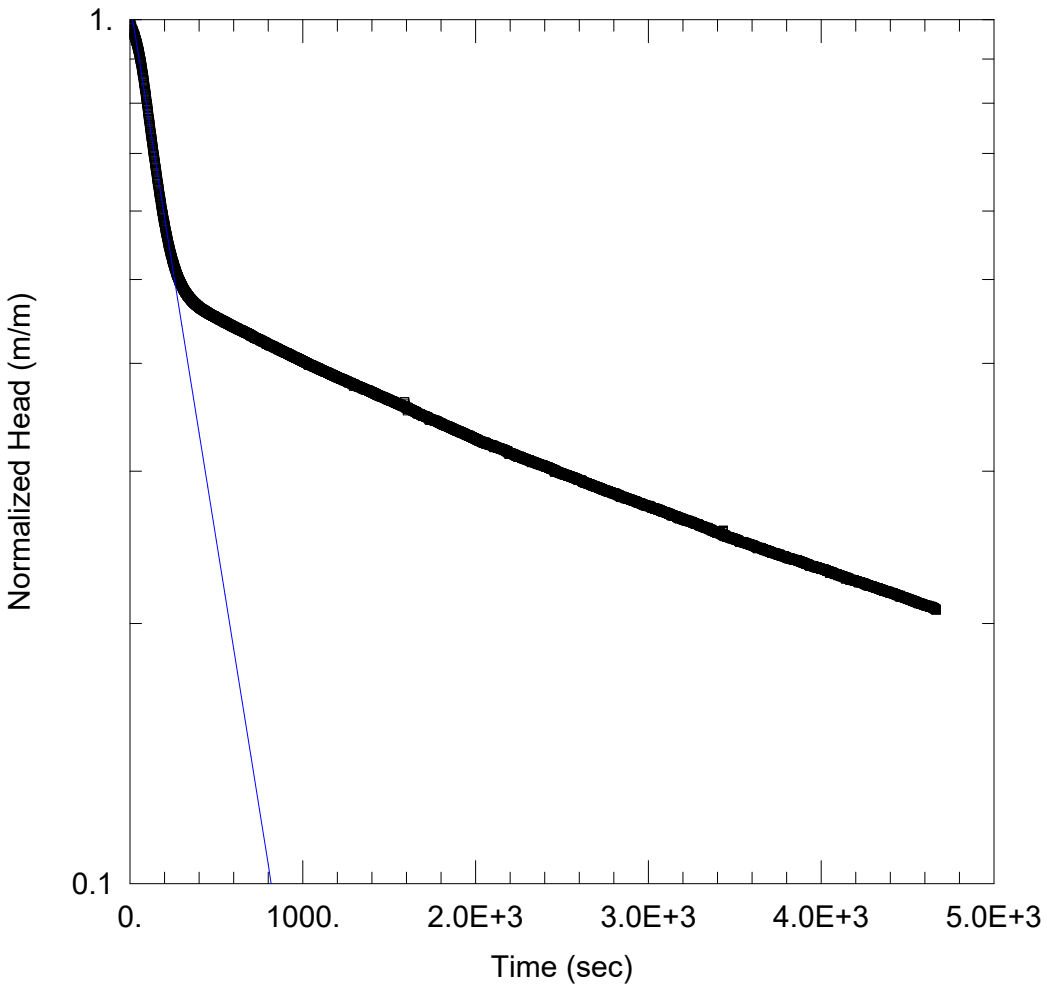
Saturated Thickness: 2.8 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH201)

Initial Displacement: 0.24 m
Total Well Penetration Depth: 3.21 m
Casing Radius: 0.025 m
Static Water Column Height: 2.8 m
Screen Length: 3. m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 3.081E-7 m/sec
y0 = 0.2364 m



WELL TEST ANALYSIS

Data Set: E:\...\BH202R.aqt
Date: 02/22/23 Time: 10:14:59

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Treasure Hill
Project: BRM-21010864-C0
Location: 15450 Woodbine Ave, Stouffvill
Test Well: BH202
Test Date: February 7, 2023

AQUIFER DATA

Saturated Thickness: 2.97 m Anisotropy Ratio (Kz/Kr): 1.

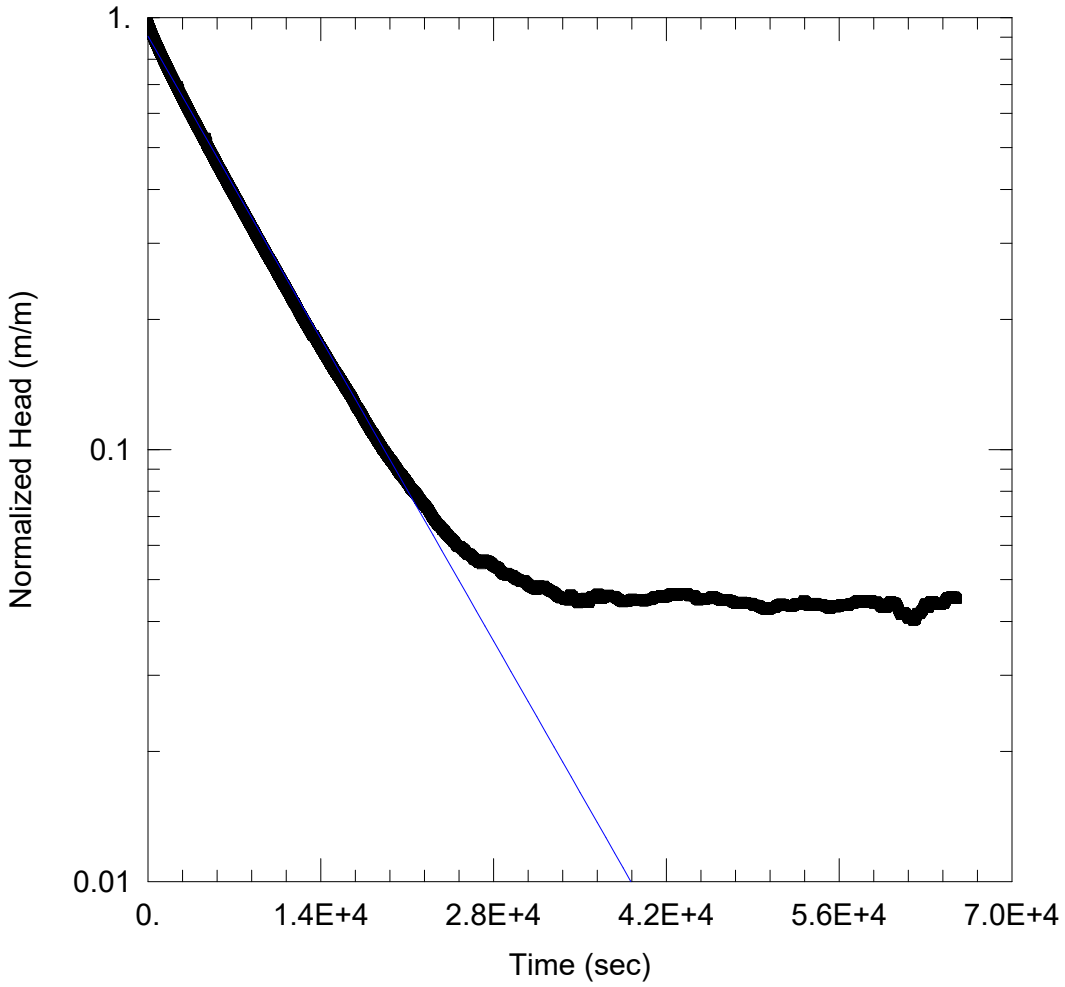
WELL DATA (BH202)

Initial Displacement: 1.52 m
Total Well Penetration Depth: 3.03 m
Casing Radius: 0.025 m
Static Water Column Height: 2.97 m
Screen Length: 3. m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 1.601E-6 m/sec y0 = 1.592 m



WELL TEST ANALYSIS

Data Set:
Date: 03/09/23 Time: 12:08:47

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Treasure Hill
Project: BRM-21010864-C0
Location: 15450 Woodbine Ave, Stouffvill
Test Well: BH205
Test Date: March 2, 2023

AQUIFER DATA

Saturated Thickness: 3.3 m Anisotropy Ratio (Kz/Kr): 1.

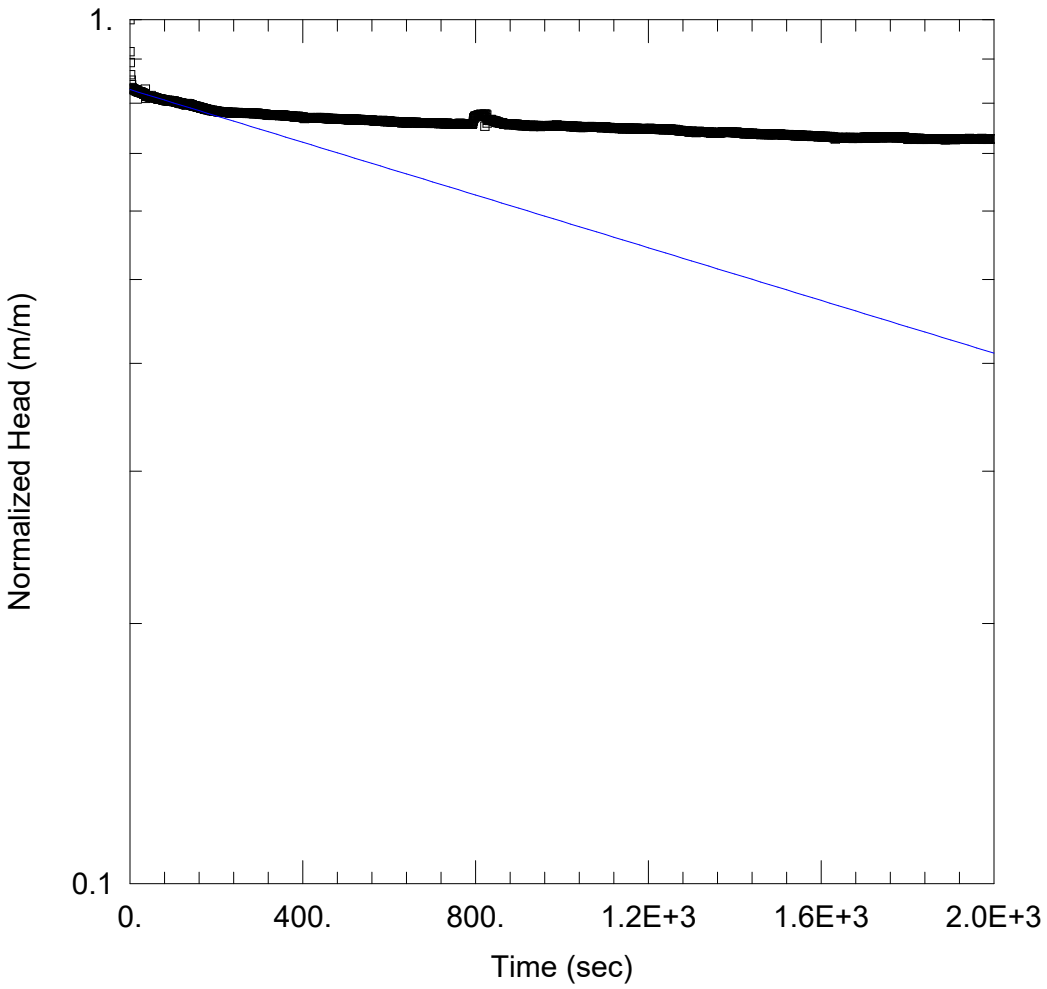
WELL DATA (BH205)

Initial Displacement: 1.65 m
Total Well Penetration Depth: 3.35 m
Casing Radius: 0.025 m
Static Water Column Height: 3.3 m
Screen Length: 3. m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 6.573E-8 m/sec y0 = 1.493 m



WELL TEST ANALYSIS

Data Set: E:\...\BH208R.aqt
Date: 02/22/23 Time: 10:25:56

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Treasure Hill
Project: BRM-21010864-C0
Location: 15450 Woodbine Ave, Stouffvill
Test Well: BH208
Test Date: February 7, 2023

AQUIFER DATA

Saturated Thickness: 1.8 m Anisotropy Ratio (Kz/Kr): 1.

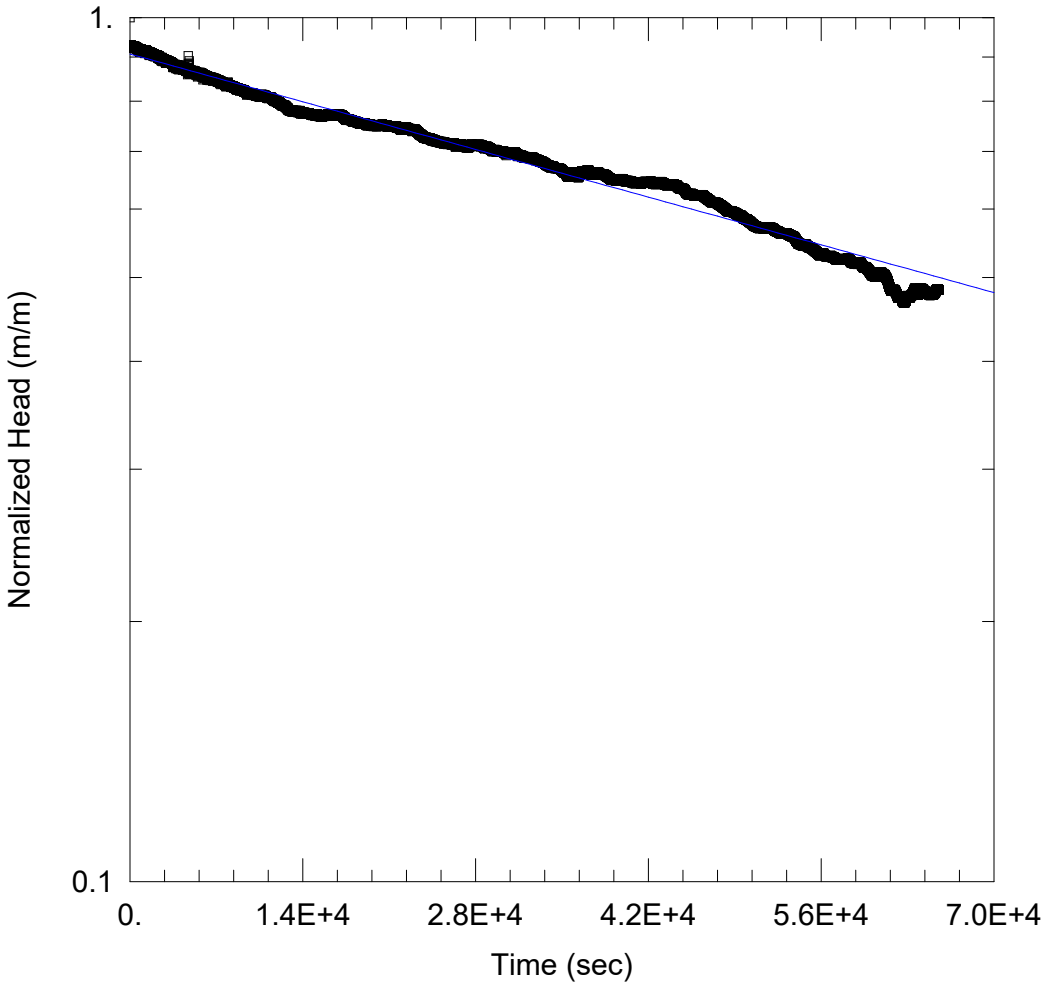
WELL DATA (BH208)

Initial Displacement: 0.4 m
Total Well Penetration Depth: 4.22 m
Casing Radius: 0.025 m
Static Water Column Height: 1.8 m
Screen Length: 3. m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 3.231E-7 m/sec y0 = 0.3319 m



WELL TEST ANALYSIS

Data Set:
Date: 03/09/23 Time: 12:13:46

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Treasure Hill
Project: BRM-21010864-C0
Location: 15450 Woodbine Ave, Stouffvill
Test Well: BH209
Test Date: March 2, 2023

AQUIFER DATA

Saturated Thickness: 2. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH209)

Initial Displacement: 0.3 m
Total Well Penetration Depth: 4.02 m
Casing Radius: 0.025 m
Static Water Column Height: 2. m
Screen Length: 3. m
Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 7.519E-9 m/sec y0 = 0.2722 m

Single Well Response Testing

Standard Operating Procedure No: 2012-8
Version 1.0
Revision Date: September, 2012

Prepared By:

exp
1595 Clark Boulevard
Brampton, ON L6T 4V1
Canada
T: +1.905.793.9800
F: +1.905.793.0641
www.exp.com

Standard Operating Procedure - Single Well Response Tests (SWRT)

1.0 Introduction

This standard operating procedure describes the use of **SWRT** (also commonly known as a slug test) to obtain estimates of the saturated hydraulic conductivity (K) in a groundwater formation. The in-situ determination of the saturated hydraulic conductivity and other hydraulic properties in an aquifer is important for characterizing groundwater flow.

Single well response tests are short–duration tests that provide estimates of the horizontal hydraulic conductivity of the geological formation in the immediate area around the well screen.

These tests involve the creation of an instantaneous change in water level and monitoring the response of the water level until it recovers to near static conditions. The instantaneous change in water level is accomplished by displacing a know volume of water through the introduction or withdrawal of water or a solid object (referred to as a 'slug') of known volume and monitoring the changes in the water level over time.

Monitoring the decrease in water level following the introduction of a slug is referred to a falling head test.

Monitoring the rise in water levels following the withdrawal of a slug is referred to as a rising head test.

It is critical to ensure:

- that the monitoring well was constructed appropriately and construction details are known;
- that the monitoring well to be tested is completely developed;
- that the well screen is free of any soil material.

If the well has not been developed recently, the well should be developed prior to commencing the SRWT.

SWRT Strengths

- Can be applied for low conductive layers where a pumping test is not feasible;
- Volume of purged water is minimal; therefore, does not need large amount of water disposal (important when testing potentially contaminated sites);
- Can be completed with minimal cost and a short period of time; and,
- No observation wells required.

SWRT Weaknesses

- Hydraulic Conductivity is given only for the immediately well area; and,
- If the formation is disturbed during MW installation, observed hydraulic conductivity maybe biased high.

2.0 Applicable Regulations/Guidelines

The following regulations and guidelines apply to this SOP:

- ASTM D4044-96 – Standard Test method for (Field Procedures) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers
- ASTM D4104-96 e-1 – Standard Test Method (Analytical Procedures) for determining Transmissivity of Non-leaky Confined Aquifers by Over-damped Well Response to Instantaneous Change in Head (Slug Test).
- ASTM 5785-95 - Standard Test Method (Analytical Procedures) for determining Transmissivity of Non-leaky Confined Aquifers by Under-damped Well Response to Instantaneous Change in Head (Slug Test).

3.0 Related SOPs

Prior to commencing SWRT procedures, field personnel are required to refer the following additional SOPs:

- Monitoring Well Development (No. 2012-6); and,
- Groundwater Sampling (No. 2012-7).

4.0 Attachments

- Static Water Level Measurement and Data Logger Installation Form (Attachment 1); and,
- Single Well Response Test Field Data Entry Form (Attachment 2).

5.0 Planning & Preparation

Prior to conducting an intrusive investigation program, the follow tasks/activities are required:

- review the project specific Health and Safety Plan (HASP) noting all Site-specific hazards and personnel protective equipment requirements.
- review the approved scope of work and other relevant project documentation regarding:
    - the project objectives;
    - site conditions;
    - specific issues of concern;
    - field methodologies:
    - sampling requirements including data quality objectives: and,
    - quality assurance/quality control (QA/QC) measures.
- review any maps, borehole logs or other information relevant to the Site.
- obtain any available well logs and/or previous water level/water quality information on all the wells to be tested.

  Required well information includes the following:

    - borehole diameter (inner diameter of the well);
    - well depth;
    - static water levels;
    - screen interval/depth;
    - gravel pack interval/depth; and,
    - geological unit screened.
- prepare an equipment check list and assemble all necessary equipment, forms, sampling containers, reagents, calibration standards.
- if not already on site, arrange for the provision of drums/containers for the collecting and storage of groundwater.
- gather equipment required to complete the SWRT. Rent and pick-up any equipment required to complete the test (see section 6.0 for a complete list of equipment).
- if using data loggers: check all the equipment for proper calibration; DLs to be reset; set the measuring interval to at least five (5) seconds, more frequent water level measurements; if a rapid water level change is expected, it is preferred to set-up the measuring interval to one (1) second.
- arrange access to the site, obtain any keys required to open wells or entrance gates.
- inform client, land owner, regulatory authorities etc. as appropriate; obtain any access/working permits to the site (e.g. City permit to work along the roads).

Note:

When dealing with contaminated sites, pre-plan the testing sequence: 'clean' wells should be tested prior to 'contaminated wells' to avoid cross contamination.

6.0 Equipment/Documentation List:

The equipment to conduct a SWRT program is to include the following:

- Copy of a signed health and safety plan
- Copy of the approved Scope of Work
- PPE as required by Site-Specific HASP
- Copy of the monitoring well location plan/site plan
- Waterproof pen and bound field note book
- SWRT field data entry form
- Disposable gloves
- Duct tape
- Deionized water
- Alconox (phosphate free detergent)
- Spray bottles
- Electronic water level meter and spare batteries
- Solid PVC or stainless steel slug of known volume or clean water
- String (nylon)
- Water pressure transducer (data logger) and baro-logger
- Watch or stop watch with second hand
- Plastic sheeting
- Closed containers to collect decontamination fluids

7.0 Field Procedures

Single Well Response Tests can be performed using electronic water level meters to manually record water levels or pressure transducers (data loggers) with subsequent data transfer to a computer for analysis. In the case of a falling head slug test, it is critical that the static water level is above the top of the well screen interval, otherwise the test is measuring the response of the unsaturated sand pack and not of the surrounding saturated formation.

Slug tests should be performed on undisturbed wells. A minimum of one week should be allowed between completion of a well and conducting a slug test.

The well should be developed and the water level recovered to within 3 cm of its static level prior to performing the slug test.

The field procedures provided are proposed, assuming that the well has been previously developed. If the monitoring well is not properly developed, the test results may not be reliable.

General

- Inspect the monitoring wells and record static water levels moving from up-gradient to down-gradient.
- If the tests are being performed in an area of know groundwater contamination, proceed from the least contaminated to the most contaminated well.
- The volume of the slug should be sufficient to create minimum 50 cm (0.5 m) change in water level
- Prepare a decontamination area with two layers of 6 mil plastic sheeting and containers to collect wash and rinse waters.
- Decontaminate the slug prior to initial use and between monitoring well locations. The slug should be decontaminated by washing first with a mixture of municipal water and phosphate free detergent, followed by rinses with municipal water, ethyl alcohol, isopropyl alcohol or Alconox and deionized water.
- The disposable rope used to lower the slug at each monitoring well location should be changed between wells.

The general procedure for completing a SWRT using three different methods is summarized below followed by a more detailed discussion on how to record water levels (manually and electronically).

Note:

The volume of the slug (or water) should be sufficient to change the water level at least 0.5 m. If the SWL is within the gravel pack, the volume calculation must account for the porosity (0.3 in general) of the sand pack. For bail-down tests, the volume of water removed must be recorded.

SWRT Methods

a) SWRT Using a Solid Slug

- Identify the well, clean the work area if required, measure static water level and time, total well depth, and record data logger serial number.
- Install the data logger at a sufficient depth below the water table, so that the slug will not strike the data logger upon insertion into the well; record the data logger depth.
- Set the slug just above the water table.
- If using a baro logger, install just below the top of the casing (ie. 1 meter below the casing).
- Pre-measure the length of string holding the slug - the slug must be completely submerged in water once dropped into the well.
- Release the slug instantaneously into water.
- Measure water level manually at intervals specified on the field form along with the time elapsed and the time of day (the time of day is required to correspond measurements with the data logger).
- Leave the slug in the well until water column has recovered by at least 90%.

  Once 90% recovery is achieved, the slug and data logger can be removed.

b) SWRT By Injecting a Slug of Water

- Identify the well, clean the work area if required, measure:
    - static water level and time;
    - total well depth; and,
    - record data logger serial number.
- Calculate the required volume of water to raise the water table for approximately 1.0 to 2.0 m from the static water level.

  It is preferred to add enough water to raise the water level by at least 0.5 m from the static water level.

  If the SWL is within the gravel pack, the volume calculation must account for the porosity (0.3 in general) of the sand pack.
- Add a known volume of water rapidly to the well.
- Measure water level manually at intervals specified on the field form along with the time elapsed and the time of day (the time of day is required to correspond measurements with the data logger).
- Leave the data logger in the well until water column has recovered by at least 90%.
- Take one last manual measurement of the water level and remove the data logger from the well.

c) SWRT By Removing A Known Volume of Water (Bail-down Test)

- Identify the well, clean the work area if required, measure static water level and time, total well depth, and record data logger serial number.
- Pre-determine the data logger installation depth and keep the data logger ready to install, as it will be installed immediately after bailing the well.
- Remove water from the well using a bailer (this must be done as quickly as possible!).
- Pour the removed water into a container – the volume of water removed must be measured once the test is completed.
- Install the data logger to the pre-determined depth, record the depth.
- Measure water level manually at intervals specified on the field form along with the time elapsed and the time of day (the time of day is required to correspond measurements with the data logger).
- Leave the data logger in the well until the water column has recovered by at least 90%.
- Take one last manual water level measurement and remove the data logger from the well, documenting the time of removal.

Note:

A bailer that has the proper diameter can be used to rapidly remove required amount of water from the well.

Procedures for Water Level Measurements

a) Manual Measurements (Electronic Water Level Meter)

- Decontaminate the electronic water level meter prior to use.
- For a falling head test, position the slug just above the static water level and the water level meter immediately above the slug.

  Quickly release the slug to create an instantaneous water level change and ensure that the slug is completely submerged.
- Upon release of the slug, quickly re-position the water level meter to record the water level and assign the level as the time zero reading.
- Start the stop watch and record the water level and the elapsed time at successive intervals as indicated on the field form.

  The recording intervals and the initial response period will be determined by the aquifer specific conditions.

  If the aquifer response is extremely quick, the measurement increments should be adjusted accordingly.
- If water is to be introduced into the well, ensure that it is from a clean source and transported in a clean container.
- Continue to record water levels for the falling head test until the water level has recovered to within 90% of its initial level.
- Upon 90% recovery, remove the water level probe and quickly remove the slug from the well to conduct the rising head test.
- Quickly re-position the water level meter to record the zero time water level.
- Record water levels over 10 second intervals or the shortest time interval as possible during the initial response period.
- Continue to record water levels for the rising head test until the water column has recovered by at least 90%.
- Be sure to document the monitoring well location, the date and time of the slug test, the model and make of the pressure transducer and data logger, the slug volume, the tests performed, depth to water and any comments in a slug test form or in a bound field notebook.

b) Level Logger Measurements (Pressure Transducers)

- Check the response and range of the pressure transducer and review the operations of the date recorder.

  Ensure that the transducer pressure range is appropriate for the water column depth.

- Decontaminate the pressure transducer and cable.
- Prior to positioning of the pressure transducer, line the edges of the well casing to protect the transducer cable.
- Set up the data logger and enter required data to initiate data logging according to the manufactures instructions.
- Position the pressure transducer at a depth where it will not be struck by the slug and at least 60 cm above the bottom of the well.

  It is critical that the data logger depth be recorded in order to calibrate the readings once the test is completed.

- Set the pressure transducer to record water levels at 1 second intervals and at shorter intervals for more coarse textured media.
    - Record water levels to the nearest 0.5 cm
    - Record the time of day to the nearest second.

  The number of measurements and intervals will depend on the formation specific conditions.

- Take manual water level measurements using an electronic water level meter at regular intervals to confirm the pressure transducer readings.
- For the falling head test, position the slug just above the static water level and quickly release the slug to create an instantaneous water level change.

  Ensure that the slug is completely submerged.

- If water is to be introduced into the well, ensure that it is from a clean source and transported in a clean container.
- Continue to record water levels for the falling head test until the water column has recovered to at least 90% of the documented static water level.
- Upon 90% recovery, quickly remove the slug from the well to conduct the rising head test.
- Continue to record water levels for the rising head test until the water column has recovered by at least 90% of the documented static water level.
- Continue to record water levels manually using an electronic water level meter (to calibrate / confirm the data logger readings).
- On completion of the rising head test, remove the data logger and download the water level and time data from to a computer.
- Be sure to document:
    - the monitoring well location;
    - the date and time of the Single Well Response Test:
    - the make and model of any equipment used (pressure transducer, data logger);
    - the slug volume;
    - the tests performed;

- depth to water;and,
- any comments in a slug test form or in a bound field notebook.

Additional Notes:

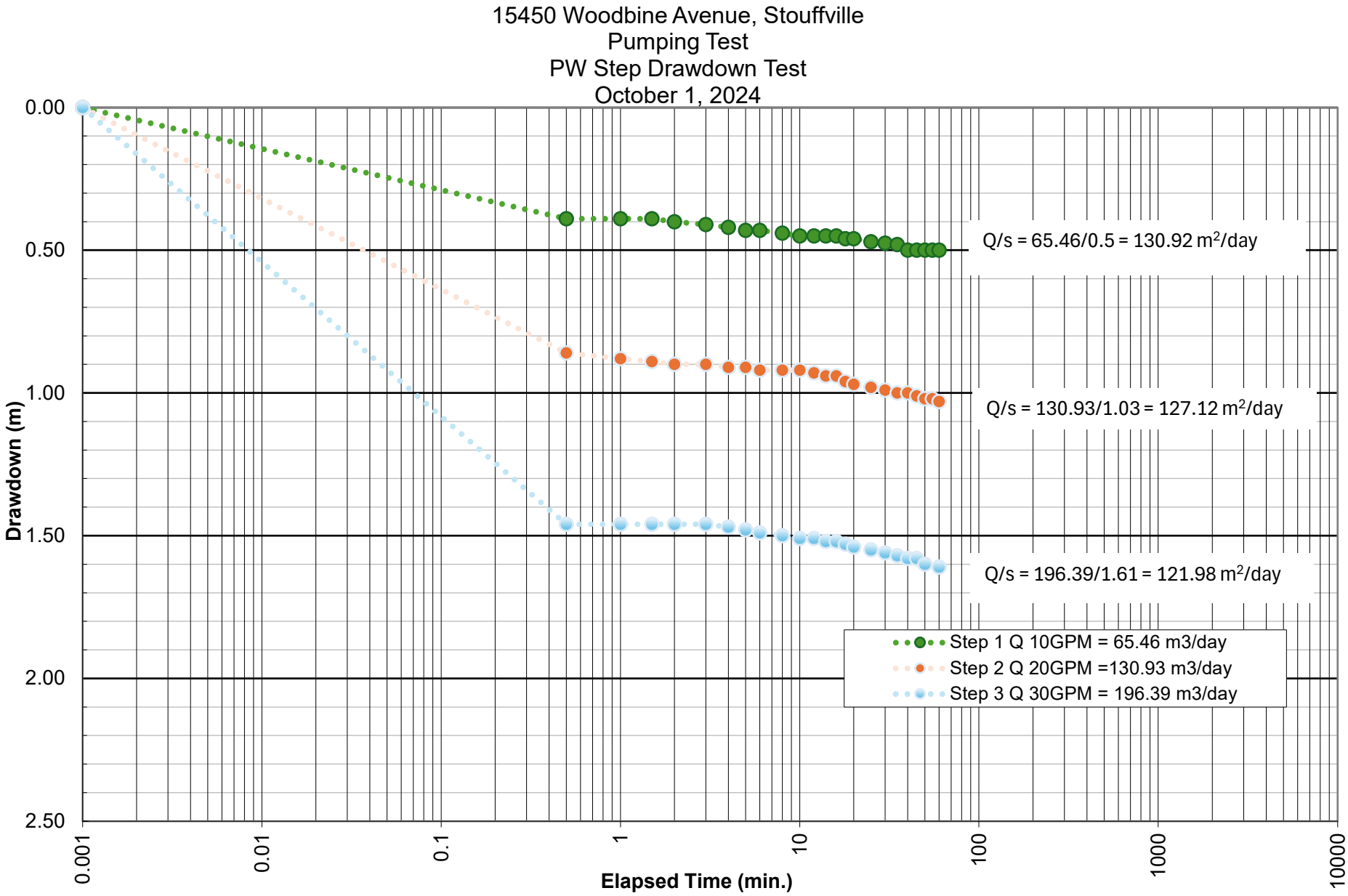
- *All manual measurements used to calibrate data logger data should correspond with the time of day (as the data logger will record levels that correspond to time of day).*
- *Ensure the starting time and measuring intervals of the data logger are properly aligned (start at the same time of day).*

Further Readings:

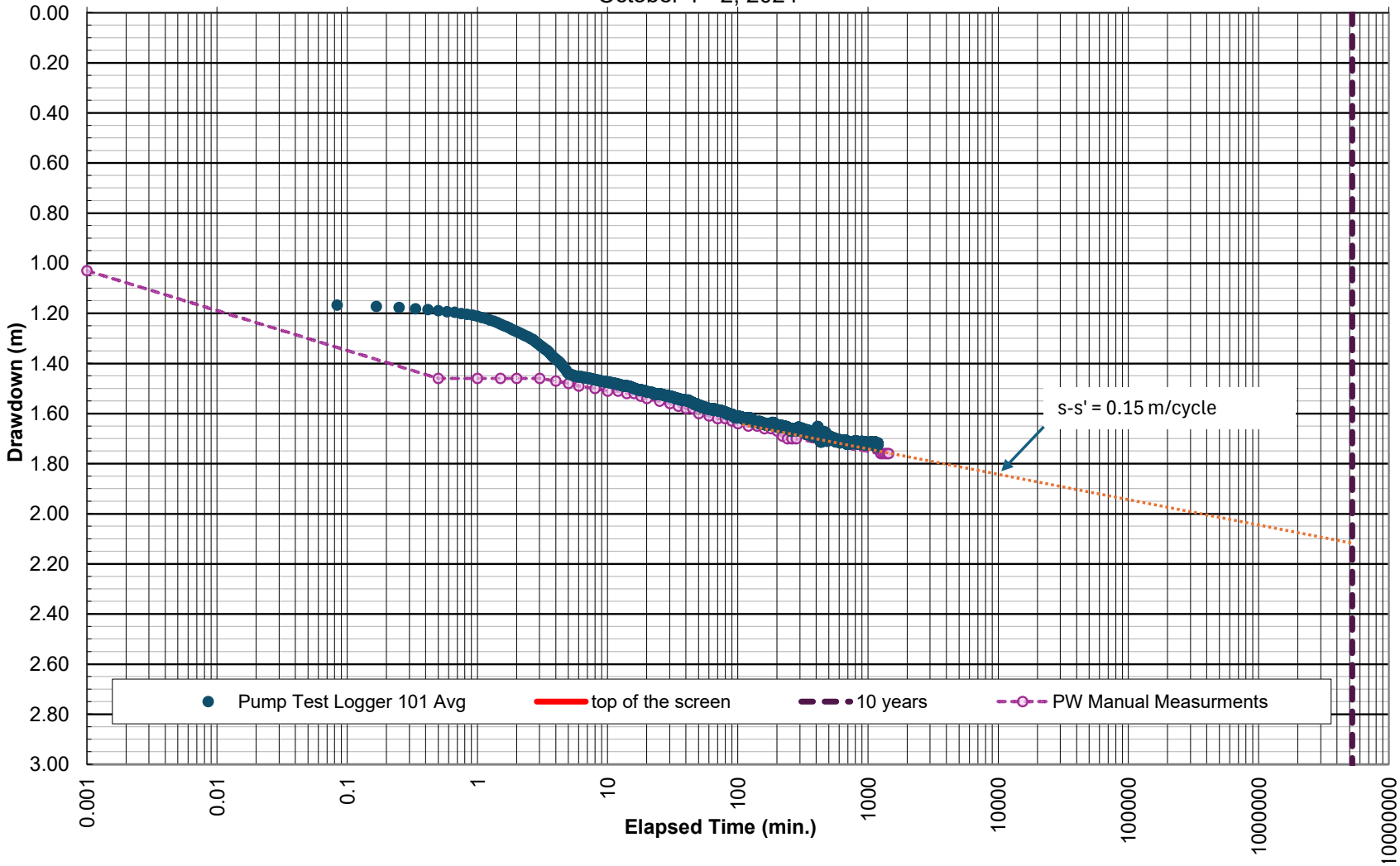
C.W. Fetter *Applied Hydrogeology*

END OF SOP

Appendix G – Pumping Test Results


15450 Woodbine Avenue, Stouffville
Pumping Test
PW Step Drawdown Test
October 1, 2024
Drawdown (m)
0.00
0.50
1.00
1.50
2.00
2.50
Elapsed Time (min.)
0.001
0.01
0.1
1
10
100
1000
10000
Q/s = 65.46/0.5 = 130.92 m²/day
Q/s = 130.93/1.03 = 127.12 m²/day
Q/s = 196.39/1.61 = 121.98 m²/day
Step 1 Q 10GPM = 65.46 m3/day
Step 2 Q 20GPM =130.93 m3/day
Step 3 Q 30GPM = 196.39 m3/day

15450 Woodbine Avenue, Stouffville
Pumping Test
Pumping Well Drawdown vs Time
October 1 - 2, 2024



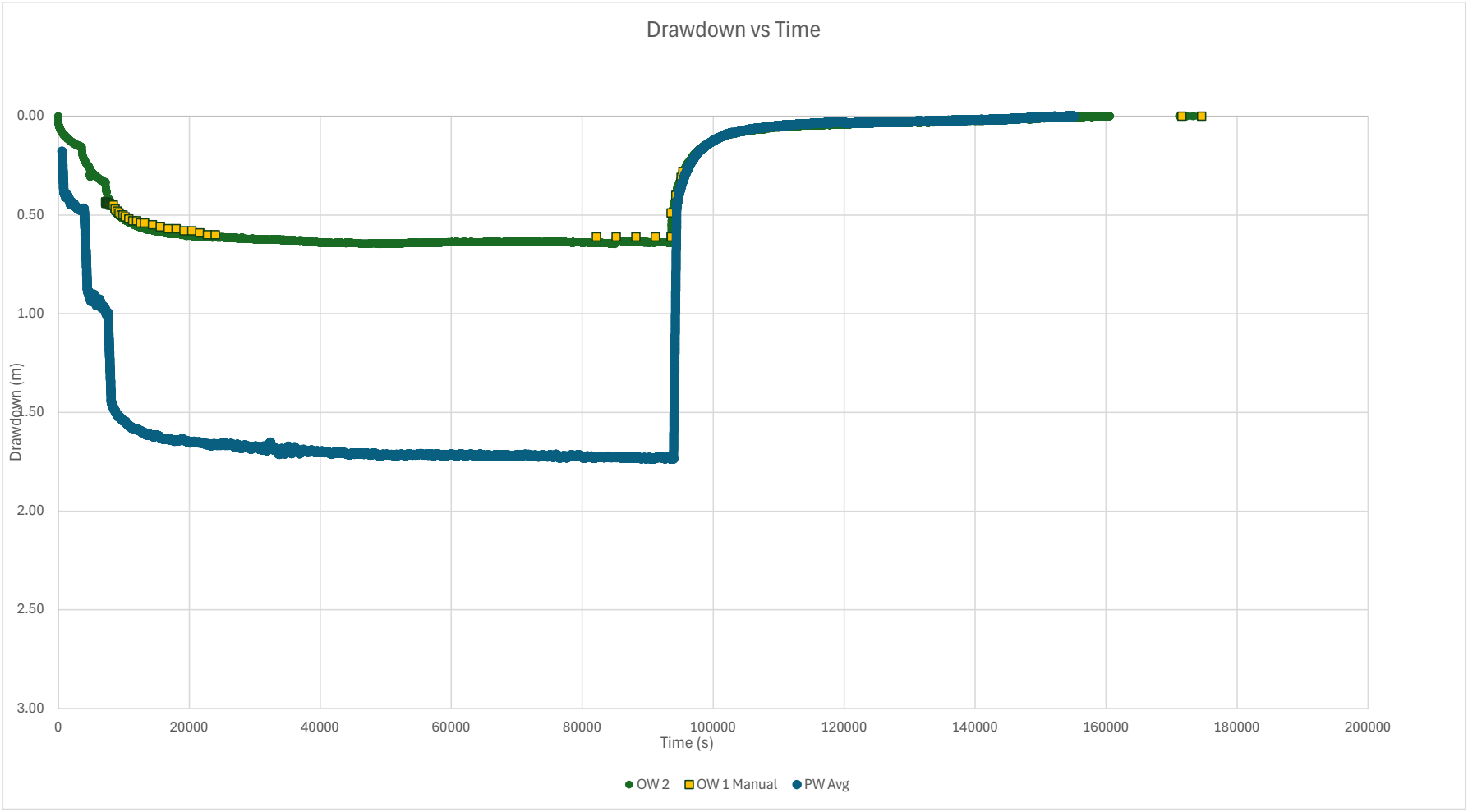

Drawdown vs Time
0.00
0.50
1.00
1.50
2.00
2.50
3.00
Drawdown (m)
0
20000
40000
60000
80000
100000
120000
140000
160000
180000
200000
Time (s)
OW 2
OW 1 Manual
PW Avg

Figure 3of 4

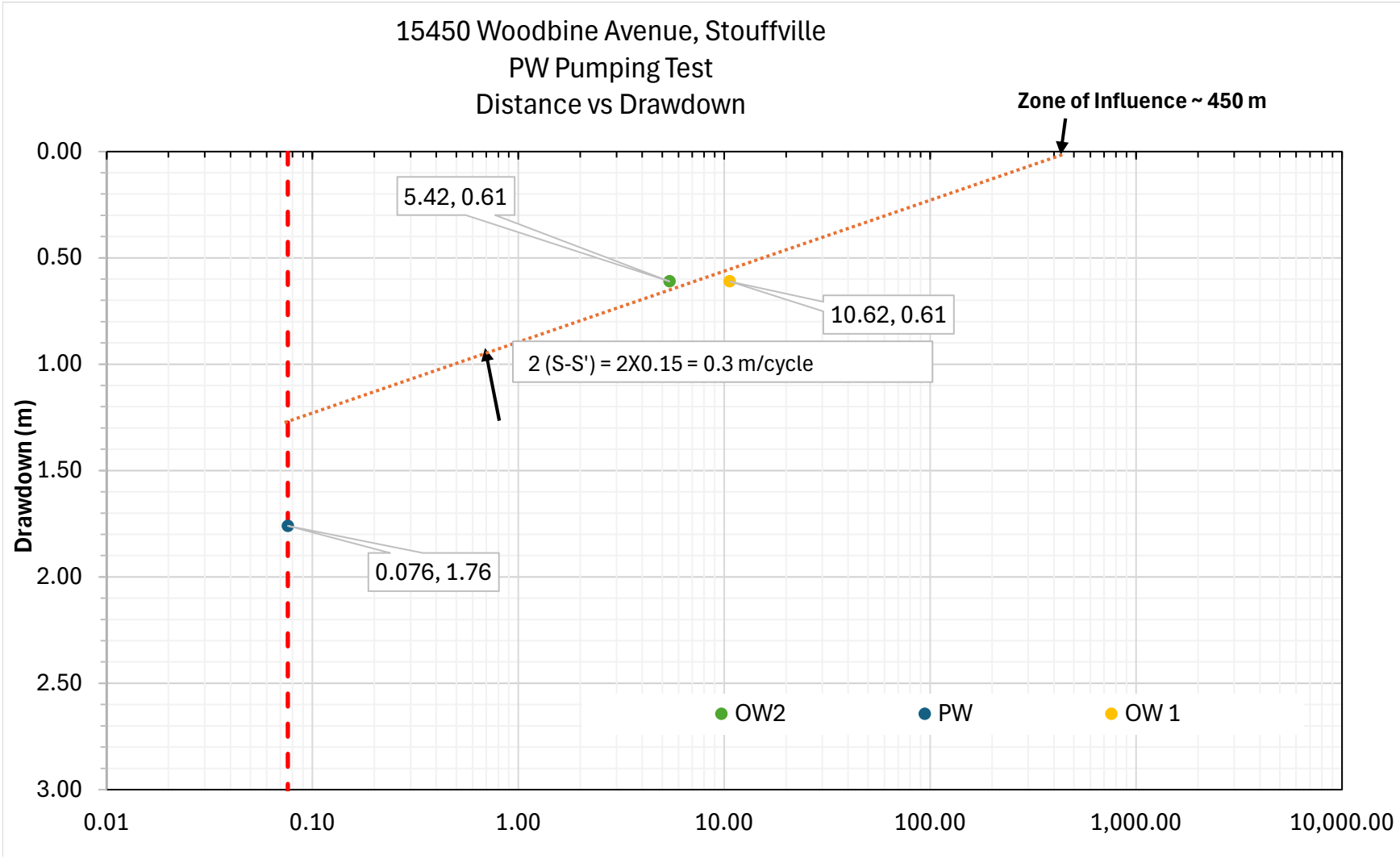

15450 Woodbine Avenue, Stouffville
PW Pumping Test
Distance vs Drawdown
Zone of Influence ~ 450 m
5.42, 0.61
10.62, 0.61
2 (S-S') = 2X0.15 = 0.3 m/cycle
0.076, 1.76
Drawdown (m)
0.00
0.50
1.00
1.50
2.00
2.50
3.00
0.01
0.10
1.00
10.00
100.00
1,000.00
10,000.00
OW2
PW
OW 1

Figure 4of 4

Appendix H – Laboratory's Certificates of Analysis

Project No. BRM-21010864-C0
Hydrogeological Assessment
15450 Woodbine Avenue, Stouffville, Ontario

SUMMARY OF GROUNDWATER SAMPLE AGAINST PROVINCIAL WATER QUALITY OBJECTIVES

			SAMPLE ID:	BH202	
			SAMPLING DATE:	2023/02/28	
Report Group	**Parameter Name**	**PWQO**	**Units**	**Result**	**DL**
Nonyl Phenol and Nonyl Phenol Ethoxylate	Nonylphenol Ethoxylate (Total)		mg/L	<0.025	0.025
Nonyl Phenol and Nonyl Phenol Ethoxylate	Nonylphenol (Total)	0.00004	mg/L	<0.001	0.001
	Total Animal/Vegetable Oil and Grease		mg/L	0.8	0.5
	Total Oil & Grease		mg/L	1.3	0.5
	Total Oil & Grease Mineral/Synthetic	0.5	mg/L	0.5	0.5
Semi-Volatile Organics by GC-MS	Bis(2-ethylhexyl)phthalate	0.6	ug/L	<2.0	2
Semi-Volatile Organics by GC-MS	Di-N-butyl phthalate	4	ug/L	<2.0	2
Polychlorinated Biphenyls by GC-ECD	Total PCB	0.001	ug/L	<0.05	0.05
	Fluoride (F-)		mg/L	<0.10	0.1
	pH	6.5:8.5	pH	7.47	N/A
	Dissolved Sulphate (SO4)		mg/L	66	1
	Total Suspended Solids		mg/L	<10	10
Elements by Atomic Spectroscopy	Total Aluminum (Al)		ug/L	18	4.9
Elements by Atomic Spectroscopy	Total Antimony (Sb)	20	ug/L	<0.50	0.5
Elements by Atomic Spectroscopy	Total Arsenic (As)	100	ug/L	<1.0	1
Elements by Atomic Spectroscopy	Total Cadmium (Cd)	0.2	ug/L	<0.090	0.09
Elements by Atomic Spectroscopy	Total Chromium (Cr)		ug/L	<5.0	5
Elements by Atomic Spectroscopy	Total Cobalt (Co)	0.9	ug/L	0.79	0.5
Elements by Atomic Spectroscopy	Total Copper (Cu)	5	ug/L	1.1	0.9
Elements by Atomic Spectroscopy	Total Lead (Pb)	5	ug/L	<0.50	0.5
Elements by Atomic Spectroscopy	Total Manganese (Mn)		ug/L	74	2
Elements by Atomic Spectroscopy	Total Molybdenum (Mo)	40	ug/L	4.3	0.5
Elements by Atomic Spectroscopy	Total Nickel (Ni)	25	ug/L	3.3	1
Elements by Atomic Spectroscopy	Total Phosphorus (P)	10	ug/L	<100	100
Elements by Atomic Spectroscopy	Total Selenium (Se)	100	ug/L	<2.0	2
Elements by Atomic Spectroscopy	Total Silver (Ag)	0.1	ug/L	<0.090	0.09
Elements by Atomic Spectroscopy	Total Tin (Sn)		ug/L	1.9	1
Elements by Atomic Spectroscopy	Total Titanium (Ti)		ug/L	<5.0	5
Elements by Atomic Spectroscopy	Total Zinc (Zn)	30	ug/L	<5.0	5
	Total Carbonaceous BOD		mg/L	<2	2
	Total Cyanide (CN)		mg/L	<0.0050	0.005
	Total Kjeldahl Nitrogen (TKN)		mg/L	3.8	1
	Phenols-4AAP	0.001	mg/L	<0.0010	0.001
Elements by Atomic Spectroscopy	Mercury (Hg)	0.0002	mg/L	<0.00010	0.0001
Volatile Organics by GC/MS	Benzene	100	ug/L	<0.40	0.4
Volatile Organics by GC/MS	Chloroform		ug/L	<0.40	0.4
Volatile Organics by GC/MS	1,2-Dichlorobenzene	2.5	ug/L	<0.80	0.8
Volatile Organics by GC/MS	1,4-Dichlorobenzene	4	ug/L	<0.80	0.8
Volatile Organics by GC/MS	cis-1,2-Dichloroethylene	200	ug/L	<1.0	1
Volatile Organics by GC/MS	trans-1,3-Dichloropropene	7	ug/L	<0.80	0.8
Volatile Organics by GC/MS	Ethylbenzene	8	ug/L	<0.40	0.4
Volatile Organics by GC/MS	Methylene Chloride(Dichloromethane)	100	ug/L	<4.0	4
Volatile Organics by GC/MS	Methyl Ethyl Ketone (2-Butanone)	400	ug/L	<20	20
Volatile Organics by GC/MS	Styrene	4	ug/L	<0.80	0.8
Volatile Organics by GC/MS	1,1,2,2-Tetrachloroethane	70	ug/L	<0.80	0.8
Volatile Organics by GC/MS	Tetrachloroethylene	50	ug/L	<0.40	0.4
Volatile Organics by GC/MS	Toluene	0.8	ug/L	<0.40	0.4
Volatile Organics by GC/MS	Trichloroethylene	20	ug/L	<0.40	0.4
Volatile Organics by GC/MS	p+m-Xylene	2	ug/L	<0.40	0.4
Volatile Organics by GC/MS	o-Xylene	40	ug/L	<0.40	0.4
Volatile Organics by GC/MS	Total Xylenes		ug/L	<0.40	0.4

NOTES:

1) PWQO - Ontario Provincial Water Quality Objectives

2) Sample collected was for York Region Sewer discharge purposes, and is compared to PWQO as a preliminary assessment, however sample collection method and laboratory analyses may differ to meet PWQO objectives

3) Indicates RDL exceeds criteria:

Disclaimer: This is not an official certficate of analysis. For QC data and comments, please refer to the original reports issued by Bureau Veritas.

Your P.O. #: ENV-BRM
Your Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your C.O.C. #: N/A

Attention: Nataliya Tkach

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/05/21
Report #: R8157188
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4E3299
Received: 2024/05/13, 17:35

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/05/19	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/05/21	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2024/05/17	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/05/19	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/05/16	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/05/17	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2024/05/17	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2024/05/21		
Anion and Cation Sum	1	N/A	2024/05/21		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2024/05/13	CAM SOP-00551	MECP-E3407
Total Ammonia-N	1	N/A	2024/05/18	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (3)	1	N/A	2024/05/15	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	1	2024/05/16	2024/05/19	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/05/17	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C)	1	N/A	2024/05/21		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2024/05/21		Auto Calc
Sulphate by Automated Turbidimetry	1	N/A	2024/05/17	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc)	1	N/A	2024/05/21		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your P.O. #: ENV-BRM
Your Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your C.O.C. #: N/A

Attention: Nataliya Tkach

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/05/21
Report #: R8157188
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4E3299
Received: 2024/05/13, 17:35

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Metals analysis was performed on the sample 'as received'.
(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Bureau Veritas
21 May 2024 18:00:17

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C4E3299
Report Date: 2024/05/21

exp Services Inc
Client Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID				ZDS057			ZDS057		
Sampling Date				2024/05/13 15:30			2024/05/13 15:30		
COC Number				N/A			N/A		
	UNITS	MAC	A/O	PW	RDL	QC Batch	PW Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	3.03	N/A	9392539			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	150	1.0	9391444			
Calculated TDS	mg/L	-	500	180	1.0	9392542			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.7	1.0	9391444			
Cation Sum	me/L	-	-	4.08	N/A	9392539			
Hardness (CaCO3)	mg/L	-	80:100	**140**	1.0	9391445			
Ion Balance (% Difference)	%	-	-	14.7	N/A	9392538			
Langelier Index (@ 20C)	N/A	-	-	0.529		9392540			
Langelier Index (@ 4C)	N/A	-	-	0.278		9392541			
Saturation pH (@ 20C)	N/A	-	-	7.75		9392540			
Saturation pH (@ 4C)	N/A	-	-	8.00		9392541			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.56	0.050	9397251			
Conductivity	umho/cm	-	-	270	1.0	9399276	280	1.0	9399276
Dissolved Organic Carbon	mg/L	-	5	1.0	0.40	9394278			
Orthophosphate (P)	mg/L	-	-	<0.010	0.010	9396372			
pH	pH	-	6.5:8.5	8.28		9399279	8.28		9399279
Dissolved Sulphate (SO4)	mg/L	-	500	<1.0	1.0	9396371			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	150	1.0	9399275	150	1.0	9399275
Dissolved Chloride (Cl-)	mg/L	-	250	<1.0	1.0	9396368			
Nitrite (N)	mg/L	1	-	<0.010	0.010	9393469			
Nitrate (N)	mg/L	10	-	<0.10	0.10	9393469			
Metals									
Aluminum (Al)	ug/L	-	100	**520**	4.9	9397791			
Antimony (Sb)	ug/L	6	-	<0.50	0.50	9397791			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4E3299
Report Date: 2024/05/21

exp Services Inc
Client Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID				ZDS057			ZDS057		
Sampling Date				2024/05/13 15:30			2024/05/13 15:30		
COC Number				N/A			N/A		
	UNITS	MAC	A/O	PW	RDL	QC Batch	PW Lab-Dup	RDL	QC Batch
Arsenic (As)	ug/L	10	-	2.3	1.0	9397791			
Barium (Ba)	ug/L	1000	-	120	2.0	9397791			
Beryllium (Be)	ug/L	-	-	<0.40	0.40	9397791			
Boron (B)	ug/L	5000	-	70	10	9397791			
Cadmium (Cd)	ug/L	5	-	<0.090	0.090	9397791			
Calcium (Ca)	ug/L	-	-	28000	200	9397791			
Chromium (Cr)	ug/L	50	-	<5.0	5.0	9397791			
Cobalt (Co)	ug/L	-	-	0.56	0.50	9397791			
Copper (Cu)	ug/L	-	1000	3.6	0.90	9397791			
Iron (Fe)	ug/L	-	300	**810**	100	9397791			
Lead (Pb)	ug/L	10	-	0.83	0.50	9397791			
Lithium (Li)	ug/L	-	-	<5.0	5.0	9397791			
Magnesium (Mg)	ug/L	-	-	17000	50	9397791			
Manganese (Mn)	ug/L	-	50	48	2.0	9397791			
Molybdenum (Mo)	ug/L	-	-	1.6	0.50	9397791			
Nickel (Ni)	ug/L	-	-	1.3	1.0	9397791			
Phosphorus (P)	ug/L	-	-	<100	100	9397791			
Potassium (K)	ug/L	-	-	1000	200	9397791			
Selenium (Se)	ug/L	50	-	<2.0	2.0	9397791			
Silicon (Si)	ug/L	-	-	8100	50	9397791			
Silver (Ag)	ug/L	-	-	<0.090	0.090	9397791			
Sodium (Na)	ug/L	-	200000	26000	100	9397791			
Strontium (Sr)	ug/L	-	-	410	1.0	9397791			
Thallium (Tl)	ug/L	-	-	<0.050	0.050	9397791			
Titanium (Ti)	ug/L	-	-	31	5.0	9397791			
Uranium (U)	ug/L	20	-	0.21	0.10	9397791			
Vanadium (V)	ug/L	-	-	7.4	0.50	9397791			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4E3299
Report Date: 2024/05/21

exp Services Inc
Client Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID				ZDS057			ZDS057		
Sampling Date				2024/05/13 15:30			2024/05/13 15:30		
COC Number				N/A			N/A		
	UNITS	MAC	A/O	PW	RDL	QC Batch	PW Lab-Dup	RDL	QC Batch
Zinc (Zn)	ug/L	-	5000	<5.0	5.0	9397791			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4E3299
Report Date: 2024/05/21

exp Services Inc
Client Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

MICROBIOLOGY (WATER)

Bureau Veritas ID			ZDS057	
Sampling Date			2024/05/13 15:30	
COC Number			N/A	
	UNITS	MAC	PW	QC Batch
Microbiological				
Background	CFU/100mL	-	1300	9392863
Total Coliforms	CFU/100mL	0	**7**	9392863
Escherichia coli	CFU/100mL	0	0	9392863

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

QC Batch = Quality Control Batch
MAC: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4E3299
Report Date: 2024/05/21

exp Services Inc
Client Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

TEST SUMMARY

Bureau Veritas ID: ZDS057
Sample ID: PW
Matrix: Water

Collected: 2024/05/13
Shipped:
Received: 2024/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9399275	N/A	2024/05/19	Kien Tran
Carbonate, Bicarbonate and Hydroxide	CALC	9391444	N/A	2024/05/21	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9396368	N/A	2024/05/17	Geetee Noorzaad
Conductivity	AT	9399276	N/A	2024/05/19	Kien Tran
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9394278	N/A	2024/05/16	Gyulshen Idriz
Hardness (calculated as CaCO3)		9391445	N/A	2024/05/17	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9397791	N/A	2024/05/17	Prempal Bhatti
Ion Balance (% Difference)	CALC	9392538	N/A	2024/05/21	Automated Statchk
Anion and Cation Sum	CALC	9392539	N/A	2024/05/21	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9392863	N/A	2024/05/13	Farhana Rahman
Total Ammonia-N	LACH/NH4	9397251	N/A	2024/05/18	Massarat Jan
Nitrate & Nitrite as Nitrogen in Water	LACH	9393469	N/A	2024/05/15	Jinal Chavda
pH	AT	9399279	2024/05/16	2024/05/19	Kien Tran
Orthophosphate	KONE	9396372	N/A	2024/05/17	Geetee Noorzaad
Sat. pH and Langelier Index (@ 20C)	CALC	9392540	N/A	2024/05/21	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9392541	N/A	2024/05/21	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9396371	N/A	2024/05/17	Geetee Noorzaad
Total Dissolved Solids (TDS calc)	CALC	9392542	N/A	2024/05/21	Automated Statchk

Bureau Veritas ID: ZDS057 Dup
Sample ID: PW
Matrix: Water

Collected: 2024/05/13
Shipped:
Received: 2024/05/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9399275	N/A	2024/05/19	Kien Tran
Conductivity	AT	9399276	N/A	2024/05/19	Kien Tran
pH	AT	9399279	2024/05/16	2024/05/19	Kien Tran

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9393469	Nitrate (N)	2024/05/15	NC	80 - 120	98	80 - 120	<0.10	mg/L	0.26	20
9393469	Nitrite (N)	2024/05/15	99	80 - 120	98	80 - 120	<0.010	mg/L	NC	20
9394278	Dissolved Organic Carbon	2024/05/16	91	80 - 120	96	80 - 120	<0.40	mg/L	1.2	20
9396368	Dissolved Chloride (Cl-)	2024/05/17	86	80 - 120	93	80 - 120	<1.0	mg/L	8.8	20
9396371	Dissolved Sulphate (SO4)	2024/05/17	91	75 - 125	95	80 - 120	<1.0	mg/L	14	20
9396372	Orthophosphate (P)	2024/05/17	96	75 - 125	94	80 - 120	<0.010	mg/L	NC	20
9397251	Total Ammonia-N	2024/05/18	98	75 - 125	100	80 - 120	<0.050	mg/L	NC	20
9397791	Aluminum (Al)	2024/05/17	105	80 - 120	100	80 - 120	<4.9	ug/L	NC	20
9397791	Antimony (Sb)	2024/05/17	122 (1)	80 - 120	107	80 - 120	<0.50	ug/L	NC	20
9397791	Arsenic (As)	2024/05/17	109	80 - 120	102	80 - 120	<1.0	ug/L	NC	20
9397791	Barium (Ba)	2024/05/17	106	80 - 120	101	80 - 120	<2.0	ug/L	0.017	20
9397791	Beryllium (Be)	2024/05/17	106	80 - 120	100	80 - 120	<0.40	ug/L	NC	20
9397791	Boron (B)	2024/05/17	102	80 - 120	99	80 - 120	<10	ug/L	1.8	20
9397791	Cadmium (Cd)	2024/05/17	111	80 - 120	103	80 - 120	<0.090	ug/L	NC	20
9397791	Calcium (Ca)	2024/05/17	NC	80 - 120	107	80 - 120	<200	ug/L	4.3	20
9397791	Chromium (Cr)	2024/05/17	107	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
9397791	Cobalt (Co)	2024/05/17	107	80 - 120	102	80 - 120	<0.50	ug/L	NC	20
9397791	Copper (Cu)	2024/05/17	108	80 - 120	100	80 - 120	<0.90	ug/L	0.33	20
9397791	Iron (Fe)	2024/05/17	111	80 - 120	105	80 - 120	<100	ug/L	1.7	20
9397791	Lead (Pb)	2024/05/17	105	80 - 120	102	80 - 120	<0.50	ug/L	4.3	20
9397791	Lithium (Li)	2024/05/17	111	80 - 120	106	80 - 120	<5.0	ug/L	1.1	20
9397791	Magnesium (Mg)	2024/05/17	NC	80 - 120	104	80 - 120	<50	ug/L	4.6	20
9397791	Manganese (Mn)	2024/05/17	106	80 - 120	101	80 - 120	<2.0	ug/L	2.0	20
9397791	Molybdenum (Mo)	2024/05/17	116	80 - 120	106	80 - 120	<0.50	ug/L	16	20
9397791	Nickel (Ni)	2024/05/17	106	80 - 120	102	80 - 120	<1.0	ug/L	3.7	20
9397791	Phosphorus (P)	2024/05/17	112	80 - 120	102	80 - 120	<100	ug/L	NC	20
9397791	Potassium (K)	2024/05/17	110	80 - 120	104	80 - 120	<200	ug/L	2.0	20
9397791	Selenium (Se)	2024/05/17	105	80 - 120	102	80 - 120	<2.0	ug/L	NC	20
9397791	Silicon (Si)	2024/05/17	108	80 - 120	105	80 - 120	<50	ug/L	5.3	20
9397791	Silver (Ag)	2024/05/17	109	80 - 120	103	80 - 120	<0.090	ug/L	NC	20

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9397791	Sodium (Na)	2024/05/17	NC	80 - 120	105	80 - 120	<100	ug/L	5.1	20
9397791	Strontium (Sr)	2024/05/17	NC	80 - 120	105	80 - 120	<1.0	ug/L	0.97	20
9397791	Thallium (Tl)	2024/05/17	107	80 - 120	102	80 - 120	<0.050	ug/L	NC	20
9397791	Titanium (Ti)	2024/05/17	109	80 - 120	105	80 - 120	<5.0	ug/L	NC	20
9397791	Uranium (U)	2024/05/17	109	80 - 120	102	80 - 120	<0.10	ug/L	1.1	20
9397791	Vanadium (V)	2024/05/17	110	80 - 120	102	80 - 120	<0.50	ug/L	NC	20
9397791	Zinc (Zn)	2024/05/17	107	80 - 120	102	80 - 120	<5.0	ug/L	19	20
9399275	Alkalinity (Total as CaCO3)	2024/05/19			97	85 - 115	<1.0	mg/L	0.77	20
9399276	Conductivity	2024/05/19			99	85 - 115	<1.0	umho/cm	1.2	10
9399279	pH	2024/05/19			102	98 - 103			0.050	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Matrix spike exceeds acceptance limits. Probable matrix interference.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere

Cristina Carriere, Senior Scientific Specialist

Farhana Rahman

Farhana Rahman, Senior Analyst

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

MICRO

www.BVNA.com

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266

CHAIN OF CUSTODY RECORD

ENV COC - 00014v5

NONT-2024-05-1443

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	EXP Services Inc	Company:	EXP services Inc	Quotation #:	
Contact Name:	Accounts Payable	Contact Name:	Nataliya Tkach	P.O. #/ AFE#:	ENV-BRM
Street Address:	1595 clark Blvd	Street Address:	1595 Clark Blvd	Project #:	GTTL-21010884-C1
City:	Brampton Prov: ON Postal Code: L6T4V1	City:	Brampton Prov: ON Postal Code: L6T4V1	Site #:	15450 Weedbine Ave
Phone:		Phone:		Site Location:	Stouffville ON
Email:	AP@exp.com	Email:	Nataliya.Tkach@exp.com	Site Location Province:	Ontario
Copies:		Copies:	Edwin.Caussell@exp.com	Sampled By:	EC

Regulatory Criteria

REG 153: ☐ Table 1 ☐ Table 2 ☐ Table 3 ☐ Table ____ | ☐ Res/Park ☐ Ind/Comm ☐ Agri/other | ☐ Med/Fine ☐ Coarse ☐ For RSC

OTHER: ☐ CCME ☐ Reg 558* ☐ MISA ☐ PWQO | ☐ Reg 406, Table: ____ ☐ Sanitary Sewer Bylaw ☐ Storm Sewer Bylaw Municipality ☒ Other: ODWS | *min 3 day TAT

Include Criteria on Certificate of Analysis (check if yes): ☑ Yes

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

	Sample Identification (Please print or Type)	Date Sampled YYYY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX/ F1	5 F2 - F4	6 VOCs	7 Reg 153 metals and inorganics	8 Reg 153 ICPMS metals	9 Reg 153 metals (Hg, Cr VI, ICPMS metals, HWS - B)	10 RCAP Comp. compared to ODWS	11	12 Microbiology total coliform + ecoli	13	14	15	16	17	18	19	20	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE
1	PW	24	5	13	15	30	GW										X		X									5	
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													
11																													
12																													

Regular Turnaround Time (TAT)

☒ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply

☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YYYY MM DD

Comments

Please include COC in final Report

Please include - Nitrate + Nitrite from generals

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present	☑					
Seal intact	☑					
Cooling media present	☐					

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

Relinquished by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Special instructions
1	2024	5	13	17	30	1	2024	05	13	17	35	
2 Edwin Caussell						2						

Bureau Veritas Job #: C4E3299
Report Date: 2024/05/21

exp Services Inc
Client Project #: GTR-21010884-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE, ON
Your P.O. #: ENV-BRM
Sampler Initials: EC

Exceedance Summary Table – DW for Human Consumption

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Exceedance Summary Table – ODWS (2002)

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
PW	ZDS057-05	Total Coliforms	0	7	N/A	CFU/100mL

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Your C.O.C. #: 1014408-01-01

Attention: Nataliya Tkach

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/10/07
Report #: R8352169
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4U8676
Received: 2024/10/02, 14:23

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/10/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/10/07	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2024/10/04	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/10/05	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/10/03	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/10/03	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2024/10/03	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2024/10/07		
Anion and Cation Sum	1	N/A	2024/10/07		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2024/10/02	CAM SOP-00551	MECP-E3407
Total Ammonia-N	1	N/A	2024/10/07	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (3)	1	N/A	2024/10/04	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	1	2024/10/04	2024/10/05	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/10/04	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C)	1	N/A	2024/10/07		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2024/10/07		Auto Calc
Sulphate by Automated Turbidimetry	1	N/A	2024/10/04	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc)	1	N/A	2024/10/07		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Your Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Your C.O.C. #: 1014408-01-01

Attention: Nataliya Tkach

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/10/07
Report #: R8352169
Version: 2 - Revision

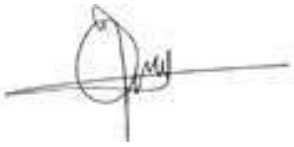
CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4U8676
Received: 2024/10/02, 14:23

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Metals analysis was performed on the sample 'as received'.
(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key



Patricia Legette
Project Manager
07 Oct 2024 18:01:56

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C4U8676
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID				AEPN71			AEPN71		
Sampling Date				2024/10/01 16:30			2024/10/01 16:30		
COC Number				1014408-01-01			1014408-01-01		
	UNITS	MAC	A/O	PW-OCT1	RDL	QC Batch	PW-OCT1 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	3.13	N/A	9676088			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	150	1.0	9676086			
Calculated TDS	mg/L	-	500	170	1.0	9676091			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.5	1.0	9676086			
Cation Sum	me/L	-	-	2.99	N/A	9676088			
Hardness (CaCO3)	mg/L	-	80:100	100	1.0	9675452			
Ion Balance (% Difference)	%	-	-	2.44	N/A	9676087			
Langelier Index (@ 20C)	N/A	-	-	0.285		9676089			
Langelier Index (@ 4C)	N/A	-	-	0.0350		9676090			
Saturation pH (@ 20C)	N/A	-	-	7.96		9676089			
Saturation pH (@ 4C)	N/A	-	-	8.21		9676090			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.27	0.050	9686392	0.29	0.050	9686392
Conductivity	umho/cm	-	-	280	1.0	9683727			
Dissolved Organic Carbon	mg/L	-	5	0.82	0.40	9680713			
Orthophosphate (P)	mg/L	-	-	0.017	0.010	9680772			
pH	pH	-	6.5:8.5	8.24		9683719			
Dissolved Sulphate (SO4)	mg/L	-	500	2.1	1.0	9680771			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	150	1.0	9683726			
Dissolved Chloride (Cl-)	mg/L	-	250	<1.0	1.0	9680770			
Nitrite (N)	mg/L	1	-	<0.010	0.010	9680838			
Nitrate (N)	mg/L	10	-	<0.10	0.10	9680838			
Metals									
Aluminum (Al)	ug/L	-	100	<4.9	4.9	9678629	<4.9	4.9	9678629
Antimony (Sb)	ug/L	6	-	<0.50	0.50	9678629	<0.50	0.50	9678629
Arsenic (As)	ug/L	10	-	2.8	1.0	9678629	3.1	1.0	9678629

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8676
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID				AEPN71			AEPN71		
Sampling Date				2024/10/01 16:30			2024/10/01 16:30		
COC Number				1014408-01-01			1014408-01-01		
	UNITS	MAC	A/O	PW-OCT1	RDL	QC Batch	PW-OCT1 Lab-Dup	RDL	QC Batch
Barium (Ba)	ug/L	1000	-	80	2.0	9678629	80	2.0	9678629
Beryllium (Be)	ug/L	-	-	<0.40	0.40	9678629	<0.40	0.40	9678629
Boron (B)	ug/L	5000	-	54	10	9678629	55	10	9678629
Cadmium (Cd)	ug/L	5	-	<0.090	0.090	9678629	<0.090	0.090	9678629
Calcium (Ca)	ug/L	-	-	17000	200	9678629	16000	200	9678629
Chromium (Cr)	ug/L	50	-	<5.0	5.0	9678629	<5.0	5.0	9678629
Cobalt (Co)	ug/L	-	-	<0.50	0.50	9678629	<0.50	0.50	9678629
Copper (Cu)	ug/L	-	1000	4.8	0.90	9678629	4.7	0.90	9678629
Iron (Fe)	ug/L	-	300	110	100	9678629	110	100	9678629
Lead (Pb)	ug/L	10	-	<0.50	0.50	9678629	<0.50	0.50	9678629
Lithium (Li)	ug/L	-	-	<5.0	5.0	9678629	<5.0	5.0	9678629
Magnesium (Mg)	ug/L	-	-	15000	50	9678629	15000	50	9678629
Manganese (Mn)	ug/L	-	50	14	2.0	9678629	14	2.0	9678629
Molybdenum (Mo)	ug/L	-	-	1.7	0.50	9678629	1.7	0.50	9678629
Nickel (Ni)	ug/L	-	-	<1.0	1.0	9678629	<1.0	1.0	9678629
Phosphorus (P)	ug/L	-	-	<100	100	9678629	<100	100	9678629
Potassium (K)	ug/L	-	-	710	200	9678629	700	200	9678629
Selenium (Se)	ug/L	50	-	<2.0	2.0	9678629	<2.0	2.0	9678629
Silicon (Si)	ug/L	-	-	8200	50	9678629	8000	50	9678629
Silver (Ag)	ug/L	-	-	<0.090	0.090	9678629	<0.090	0.090	9678629
Sodium (Na)	ug/L	-	200000	20000	100	9678629	20000	100	9678629
Strontium (Sr)	ug/L	-	-	380	1.0	9678629	390	1.0	9678629
Thallium (Tl)	ug/L	-	-	<0.050	0.050	9678629	<0.050	0.050	9678629
Titanium (Ti)	ug/L	-	-	<5.0	5.0	9678629	<5.0	5.0	9678629
Uranium (U)	ug/L	20	-	<0.10	0.10	9678629	<0.10	0.10	9678629
Vanadium (V)	ug/L	-	-	<0.50	0.50	9678629	<0.50	0.50	9678629
Zinc (Zn)	ug/L	-	5000	14	5.0	9678629	15	5.0	9678629

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8676
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

MICROBIOLOGY (WATER)

Bureau Veritas ID			AEPN71	
Sampling Date			2024/10/01 16:30	
COC Number			1014408-01-01	
	UNITS	MAC	PW-OCT1	QC Batch
Microbiological				
Background	CFU/100mL	-	210	9678017
Total Coliforms	CFU/100mL	0	0	9678017
Escherichia coli	CFU/100mL	0	0	9678017

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

QC Batch = Quality Control Batch

MAC: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8676
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

TEST SUMMARY

Bureau Veritas ID: AEPN71
Sample ID: PW-OCT1
Matrix: Water

Collected: 2024/10/01
Shipped:
Received: 2024/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9683726	N/A	2024/10/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9676086	N/A	2024/10/07	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9680770	N/A	2024/10/04	Alina Dobreanu
Conductivity	AT	9683727	N/A	2024/10/05	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9680713	N/A	2024/10/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9675452	N/A	2024/10/03	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9678629	N/A	2024/10/03	Azita Fazaeli
Ion Balance (% Difference)	CALC	9676087	N/A	2024/10/07	Automated Statchk
Anion and Cation Sum	CALC	9676088	N/A	2024/10/07	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9678017	N/A	2024/10/02	Jessica (Ya Ping) Qiang
Total Ammonia-N	SKAL/NH4	9686392	N/A	2024/10/07	Muskan
Nitrate & Nitrite as Nitrogen in Water	LACH	9680838	N/A	2024/10/04	Chandra Nandlal
pH	AT	9683719	2024/10/04	2024/10/05	Nachiketa Gohil
Orthophosphate	SKAL	9680772	N/A	2024/10/04	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9676089	N/A	2024/10/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9676090	N/A	2024/10/07	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9680771	N/A	2024/10/04	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9676091	N/A	2024/10/07	Automated Statchk

Bureau Veritas ID: AEPN71 Dup
Sample ID: PW-OCT1
Matrix: Water

Collected: 2024/10/01
Shipped:
Received: 2024/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Metals Analysis by ICPMS (as received)	ICP/MS	9678629	N/A	2024/10/03	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9686392	N/A	2024/10/07	Muskan

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8676
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C

Revised Report (2024/10/07): ODWS criteria policy has been included in this CofA.

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8676
Report Date: 2024/10/07

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9678629	Aluminum (Al)	2024/10/03	97	80 - 120	96	80 - 120	<4.9	ug/L	NC	20
9678629	Antimony (Sb)	2024/10/03	102	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
9678629	Arsenic (As)	2024/10/03	98	80 - 120	99	80 - 120	<1.0	ug/L	13	20
9678629	Barium (Ba)	2024/10/03	98	80 - 120	98	80 - 120	<2.0	ug/L	0.29	20
9678629	Beryllium (Be)	2024/10/03	95	80 - 120	96	80 - 120	<0.40	ug/L	NC	20
9678629	Boron (B)	2024/10/03	94	80 - 120	93	80 - 120	<10	ug/L	1.6	20
9678629	Cadmium (Cd)	2024/10/03	99	80 - 120	96	80 - 120	<0.090	ug/L	NC	20
9678629	Calcium (Ca)	2024/10/03	94	80 - 120	97	80 - 120	<200	ug/L	4.8	20
9678629	Chromium (Cr)	2024/10/03	95	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
9678629	Cobalt (Co)	2024/10/03	95	80 - 120	96	80 - 120	<0.50	ug/L	NC	20
9678629	Copper (Cu)	2024/10/03	97	80 - 120	95	80 - 120	<0.90	ug/L	2.4	20
9678629	Iron (Fe)	2024/10/03	97	80 - 120	99	80 - 120	<100	ug/L	1.3	20
9678629	Lead (Pb)	2024/10/03	95	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
9678629	Lithium (Li)	2024/10/03	106	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
9678629	Magnesium (Mg)	2024/10/03	93	80 - 120	94	80 - 120	<50	ug/L	1.5	20
9678629	Manganese (Mn)	2024/10/03	96	80 - 120	96	80 - 120	<2.0	ug/L	1.3	20
9678629	Molybdenum (Mo)	2024/10/03	98	80 - 120	96	80 - 120	<0.50	ug/L	1.8	20
9678629	Nickel (Ni)	2024/10/03	93	80 - 120	94	80 - 120	<1.0	ug/L	NC	20
9678629	Phosphorus (P)	2024/10/03	101	80 - 120	94	80 - 120	<100	ug/L	NC	20
9678629	Potassium (K)	2024/10/03	96	80 - 120	97	80 - 120	<200	ug/L	1.9	20
9678629	Selenium (Se)	2024/10/03	97	80 - 120	97	80 - 120	<2.0	ug/L	NC	20
9678629	Silicon (Si)	2024/10/03	94	80 - 120	95	80 - 120	<50	ug/L	2.2	20
9678629	Silver (Ag)	2024/10/03	93	80 - 120	94	80 - 120	<0.090	ug/L	NC	20
9678629	Sodium (Na)	2024/10/03	90	80 - 120	93	80 - 120	<100	ug/L	2.4	20
9678629	Strontium (Sr)	2024/10/03	99	80 - 120	99	80 - 120	<1.0	ug/L	3.0	20
9678629	Thallium (Tl)	2024/10/03	99	80 - 120	102	80 - 120	<0.050	ug/L	NC	20
9678629	Titanium (Ti)	2024/10/03	99	80 - 120	97	80 - 120	<5.0	ug/L	NC	20
9678629	Uranium (U)	2024/10/03	96	80 - 120	96	80 - 120	<0.10	ug/L	NC	20
9678629	Vanadium (V)	2024/10/03	95	80 - 120	96	80 - 120	<0.50	ug/L	NC	20
9678629	Zinc (Zn)	2024/10/03	95	80 - 120	96	80 - 120	<5.0	ug/L	8.8	20
9680713	Dissolved Organic Carbon	2024/10/03	NC	80 - 120	95	80 - 120	<0.40	mg/L	0.90	20

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9680770	Dissolved Chloride (Cl-)	2024/10/04	NC	80 - 120	98	80 - 120	<1.0	mg/L	0.96	20
9680771	Dissolved Sulphate (SO4)	2024/10/04	NC	75 - 125	91	80 - 120	<1.0	mg/L	2.0	20
9680772	Orthophosphate (P)	2024/10/04	93	75 - 125	98	80 - 120	<0.010	mg/L	NC	20
9680838	Nitrate (N)	2024/10/04	96	80 - 120	99	80 - 120	<0.10	mg/L	NC	20
9680838	Nitrite (N)	2024/10/04	102	80 - 120	103	80 - 120	<0.010	mg/L	NC	20
9683719	pH	2024/10/05			102	98 - 103			0.022	N/A
9683726	Alkalinity (Total as CaCO3)	2024/10/05			99	85 - 115	<1.0	mg/L	1.0	20
9683727	Conductivity	2024/10/05			102	85 - 115	<1.0	umho/cm	0.74	10
9686392	Total Ammonia-N	2024/10/07	93	75 - 125	93	80 - 120	<0.050	mg/L	7.1	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8676
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere, Senior Scientific Specialist

Jessica (Ya Ping) Qiang, Analyst II

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

ONTARIO DRINKING WATER CHAIN OF CUSTODY RECORD

BUREAU VERITAS

6660 & 6740 Campobello Rd, Mississauga, Ontario Canada L5N 2L8 www.bvna.com
Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:905-817-5779

MICRO

Bottle Order #: 1014408 COC #: C#1014408-01-01

Please indicate which regulation applies to the samples being submitted:

☐ 170 ☐ 318/319 ☐ 243 ☐ 170Pb
☒ Not regulated (however water is for human consumption)

CAM FCD-01101/2

Page of

INVOICE TO:

Company Name: #30554 exp Services Inc
Attention: Accounts Payable
Address: 1595 Clark Blvd Brampton ON L6T 4V1
Tel: (905) 793-9800 Project: GTR-21010864-C1
Fax: (905) 793-0641 P.O. #:
Email: AP@exp.com; Karen.Burke@exp.com

REPORT TO:

Same as Invoice To ☒
Company Name:
Attention: Nataliya Tkach
Address:
Tel: (905) 793-9800 Ext: 3621 Fax:
Email: Nataliya.Tkach@exp.com

***DRINKING WATER TYPE LEGEND: [R=Raw Water] [T=Treated/POE] [D=Distribution] [P=Plumbing] [S=Standing] [F=Flushed]**

	Sample Identification/Location	Date Sampled	Time Sampled	*WATER TYPE (R,T,D,P,S,F)	MOE/MOH Adverse Notifcation Required? Yes	MOE/MOH Adverse Notifcation Required? No	Field Chlorine Free	Field Chlorine Total	Field Turbidity	Field pH	Watertrax SPL#	Resample Y/N?	# of Bottles	Analysis Requested: RCAp - Comprehensive (Drinking	Analysis Requested: Total Coliforms/ E. coli, CFU/100mL
1	PW-OCT1	OCT 1,24	16:30	R		X									
2						X	/	/	0	6.88	/	N	5	X	X
3															
4															
5															
6															
7															
8															
9															
10															

C4U8676
NONT-2024-10-502

IT IS MANDATORY THAT ALL NOTIFICATION INFORMATION BELOW BE COMPLETED PRIOR TO ANALYSIS FOR REGULATED DRINKING WATER SUBMISSIONS.

TAT (TURNAROUND TIME):

RUSH TAT MUST HAVE PRIOR APPROVAL

☒ Regular (5-15 Working Days)
☐ RUSH (Specify Below)

Date Due:
RUSH #

ADVERSE NOTIFICATION INFORMATION

Waterworks Name: .
Waterworks Number: .
Address:
Contact:
Tel: Fax:
Cell:
Email:

Medical Officer of Health/Public Health Unit

Name/Region:
Contact:
Address:
Tel:
Fax:
After Hours:

LABORATORY USE ONLY

Received By (Print):
Received By (Sign):
Date: Time:
Comments
Receiving Temp: 4 | 8
Cooling Media Present Y/N?
Metals Preservation Check Y/N?

Sampled By (Print): MICHAEL HOLMES Sampled By (Sign):
*Relinquished By (Print): MICHAEL HOLMES *Relinquished By (Sign):
Date: OCT 1, 2024 Time: 13:00
Date: OCT 2, 2024 Time: 13:00

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

Exceedance Summary Table – DW for Human Consumption

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Exceedance Summary Table – ODWS (2002)

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Your C.O.C. #: 1014408-02-01

Attention: Nataliya Tkach

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/10/07
Report #: R8352164
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4U8681
Received: 2024/10/02, 14:23

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/10/05	CAM SOP-00448	SM 24 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2024/10/07	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2024/10/04	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/10/05	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/10/03	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/10/03	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2024/10/03	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2024/10/07		
Anion and Cation Sum	1	N/A	2024/10/07		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2024/10/02	CAM SOP-00551	MECP-E3407
Total Ammonia-N	1	N/A	2024/10/07	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (3)	1	N/A	2024/10/04	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH	1	2024/10/04	2024/10/05	CAM SOP-00413	SM 24th - 4500H+ B
Orthophosphate	1	N/A	2024/10/04	CAM SOP-00461	SM 24 4500-P E
Sat. pH and Langelier Index (@ 20C)	1	N/A	2024/10/07		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2024/10/07		Auto Calc
Sulphate by Automated Turbidimetry	1	N/A	2024/10/04	CAM SOP-00464	SM 24 4500-SO42- E m
Total Dissolved Solids (TDS calc)	1	N/A	2024/10/07		Auto Calc

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report.

Your Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Your C.O.C. #: 1014408-02-01

Attention: Nataliya Tkach

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/10/07
Report #: R8352164
Version: 2 - Revision

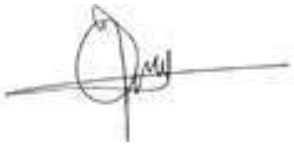
CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4U8681
Received: 2024/10/02, 14:23

Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Metals analysis was performed on the sample 'as received'.
(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key



Patricia Legette
Project Manager
07 Oct 2024 17:58:20

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8681
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID				AEPP48			AEPP48		
Sampling Date				2024/10/02 12:00			2024/10/02 12:00		
COC Number				1014408-02-01			1014408-02-01		
	UNITS	MAC	A/O	PW-OCT2	RDL	QC Batch	PW-OCT2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Anion Sum	me/L	-	-	3.05	N/A	9676088			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	150	1.0	9676086			
Calculated TDS	mg/L	-	500	160	1.0	9676091			
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.5	1.0	9676086			
Cation Sum	me/L	-	-	2.92	N/A	9676088			
Hardness (CaCO3)	mg/L	-	80:100	97	1.0	9675452			
Ion Balance (% Difference)	%	-	-	2.17	N/A	9676087			
Langelier Index (@ 20C)	N/A	-	-	0.238		9676089			
Langelier Index (@ 4C)	N/A	-	-	-0.0120		9676090			
Saturation pH (@ 20C)	N/A	-	-	8.02		9676089			
Saturation pH (@ 4C)	N/A	-	-	8.27		9676090			
Inorganics									
Total Ammonia-N	mg/L	-	-	0.28	0.050	9686392			
Conductivity	umho/cm	-	-	270	1.0	9683727	280	1.0	9683727
Dissolved Organic Carbon	mg/L	-	5	0.83	0.40	9680713			
Orthophosphate (P)	mg/L	-	-	0.015	0.010	9680772			
pH	pH	-	6.5:8.5	8.26		9683719	8.26		9683719
Dissolved Sulphate (SO4)	mg/L	-	500	1.3	1.0	9680771			
Alkalinity (Total as CaCO3)	mg/L	-	30:500	150	1.0	9683726	150	1.0	9683726
Dissolved Chloride (Cl-)	mg/L	-	250	<1.0	1.0	9680770			
Nitrite (N)	mg/L	1	-	<0.010	0.010	9680838	<0.010	0.010	9680838
Nitrate (N)	mg/L	10	-	<0.10	0.10	9680838	<0.10	0.10	9680838
Metals									
Aluminum (Al)	ug/L	-	100	6.6	4.9	9678629			
Antimony (Sb)	ug/L	6	-	<0.50	0.50	9678629			
Arsenic (As)	ug/L	10	-	2.6	1.0	9678629			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)
N/A = Not Applicable

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8681
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

RCAP - COMPREHENSIVE (DRINKING WATER)

Bureau Veritas ID				AEPP48			AEPP48		
Sampling Date				2024/10/02 12:00			2024/10/02 12:00		
COC Number				1014408-02-01			1014408-02-01		
	UNITS	MAC	A/O	PW-OCT2	RDL	QC Batch	PW-OCT2 Lab-Dup	RDL	QC Batch
Barium (Ba)	ug/L	1000	-	82	2.0	9678629			
Beryllium (Be)	ug/L	-	-	<0.40	0.40	9678629			
Boron (B)	ug/L	5000	-	58	10	9678629			
Cadmium (Cd)	ug/L	5	-	<0.090	0.090	9678629			
Calcium (Ca)	ug/L	-	-	15000	200	9678629			
Chromium (Cr)	ug/L	50	-	<5.0	5.0	9678629			
Cobalt (Co)	ug/L	-	-	<0.50	0.50	9678629			
Copper (Cu)	ug/L	-	1000	7.0	0.90	9678629			
Iron (Fe)	ug/L	-	300	<100	100	9678629			
Lead (Pb)	ug/L	10	-	0.67	0.50	9678629			
Lithium (Li)	ug/L	-	-	<5.0	5.0	9678629			
Magnesium (Mg)	ug/L	-	-	15000	50	9678629			
Manganese (Mn)	ug/L	-	50	10	2.0	9678629			
Molybdenum (Mo)	ug/L	-	-	1.8	0.50	9678629			
Nickel (Ni)	ug/L	-	-	<1.0	1.0	9678629			
Phosphorus (P)	ug/L	-	-	<100	100	9678629			
Potassium (K)	ug/L	-	-	680	200	9678629			
Selenium (Se)	ug/L	50	-	<2.0	2.0	9678629			
Silicon (Si)	ug/L	-	-	7400	50	9678629			
Silver (Ag)	ug/L	-	-	<0.090	0.090	9678629			
Sodium (Na)	ug/L	-	200000	22000	100	9678629			
Strontium (Sr)	ug/L	-	-	370	1.0	9678629			
Thallium (Tl)	ug/L	-	-	<0.050	0.050	9678629			
Titanium (Ti)	ug/L	-	-	<5.0	5.0	9678629			
Uranium (U)	ug/L	20	-	<0.10	0.10	9678629			
Vanadium (V)	ug/L	-	-	<0.50	0.50	9678629			
Zinc (Zn)	ug/L	-	5000	23	5.0	9678629			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8681
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

MICROBIOLOGY (WATER)

Bureau Veritas ID			AEPP48	
Sampling Date			2024/10/02 12:00	
COC Number			1014408-02-01	
	UNITS	MAC	PW-OCT2	QC Batch
Microbiological				
Background	CFU/100mL	-	46	9678017
Total Coliforms	CFU/100mL	0	0	9678017
Escherichia coli	CFU/100mL	0	0	9678017

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

QC Batch = Quality Control Batch

MAC: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8681
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

TEST SUMMARY

Bureau Veritas ID: AEPP48
Sample ID: PW-OCT2
Matrix: Water

Collected: 2024/10/02
Shipped:
Received: 2024/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9683726	N/A	2024/10/05	Nachiketa Gohil
Carbonate, Bicarbonate and Hydroxide	CALC	9676086	N/A	2024/10/07	Automated Statchk
Chloride by Automated Colourimetry	SKAL	9680770	N/A	2024/10/04	Alina Dobreanu
Conductivity	AT	9683727	N/A	2024/10/05	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9680713	N/A	2024/10/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9675452	N/A	2024/10/03	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	9678629	N/A	2024/10/03	Azita Fazaeli
Ion Balance (% Difference)	CALC	9676087	N/A	2024/10/07	Automated Statchk
Anion and Cation Sum	CALC	9676088	N/A	2024/10/07	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	9678017	N/A	2024/10/02	Jessica (Ya Ping) Qiang
Total Ammonia-N	SKAL/NH4	9686392	N/A	2024/10/07	Muskan
Nitrate & Nitrite as Nitrogen in Water	LACH	9680838	N/A	2024/10/04	Chandra Nandlal
pH	AT	9683719	2024/10/04	2024/10/05	Nachiketa Gohil
Orthophosphate	SKAL	9680772	N/A	2024/10/04	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	9676089	N/A	2024/10/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	9676090	N/A	2024/10/07	Automated Statchk
Sulphate by Automated Turbidimetry	SKAL	9680771	N/A	2024/10/04	Alina Dobreanu
Total Dissolved Solids (TDS calc)	CALC	9676091	N/A	2024/10/07	Automated Statchk

Bureau Veritas ID: AEPP48 Dup
Sample ID: PW-OCT2
Matrix: Water

Collected: 2024/10/02
Shipped:
Received: 2024/10/02

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9683726	N/A	2024/10/05	Nachiketa Gohil
Conductivity	AT	9683727	N/A	2024/10/05	Nachiketa Gohil
Nitrate & Nitrite as Nitrogen in Water	LACH	9680838	N/A	2024/10/04	Chandra Nandlal
pH	AT	9683719	2024/10/04	2024/10/05	Nachiketa Gohil

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8681
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C

Revised Report (2024/10/07): ODWS criteria policy has been included in this CofA.

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9678629	Aluminum (Al)	2024/10/03	97	80 - 120	96	80 - 120	<4.9	ug/L	NC	20
9678629	Antimony (Sb)	2024/10/03	102	80 - 120	98	80 - 120	<0.50	ug/L	NC	20
9678629	Arsenic (As)	2024/10/03	98	80 - 120	99	80 - 120	<1.0	ug/L	13	20
9678629	Barium (Ba)	2024/10/03	98	80 - 120	98	80 - 120	<2.0	ug/L	0.29	20
9678629	Beryllium (Be)	2024/10/03	95	80 - 120	96	80 - 120	<0.40	ug/L	NC	20
9678629	Boron (B)	2024/10/03	94	80 - 120	93	80 - 120	<10	ug/L	1.6	20
9678629	Cadmium (Cd)	2024/10/03	99	80 - 120	96	80 - 120	<0.090	ug/L	NC	20
9678629	Calcium (Ca)	2024/10/03	94	80 - 120	97	80 - 120	<200	ug/L	4.8	20
9678629	Chromium (Cr)	2024/10/03	95	80 - 120	95	80 - 120	<5.0	ug/L	NC	20
9678629	Cobalt (Co)	2024/10/03	95	80 - 120	96	80 - 120	<0.50	ug/L	NC	20
9678629	Copper (Cu)	2024/10/03	97	80 - 120	95	80 - 120	<0.90	ug/L	2.4	20
9678629	Iron (Fe)	2024/10/03	97	80 - 120	99	80 - 120	<100	ug/L	1.3	20
9678629	Lead (Pb)	2024/10/03	95	80 - 120	97	80 - 120	<0.50	ug/L	NC	20
9678629	Lithium (Li)	2024/10/03	106	80 - 120	101	80 - 120	<5.0	ug/L	NC	20
9678629	Magnesium (Mg)	2024/10/03	93	80 - 120	94	80 - 120	<50	ug/L	1.5	20
9678629	Manganese (Mn)	2024/10/03	96	80 - 120	96	80 - 120	<2.0	ug/L	1.3	20
9678629	Molybdenum (Mo)	2024/10/03	98	80 - 120	96	80 - 120	<0.50	ug/L	1.8	20
9678629	Nickel (Ni)	2024/10/03	93	80 - 120	94	80 - 120	<1.0	ug/L	NC	20
9678629	Phosphorus (P)	2024/10/03	101	80 - 120	94	80 - 120	<100	ug/L	NC	20
9678629	Potassium (K)	2024/10/03	96	80 - 120	97	80 - 120	<200	ug/L	1.9	20
9678629	Selenium (Se)	2024/10/03	97	80 - 120	97	80 - 120	<2.0	ug/L	NC	20
9678629	Silicon (Si)	2024/10/03	94	80 - 120	95	80 - 120	<50	ug/L	2.2	20
9678629	Silver (Ag)	2024/10/03	93	80 - 120	94	80 - 120	<0.090	ug/L	NC	20
9678629	Sodium (Na)	2024/10/03	90	80 - 120	93	80 - 120	<100	ug/L	2.4	20
9678629	Strontium (Sr)	2024/10/03	99	80 - 120	99	80 - 120	<1.0	ug/L	3.0	20
9678629	Thallium (Tl)	2024/10/03	99	80 - 120	102	80 - 120	<0.050	ug/L	NC	20
9678629	Titanium (Ti)	2024/10/03	99	80 - 120	97	80 - 120	<5.0	ug/L	NC	20
9678629	Uranium (U)	2024/10/03	96	80 - 120	96	80 - 120	<0.10	ug/L	NC	20
9678629	Vanadium (V)	2024/10/03	95	80 - 120	96	80 - 120	<0.50	ug/L	NC	20
9678629	Zinc (Zn)	2024/10/03	95	80 - 120	96	80 - 120	<5.0	ug/L	8.8	20
9680713	Dissolved Organic Carbon	2024/10/03	NC	80 - 120	95	80 - 120	<0.40	mg/L	0.90	20

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9680770	Dissolved Chloride (Cl-)	2024/10/04	NC	80 - 120	98	80 - 120	<1.0	mg/L	0.96	20
9680771	Dissolved Sulphate (SO4)	2024/10/04	NC	75 - 125	91	80 - 120	<1.0	mg/L	2.0	20
9680772	Orthophosphate (P)	2024/10/04	93	75 - 125	98	80 - 120	<0.010	mg/L	NC	20
9680838	Nitrate (N)	2024/10/04	96	80 - 120	99	80 - 120	<0.10	mg/L	NC	20
9680838	Nitrite (N)	2024/10/04	102	80 - 120	103	80 - 120	<0.010	mg/L	NC	20
9683719	pH	2024/10/05			102	98 - 103			0.022	N/A
9683726	Alkalinity (Total as CaCO3)	2024/10/05			99	85 - 115	<1.0	mg/L	1.0	20
9683727	Conductivity	2024/10/05			102	85 - 115	<1.0	umho/cm	0.74	10
9686392	Total Ammonia-N	2024/10/07	93	75 - 125	93	80 - 120	<0.050	mg/L	7.1	20

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C4U8681
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere, Senior Scientific Specialist

Jessica (Ya Ping) Qiang, Analyst II

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

ONTARIO DRINKING WATER CHAIN OF CUSTODY RECORD

Bottle Order #: 1014408 COC #: C#1014408-02-01

BUREAU VERITAS

6660 & 6740 Campobello Rd, Mississauga, Ontario Canada L5N 2L8 www.bvna.com
Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:905-817-5779

MICRO

Please indicate which regulation applies to the samples being submitted:

☐ 170 ☐ 318/319 ☐ 243 ☐ 170Pb
☒ Not regulated (however water is for human consumption)

CAM FCD-01101/2 Page of

INVOICE TO:

Company Name: #30554 exp Services Inc
Attention: Accounts Payable
Address: 1595 Clark Blvd Brampton ON L6T 4V1
Tel: (905) 793-9800 Project: GTR-21010864-C1
Fax: (905) 793-0641 P.O. #:
Email: AP@exp.com; Karen.Burke@exp.com

REPORT TO:

Same as Invoice To ☒
Company Name:
Attention: Nataliya Tkach
Address:
Tel: (905) 793-9800 Ext: 3621 Fax:
Email: Nataliya.Tkach@exp.com

***DRINKING WATER TYPE LEGEND: [R=Raw Water] [T=Treated/POE] [D=Distribution] [P=Plumbing] [S=Standing] [F=Flushed]**

	Sample Identification/Location	Date Sampled	Time Sampled	*WATER TYPE (R,T,D,P,S,F)	MOE/MOH Adverse Notifcation Required? Yes	MOE/MOH Adverse Notifcation Required? No	Field Chlorine Free	Field Chlorine Total	Field Turbidity	Field pH	Watertrax SPL#	Resample Y/N?	# of Bottles	Analysis Requested: RCAp - Comprehensive (Drinking	Analysis Requested: Total Coliforms/ E. coli, CFU/100mL
1	PW-OCT 2	OCT 2,24	12:00	R		X	/	/	0	6.91	/	N	5	X	X
2															
3															
4															
5															
6															
7															
8															
9															
10															

C4U8681
NONT-2024-10-503

IT IS MANDATORY THAT ALL NOTIFICATION INFORMATION BELOW BE COMPLETED PRIOR TO ANALYSIS FOR REGULATED DRINKING WATER SUBMISSIONS.

TAT (TURNAROUND TIME):

RUSH TAT MUST HAVE PRIOR APPROVAL
☒ Regular (5-15 Working Days)
☐ RUSH (Specify Below)
Date Due:
RUSH #

ADVERSE NOTIFICATION INFORMATION

Waterworks Name: .
Waterworks Number: .
Address:
Contact:
Tel: Fax:
Cell:
Email:

Medical Officer of Health/Public Health Unit

Name/Region:
Contact:
Address:
Tel:
Fax:
After Hours:

LABORATORY USE ONLY

Received By (Print):
Received By (Sign):
Date: Time:
Comments
Receiving Temp: 4.1 & 4.8
Cooling Media Present Y/N? ☑
Metals Preservation Check Y/N? ☑

Sampled By (Print): MICHAEL HOLMES Sampled By (Sign): Date: OCT 2, 24 Time: 13:00
*Relinquished By (Print): MICHAEL HOLMES *Relinquished By (Sign): Date: OCT 2, 24 Time: 13:00

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

Bureau Veritas Job #: C4U8681
Report Date: 2024/10/07

exp Services Inc
Client Project #: GTR-21010864-C1
Site Location: 15450 WOODBINE AVE, STOUFFVILLE
Sampler Initials: MH

Exceedance Summary Table – DW for Human Consumption

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Exceedance Summary Table – ODWS (2002)

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Your C.O.C. #: 921878-10-01

Attention: Simon Lan

exp Services Inc
Markham Branch
220 Commerce Valley Dr W
Suite 500
Markham, ON
CANADA L3T 0A8

Report Date: 2023/03/09
Report #: R7540229
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C358707
Received: 2023/03/01, 14:55

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2023/03/08	2023/03/08	CAM SOP-00301	EPA 8270 m
Carbonaceous BOD	1	2023/03/02	2023/03/07	CAM SOP-00427	SM 23 5210B m
Total Cyanide	1	2023/03/02	2023/03/02	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2023/03/02	2023/03/03	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2023/03/03	2023/03/03	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2023/03/03	2023/03/03	CAM SOP-00447	EPA 6020B m
Total Nonylphenol in Liquids by HPLC	1	2023/03/06	2023/03/07	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2023/03/06	2023/03/07	CAM SOP-00313	Bureau Veritas
Animal and Vegetable Oil and Grease	1	N/A	2023/03/02	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2023/03/02	2023/03/02	CAM SOP-00326	EPA1664B m,SM5520B m
Polychlorinated Biphenyl in Water	1	2023/03/02	2023/03/02	CAM SOP-00309	EPA 8082A m
pH	1	2023/03/02	2023/03/03	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/03/02	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	1	N/A	2023/03/03	CAM SOP-00464	SM 23 4500-SO42- E m
Total Kjeldahl Nitrogen in Water	1	2023/03/03	2023/03/08	CAM SOP-00938	OMOE E3516 m
Mineral/Synthetic O & G (TPH Heavy Oil) (1)	1	2023/03/02	2023/03/02	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2023/03/03	2023/03/06	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2023/03/03	CAM SOP-00228	EPA 8260D

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or

Your Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Your C.O.C. #: 921878-10-01

Attention: Simon Lan

exp Services Inc
Markham Branch
220 Commerce Valley Dr W
Suite 500
Markham, ON
CANADA L3T 0A8

Report Date: 2023/03/09
Report #: R7540229
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C358707
Received: 2023/03/01, 14:55

implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
09 Mar 2023 17:02:13

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C358707
Report Date: 2023/03/09

exp Services Inc
Client Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Sampler Initials: JD

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID				VEG837			VEG837		
Sampling Date				2023/02/28			2023/02/28		
COC Number				921878-10-01			921878-10-01		
	UNITS	**Criteria**	**Criteria-2**	**BH202**	**RDL**	**QC Batch**	**BH202 Lab-Dup**	**RDL**	**QC Batch**
Calculated Parameters									
Total Animal/Vegetable Oil and Greas	mg/L	-	150	0.80	0.50	8528123			
Inorganics									
Total Carbonaceous BOD	mg/L	15	300	<2	2	8530489			
Fluoride (F-)	mg/L	-	10	<0.10	0.10	8531629			
Total Kjeldahl Nitrogen (TKN)	mg/L	1	100	**3.8**	1.0	8533354			
pH	pH	6.0:9.0	6.0:10.5	7.47		8531634			
Phenols-4AAP	mg/L	0.008	1	<0.0010	0.0010	8531736			
Total Suspended Solids	mg/L	15	350	<10	10	8531699	<10	10	8531699
Dissolved Sulphate (SO4)	mg/L	-	1500	66	1.0	8531489			
Total Cyanide (CN)	mg/L	0.020	2	<0.0050	0.0050	8530462			
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	-	-	1.3	0.50	8531514			
Total Oil & Grease Mineral/Synthetic	mg/L	-	15	0.50	0.50	8531521			
Miscellaneous Parameters									
Nonylphenol Ethoxylate (Total)	mg/L	-	0.2	<0.025	0.025	8535527			
Nonylphenol (Total)	mg/L	-	0.02	<0.001	0.001	8535524			
Metals									
Mercury (Hg)	mg/L	0.0004	0.01	<0.00010	0.00010	8532708			
Total Aluminum (Al)	ug/L	-	50000	18	4.9	8532737			
Total Antimony (Sb)	ug/L	-	5000	<0.50	0.50	8532737			
Total Arsenic (As)	ug/L	20	1000	<1.0	1.0	8532737			
Total Cadmium (Cd)	ug/L	8	700	<0.090	0.090	8532737			
Total Chromium (Cr)	ug/L	80	2000	<5.0	5.0	8532737			
Total Cobalt (Co)	ug/L	-	5000	0.79	0.50	8532737			
Total Copper (Cu)	ug/L	50	3000	1.1	0.90	8532737			
Total Lead (Pb)	ug/L	120	1000	<0.50	0.50	8532737			
Total Manganese (Mn)	ug/L	150	5000	74	2.0	8532737			
Total Molybdenum (Mo)	ug/L	-	5000	4.3	0.50	8532737			
Total Nickel (Ni)	ug/L	80	2000	3.3	1.0	8532737			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Regional Municipality of York By-Law No 2021-102, Limits for Storm Sewer/Land Drainage Discharge
Criteria-2: Regional Municipality of York By-Law No 2021-102, Limits for Sanitary Sewer Discharge

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID				VEG837			VEG837		
Sampling Date				2023/02/28			2023/02/28		
COC Number				921878-10-01			921878-10-01		
	UNITS	**Criteria**	**Criteria-2**	**BH202**	**RDL**	**QC Batch**	**BH202 Lab-Dup**	**RDL**	**QC Batch**
Total Phosphorus (P)	ug/L	400	10000	<100	100	8532737			
Total Selenium (Se)	ug/L	20	1000	<2.0	2.0	8532737			
Total Silver (Ag)	ug/L	120	5000	<0.090	0.090	8532737			
Total Tin (Sn)	ug/L	-	5000	1.9	1.0	8532737			
Total Titanium (Ti)	ug/L	-	5000	<5.0	5.0	8532737			
Total Zinc (Zn)	ug/L	40	2000	<5.0	5.0	8532737			
Semivolatile Organics									
Bis(2-ethylhexyl)phthalate	ug/L	8.8	12	<2.0	2.0	8540171			
Di-N-butyl phthalate	ug/L	15.0	80	<2.0	2.0	8540171			
Volatile Organics									
Benzene	ug/L	2.0	10	<0.40	0.40	8531364			
Chloroform	ug/L	2.0	40	<0.40	0.40	8531364			
1,2-Dichlorobenzene	ug/L	5.6	50	<0.80	0.80	8531364			
1,4-Dichlorobenzene	ug/L	6.8	80	<0.80	0.80	8531364			
cis-1,2-Dichloroethylene	ug/L	5.6	4000	<1.0	1.0	8531364			
trans-1,3-Dichloropropene	ug/L	5.6	140	<0.80	0.80	8531364			
Ethylbenzene	ug/L	2.0	160	<0.40	0.40	8531364			
Methylene Chloride(Dichloromethane	ug/L	5.2	2000	<4.0	4.0	8531364			
Methyl Ethyl Ketone (2-Butanone)	ug/L	-	8000	<20	20	8531364			
Styrene	ug/L	-	200	<0.80	0.80	8531364			
1,1,2,2-Tetrachloroethane	ug/L	17.0	1400	<0.80	0.80	8531364			
Tetrachloroethylene	ug/L	4.4	1000	<0.40	0.40	8531364			
Toluene	ug/L	2.0	270	<0.40	0.40	8531364			
Trichloroethylene	ug/L	8.0	400	<0.40	0.40	8531364			
p+m-Xylene	ug/L	-	-	<0.40	0.40	8531364			
o-Xylene	ug/L	-	-	<0.40	0.40	8531364			
Total Xylenes	ug/L	4.4	1400	<0.40	0.40	8531364			
PCBs									
Total PCB	ug/L	0.4	1	<0.05	0.05	8530128			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Regional Municipality of York By-Law No 2021-102, Limits for Storm Sewer/Land Drainage Discharge
Criteria-2: Regional Municipality of York By-Law No 2021-102, Limits for Sanitary Sewer Discharge

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C358707
Report Date: 2023/03/09

exp Services Inc
Client Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Sampler Initials: JD

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID				VEG837			VEG837		
Sampling Date				2023/02/28			2023/02/28		
COC Number				921878-10-01			921878-10-01		
	UNITS	**Criteria**	**Criteria-2**	**BH202**	**RDL**	**QC Batch**	**BH202 Lab-Dup**	**RDL**	**QC Batch**
Surrogate Recovery (%)									
2,4,6-Tribromophenol	%	-	-	51		8540171			
2-Fluorobiphenyl	%	-	-	60		8540171			
2-Fluorophenol	%	-	-	22		8540171			
D14-Terphenyl	%	-	-	91		8540171			
D5-Nitrobenzene	%	-	-	59		8540171			
D5-Phenol	%	-	-	14		8540171			
Decachlorobiphenyl	%	-	-	93		8530128			
4-Bromofluorobenzene	%	-	-	91		8531364			
D4-1,2-Dichloroethane	%	-	-	106		8531364			
D8-Toluene	%	-	-	92		8531364			

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
Criteria: Regional Municipality of York By-Law No 2021-102, Limits for Storm Sewer/Land Drainage Discharge
Criteria-2: Regional Municipality of York By-Law No 2021-102, Limits for Sanitary Sewer Discharge

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C358707
Report Date: 2023/03/09

exp Services Inc
Client Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Sampler Initials: JD

TEST SUMMARY

Bureau Veritas ID: VEG837
Sample ID: BH202
Matrix: Water

Collected: 2023/02/28
Shipped:
Received: 2023/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
ABN Compounds in Water by GC/MS	GC/MS	8540171	2023/03/08	2023/03/08	Kathy Horvat
Carbonaceous BOD	DO	8530489	2023/03/02	2023/03/07	Frank Zhang
Total Cyanide	SKAL/CN	8530462	2023/03/02	2023/03/02	Kruti Jitesh Patel
Fluoride	ISE	8531629	2023/03/02	2023/03/03	Kien Tran
Mercury in Water by CVAA	CV/AA	8532708	2023/03/03	2023/03/03	Thuy Linh Nguyen
Total Metals Analysis by ICPMS	ICP/MS	8532737	2023/03/03	2023/03/03	Arefa Dabhad
Total Nonylphenol in Liquids by HPLC	LC/FLU	8535524	2023/03/06	2023/03/07	Furneesh Kumar
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	8535527	2023/03/06	2023/03/07	Furneesh Kumar
Animal and Vegetable Oil and Grease	BAL	8528123	N/A	2023/03/02	Automated Statchk
Total Oil and Grease	BAL	8531514	2023/03/02	2023/03/02	Kishan Patel
Polychlorinated Biphenyl in Water	GC/ECD	8530128	2023/03/02	2023/03/02	Svitlana Shaula
pH	AT	8531634	2023/03/02	2023/03/03	Kien Tran
Phenols (4AAP)	TECH/PHEN	8531736	N/A	2023/03/02	Mandeep Kaur
Sulphate by Automated Turbidimetry	KONE	8531489	N/A	2023/03/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	8533354	2023/03/03	2023/03/08	Jency Sara Johnson
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	8531521	2023/03/02	2023/03/02	Kishan Patel
Total Suspended Solids	BAL	8531699	2023/03/03	2023/03/06	Shaneil Hall
Volatile Organic Compounds in Water	GC/MS	8531364	N/A	2023/03/03	Manpreet Sarao

Bureau Veritas ID: VEG837 Dup
Sample ID: BH202
Matrix: Water

Collected: 2023/02/28
Shipped:
Received: 2023/03/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Suspended Solids	BAL	8531699	2023/03/03	2023/03/06	Shaneil Hall

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	1.0°C

Sample VEG837 [BH202] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C358707
Report Date: 2023/03/09

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Sampler Initials: JD

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8530128	Decachlorobiphenyl	2023/03/02	92	60 - 130	79	60 - 130	91	%				
8531364	4-Bromofluorobenzene	2023/03/03	102	70 - 130	102	70 - 130	95	%				
8531364	D4-1,2-Dichloroethane	2023/03/03	102	70 - 130	99	70 - 130	106	%				
8531364	D8-Toluene	2023/03/03	103	70 - 130	106	70 - 130	93	%				
8540171	2,4,6-Tribromophenol	2023/03/08	82	10 - 130	89	10 - 130	71	%				
8540171	2-Fluorobiphenyl	2023/03/08	73	30 - 130	68	30 - 130	75	%				
8540171	2-Fluorophenol	2023/03/08	41	10 - 130	47	10 - 130	36	%				
8540171	D14-Terphenyl	2023/03/08	91	30 - 130	95	30 - 130	93	%				
8540171	D5-Nitrobenzene	2023/03/08	77	30 - 130	88	30 - 130	83	%				
8540171	D5-Phenol	2023/03/08	26	10 - 130	29	10 - 130	23	%				
8530128	Total PCB	2023/03/02	93	60 - 130	82	60 - 130	<0.05	ug/L	NC	40		
8530462	Total Cyanide (CN)	2023/03/02	86	80 - 120	99	80 - 120	<0.0050	mg/L	NC	20		
8530489	Total Carbonaceous BOD	2023/03/07					<2	mg/L	NC	30	90	85 - 115
8531364	1,1,2,2-Tetrachloroethane	2023/03/03	88	70 - 130	93	70 - 130	<0.40	ug/L	NC	30		
8531364	1,2-Dichlorobenzene	2023/03/03	88	70 - 130	95	70 - 130	<0.40	ug/L	NC	30		
8531364	1,4-Dichlorobenzene	2023/03/03	100	70 - 130	107	70 - 130	<0.40	ug/L	NC	30		
8531364	Benzene	2023/03/03	83	70 - 130	83	70 - 130	<0.20	ug/L	NC	30		
8531364	Chloroform	2023/03/03	89	70 - 130	89	70 - 130	<0.20	ug/L	0.79	30		
8531364	cis-1,2-Dichloroethylene	2023/03/03	92	70 - 130	92	70 - 130	<0.50	ug/L	0.60	30		
8531364	Ethylbenzene	2023/03/03	83	70 - 130	88	70 - 130	<0.20	ug/L	NC	30		
8531364	Methyl Ethyl Ketone (2-Butanone)	2023/03/03	105	60 - 140	108	60 - 140	<10	ug/L	NC	30		
8531364	Methylene Chloride(Dichloromethane)	2023/03/03	91	70 - 130	91	70 - 130	<2.0	ug/L	NC	30		
8531364	o-Xylene	2023/03/03	81	70 - 130	91	70 - 130	<0.20	ug/L	NC	30		
8531364	p+m-Xylene	2023/03/03	88	70 - 130	95	70 - 130	<0.20	ug/L	NC	30		
8531364	Styrene	2023/03/03	96	70 - 130	106	70 - 130	<0.40	ug/L	NC	30		
8531364	Tetrachloroethylene	2023/03/03	75	70 - 130	85	70 - 130	<0.20	ug/L	2.9	30		
8531364	Toluene	2023/03/03	88	70 - 130	93	70 - 130	<0.20	ug/L	NC	30		
8531364	Total Xylenes	2023/03/03					<0.20	ug/L	NC	30		
8531364	trans-1,3-Dichloropropene	2023/03/03	102	70 - 130	97	70 - 130	<0.40	ug/L	NC	30		
8531364	Trichloroethylene	2023/03/03	92	70 - 130	94	70 - 130	<0.20	ug/L	4.7	30		
8531489	Dissolved Sulphate (SO4)	2023/03/03	NC	75 - 125	91	80 - 120	<1.0	mg/L	1.1	20		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8531514	Total Oil & Grease	2023/03/02			99	85 - 115	<0.50	mg/L	0.51	25		
8531521	Total Oil & Grease Mineral/Synthetic	2023/03/02			97	85 - 115	<0.50	mg/L	0.52	25		
8531629	Fluoride (F-)	2023/03/03	86	80 - 120	99	80 - 120	<0.10	mg/L	0.48	20		
8531634	pH	2023/03/03			102	98 - 103			1.6	N/A		
8531699	Total Suspended Solids	2023/03/06					<10	mg/L	NC	20	98	85 - 115
8531736	Phenols-4AAP	2023/03/02	101	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20		
8532708	Mercury (Hg)	2023/03/03	101	75 - 125	105	80 - 120	<0.00010	mg/L	NC	20		
8532737	Total Aluminum (Al)	2023/03/03	NC	80 - 120	107	80 - 120	<4.9	ug/L				
8532737	Total Antimony (Sb)	2023/03/03	108	80 - 120	103	80 - 120	<0.50	ug/L				
8532737	Total Arsenic (As)	2023/03/03	101	80 - 120	100	80 - 120	<1.0	ug/L				
8532737	Total Cadmium (Cd)	2023/03/03	96	80 - 120	98	80 - 120	<0.090	ug/L				
8532737	Total Chromium (Cr)	2023/03/03	100	80 - 120	98	80 - 120	<5.0	ug/L				
8532737	Total Cobalt (Co)	2023/03/03	96	80 - 120	97	80 - 120	<0.50	ug/L				
8532737	Total Copper (Cu)	2023/03/03	102	80 - 120	101	80 - 120	<0.90	ug/L				
8532737	Total Lead (Pb)	2023/03/03	91	80 - 120	98	80 - 120	<0.50	ug/L				
8532737	Total Manganese (Mn)	2023/03/03	96	80 - 120	96	80 - 120	<2.0	ug/L				
8532737	Total Molybdenum (Mo)	2023/03/03	105	80 - 120	97	80 - 120	<0.50	ug/L				
8532737	Total Nickel (Ni)	2023/03/03	91	80 - 120	94	80 - 120	<1.0	ug/L				
8532737	Total Phosphorus (P)	2023/03/03	108	80 - 120	102	80 - 120	<100	ug/L				
8532737	Total Selenium (Se)	2023/03/03	103	80 - 120	107	80 - 120	<2.0	ug/L				
8532737	Total Silver (Ag)	2023/03/03	89	80 - 120	92	80 - 120	<0.090	ug/L				
8532737	Total Tin (Sn)	2023/03/03	103	80 - 120	100	80 - 120	<1.0	ug/L				
8532737	Total Titanium (Ti)	2023/03/03	112	80 - 120	101	80 - 120	<5.0	ug/L				
8532737	Total Zinc (Zn)	2023/03/03	95	80 - 120	101	80 - 120	<5.0	ug/L				
8533354	Total Kjeldahl Nitrogen (TKN)	2023/03/08	99	80 - 120	104	80 - 120	<0.10	mg/L	NC	20	99	80 - 120
8535524	Nonylphenol (Total)	2023/03/07	105	50 - 130	104	50 - 130	<0.001	mg/L	NC	40		
8535527	Nonylphenol Ethoxylate (Total)	2023/03/07	NC (1)	50 - 130	93	50 - 130	<0.025	mg/L	NC	40		
8540171	Bis(2-ethylhexyl)phthalate	2023/03/09	96	30 - 130	95	30 - 130	<2.0	ug/L	NC	40		

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8540171	Di-N-butyl phthalate	2023/03/09	103	30 - 130	110	30 - 130	<2.0	ug/L	NC	40		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Due to background interference, recovery in the Matrix Spike was not calculated (NC).The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation.

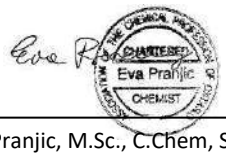
Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C358707
Report Date: 2023/03/09

exp Services Inc
Client Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Sampler Initials: JD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.bvna.com

Page 1 of 1

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#17485 exp Services Inc	Company Name:	EXP	Quotation #:	C20328	Bureau Veritas Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	Simon Leung, James Duncan	P.O. #:			921878
Address:	220 Commerce Valley Dr W Suite 500	Address:		Project:	15450 Woodbine Avenue	COC #:	Project Manager:
	Markham ON L3T 0A8			Project Name:	BRM-210108644-CO	C#921878-10-01	Patricia Legette
Tel:	(905) 695-3217 Fax:	Tel:	Fax:	Site #:			
Email:	AP@exp.com; karen.burke@exp.com	Email:	simon.leung@exp.com; james.duncan@exp.com	Sampled By:	SP		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine	☐ CCME ☐ Sanitary Sewer Bylaw	
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ Reg 558 ☒ Storm Sewer Bylaw	
☐ Table 3 ☐ Agri/Other ☐ For RSC	☐ MISA Municipality York	
☐ Table ___	☐ PWQO ☐ Reg 406 Table	
	☐ Other	

Include Criteria on Certificate of Analysis (Y/N)? ____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT:
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ____ Time Required: ____
Rush Confirmation Number: ____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Sewer Use Bylaw Region of York	# of Bottles	Comments
1		BH202	2023/02/28	AM	GW	NO	X	17	
2									
3									
4									
5									
6									
7									
8									
9									
10									

01-Mar-23 14:55
Patricia Legette
C358707
AKO ENV-1319

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
James Duncan	2023/03/01	11:00AM	KAUSHALYA SOLADHARA	2023/03/01	14:55		Time Sensitive	Temperature (°C) on Recei	Custody Seal Present	Yes ✓	No
								1.0.2	Intact	✓	

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

BV: 634521

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Job #: C358707
Report Date: 2023/03/09

exp Services Inc
Client Project #: BRM-21010864-C0
Site Location: 15450 WOODBINE AVENUE, ON
Sampler Initials: JD

Exceedance Summary Table – York Storm SUB 2021

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH202	VEG837-10	Total Kjeldahl Nitrogen (TKN)	1	3.8	1.0	mg/L

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Exceedance Summary Table – York Sanitary SUB 2021

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Appendix I – Infiltration Testing

Location:	15450 Woodine
Date:	10-Dec-24
Weather:	Overcast
Analyst:	MH

Borehole radius (cm):	2.5
Soil class:	Default

12.0 2.074 0.093 0.754

Measurement	Start depth of water (cm)	End depth of water (cm)	Start time (*decimal min)	End time (*decimal min)	Elapsed time (min)	Change in head (cm)	Perc test result (min/cm)	Perc test (hr/mm)	mean head (m)	H/a (unitless)	2H^2 (m2)	2H/* (unitless)	C (unitless)	Ca2 (m2)	Denom	K_{fs} (mm/hr)	Kfs (m/sec)	Kfs (cm/sec)
INF304	418.32	82.54	0.0	30.7	30.65	335.8	0.1	0.0002	2.504	100.172	12.543	0.417	5.1516	0.00322	0.001972202	1.6	4.5E-07	4.5E-05
INF306	318.3	39	0.0	61.5	61.45	279.3	0.2	0.0004	1.787	71.460	6.383	0.298	4.8845	0.00305	0.002450948	1.2	3.5E-07	3.5E-05
INF307	357.3	71.7	0.0	59.2	59.17	285.6	0.2	0.0003	2.145	85.800	9.202	0.358	5.0362	0.00315	0.003301966	1.0	2.6E-07	2.6E-05
																Geomean	3.46E-07	3.46E-05

Seconds	decimal minute

*It will be easiest to take field measurements in minutes and seconds. Then round to the nearest 6 seconds when using the electronic version of the form for calculations. E.g. 2 minutes and 25 seconds becomes 2.4 minutes.

Location:	15450 Woodbine Avenue, Stouffville
Date:	7-Feb-23
Weather:	Snow
Analyst:	RB

Borehole radius (cm):	2.54
Soil class:	Default

12.0 2.074 0.093 0.754

Measurement	Start depth of water (cm)	End depth of water (cm)	Start time (*decimal min)	End time (*decimal min)	Elapsed time (min)	Change in head (cm)	Perc test result (min/cm)	Perc test (hr/mm)	mean head (m)	H/a (unitless)	2H^2 (m2)	2H/* (unitless)	C (unitless)	Ca2 (m2)	Denom	K_{fs} (mm/hr)	**Kfs (cm/sec)**	**Kfs (m/sec)**
IT210	30.18	0.91	0.0	13.0	13.00	29.3	0.4	0.0007	0.155	6.120	0.048	0.026	1.8834	0.00122	5.58528E-05	21.8	6.0E-04	6.0E-06
IT211	40.84	1.22	0.0	16.0	16.00	39.6	0.4	0.0007	0.210	8.280	0.088	0.035	2.2383	0.00144	8.40964E-05	17.2	4.8E-04	4.8E-06

Seconds	decimal minute

*It will be easiest to take field measurements in minutes and seconds. Then round to the nearest 6 seconds when using the electronic version of the form for calculations. E.g. 2 minutes and 25 seconds becomes 2.4 minute

Geomean 5.37E-04 5.37E-06

Appendix J – Water Balance Assessment (Site Specific)

Appendix J-1: Model Input

15450 Woodbine Avenue, Stouffville, Ontario
GTR-21010864-C2

Year	Month	Ave. T (^{0}C)	Ave P (mm)
1975-2003	1	-7.7	52.6
1975-2003	2	-6.6	44.8
1975-2003	3	-1.6	55.5
1975-2003	4	5.7	65.7
1975-2003	5	12.7	84.5
1975-2003	6	17.6	80.6
1975-2003	7	20.5	85.7
1975-2003	8	19.6	88.0
1975-2003	9	15.1	84.8
1975-2003	10	8.4	73.1
1975-2003	11	2.2	79.6
1975-2003	12	-4.2	56.4

Note:

Station Name	KING SMOKE TREE
Climate Station ID:	6154142
Longitude	79°31'00.000" W
Latitude	44°01'00.000" N
Elevation	352.00 m

Appendix J-2: Model Output

15450 Woodbine Avenue, Stouffville, Ontario
GTR-21010864-C2

Month	PET	P	P-PET	Soil Moisture	AET	PET-AET	Snow Storage	Surplus
January	7.8	52.6	13.4	195.3	7.7	0.1	49.9	13.3
February	9.6	44.8	25.3	198.2	9.5	0.0	59.9	22.4
March	18.6	55.5	66.0	200.0	18.6	0.0	30.9	64.2
April	36.4	65.7	59.9	200.0	36.4	0.0	0.3	59.9
May	70.0	84.5	14.8	192.5	70.0	0.0	0.0	22.3
June	100.0	80.6	-19.5	166.0	99.3	0.7	0.0	7.8
July	118.7	85.7	-33.1	137.6	111.7	7.0	0.0	2.3
August	95.1	88.0	-7.2	130.3	90.4	4.8	0.0	4.9
September	55.2	84.8	29.7	150.4	54.3	0.9	0.0	10.5
October	28.8	73.1	44.3	176.3	28.6	0.2	0.0	18.6
November	14.6	79.6	64.1	192.1	14.6	0.0	0.9	48.3
December	8.9	56.4	29.4	196.9	8.9	0.0	19.0	24.6
Annual Rate (mm/yr)	563.6	851.16			549.94			299.08

Note:

Station Name KING SMOKE TREE
Climate Station I 6154142
Longitude 79°31'00.000" W
Latitude 44°01'00.000" N
Elevation 352.00 m

Appendix J-3
15450 Woodbine Avenue, Stouffville, Ontario
GTR-21010864-C2

Lot-level Average Infiltration Factors

1. Average Infiltration Factor – Pre Development Conditions

Category	Weighted Infiltration Factor
Topography/Slope	0.11
Soil Type: 19% Stone-poor, Carbonate-drived silty to sandy till; 48% Coarse-textured (Foreshore-Basinal) Glaciolacustrine deposits and 33% Fine-textured glaciolacustrine deposits	0.20
Cover: Cultivated Lands	0.10
Total weighted Infiltration factor	**0.41**

2. Average Infilteration Factor – Post Development Conditions

Un-Mitigated

Category	Weighted Infiltration Factor
Topography/Slope	0.11
Soil Type: 19% Stone-poor, Carbonate-drived silty to sandy till; 48% Coarse-textured (Foreshore-Basinal) Glaciolacustrine deposits and 33% Fine-textured glaciolacustrine deposits	0.20
Cover: Cultivated Lands	0.10
Total weighted Infiltration factor	**0.41**

Notes:

Landscaped area considered equivalent to Cultivated Cover

Appendix J- 4: Summary of Pre and Post-Development Water Balance (Unmitigated)
15450 Woodbine Avenue, Stouffville, Ontario
GTR-21010864-C2

1. Climate Data

Item	Pre-Development (mm/a)	Post-Development Un-Mitigated (mm/a)
Precipitation	851.16	851.16
Evapotranspiration	563.59	563.59
Water Surplus	299.08	299.08
Infiltration Rate	122.02	122.02
Runoff	177.05	177.05

2. Pre-Developed Study Area Statistics

Item	Area (sq.m.)	%
Existing Buildings (Barn, Dwelling	5,900	3.6%
Existing Gravel Drive	3,200	1.9%
Open Space (Farmland)	156,800	94.5%
TOTAL	**165,900**	**100%**

3. Proposed Post Development Site Characteristics

Item	Area (sq.m.)	%
Block 1 Industrial	**58,400**	**35%**
Building	11,272	7%
Landscape	10,828	7%
Open Space (Undisturbed MTO Buffer)	2,685	2%
Paved Surface (Roads and Sidewalks)	33,615	20%
Block 2 Industrial	**10,400**	**6%**
Building and Roads	8,300	5%
Landscaped Areas	2,100	1%
Block 3 Industrial	**10,400**	**6%**
Building and Roads	8,300	5%
Landscaped Areas	2,100	1%
Block 4 Industrial	**10,500**	**6%**
Building and Roads	8,400	5%
Landscaped Areas	2,100	1%
Block 5 Industrial	**8,600**	**5%**
Building and Roads	6,880	4%
Landscaped Areas	1,720	1%
Block 6 Industrial	**9,100**	**5%**
Building and Roads	7,280	4%
Landscaped Areas	1,820	1%
Block 7 Industrial	**22,400**	**14%**
Building and Roads	17,920	11%
Landscaped Areas	4,480	3%
Block 8 Landscape Buffer	**3,000**	**2%**
Block 9 Natural Heritage System	**14,400**	**9%**
Street A and Street B	**18,700**	**11%**
Paved Surface Industrial Roac	18,700	11%
TOTAL	**165,900**	**100%**

4. Annual Pre-Development Water Balance

Land Use	Area (sq.m.)	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Infiltration Rate * (cu.m.)	Run-off (cu.m.)
Existing Buildings (Barn, Dwelling)	5,900	5,022	0	0	5,022
Existing Gravel Drive	3,200	2,724	1,803	390	530
Open Space (Farmland)	156,800	133,461	88,371	19,133	25,956
Total	165,900	141,207	90,175	19,524	31,508
		Pre-development (mm/a)	**543.5**	**117.7**	**189.9**
		100%	63.9%	13.8%	22.3%

5. Annual Post-Development Water Balance Un-Mitigated

Land Use	Area (sq.m.)	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Infiltration Rate * (cu.m.)	Run-off (cu.m.)
Block 1 Industrial	**58,400**	**49,707**	**7,616**	**1,649**	**40,443**
Building	11,272	9,594	0	0	9,594
Landscape	10,828	9,216	6,103	1,321	1,792
Open Space (Undisturbed MTO Buffer)	2,685	2,285	1,513	328	444
Paved Surface (Roads and Sidewalks)	33,615	28,612	0	0	28,612
Block 2 Industrial	**10,400**	**8,852**	**1,184**	**256**	**7,412**
Building and Roads	8,300	7,065	0	0	7,065
Landscaped Areas	2,100	1,787	1,184	256	348
Block 3 Industrial	**10,400**	**8,852**	**1,184**	**256**	**7,412**
Building and Roads	8,300	7,065	0	0	7,065
Landscaped Areas	2,100	1,787	1,184	256	348
Block 4 Industrial	**10,500**	**8,937**	**1,184**	**256**	**7,497**
Building and Roads	8,400	7,150	0	0	7,150
Landscaped Areas	2,100	1,787	1,184	256	348
Block 5 Industrial	**8,600**	**7,320**	**969**	**210**	**6,141**
Building and Roads	6,880	5,856	0	0	5,856
Landscaped Areas	1,720	1,464	969	210	285
Block 6 Industrial	**9,100**	**7,746**	**1,026**	**222**	**6,498**
Building and Roads	7,280	6,196	0	0	6,196
Landscaped Areas	1,820	1,549	1,026	222	301
Block 7 Industrial	**22,400**	**19,066**	**2,525**	**547**	**15,994**
Building and Roads	17,920	15,253	0	0	15,253
Landscaped Areas	4,480	3,813	2,525	547	742
Block 8 Landscape Buffer	**3,000**	**2,553**	**1,691**	**366**	**497**
Block 9 Natural Heritage System	**14,400**	**12,257**	**8,116**	**1,757**	**2,384**
Street A and Street B	**18,700**	**15,917**	**0**	**0**	**15,917**
Paved Surface Industrial Roac	18,700	15,917	0	0	15,917
TOTAL	165,900	141,207	25,493	5,520	110,194
		Post-development Un-Mitigated (mm/a)	**153.7**	**33.3**	**664.2**
		100%	18.1%	3.9%	78.0%

6. Comparison of Pre-Development and Post-Development Un-Mitigated

	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Run-off (cu.m.)	Infiltration Rate (cu.m.)	Percent of Pervious Area with Grade and Water Table Greater Than 0 m %
Pre-Development	141,207	90,175	31,508	19,524	100.00%
Post Development	141,207	25,493	110,194	5,520	100.00%
			Pre-development Infiltration Rate	**117.7**	**mm/a**
			Post-development Infiltration Rate Un-Mitigated	**33.3**	**mm/a**
			Deficit Post Development Un-Mitigated	**14,004**	**cu.m./a**

Appendix J-5 : Low Impact Design (LID) Calculations
15450 Woodbine Avenue, Stouffville, Ontario
GTR-21010864-C1

Test Location	Hydraulic Conductivity (K_{fs}) (cm/s)	Hydraulic Conductivity (K_{fs}) (m/s)	Infiltration Rate (IR) (mm/hr)	Discrete Design Infiltration Rate(DIR) (mm/hr)	Percolation Time (min/cm)
IT210	6.0E-04	6.0E-06	75	30	20
IT211	4.8E-04	4.8E-06	70	28	21
INF304	4.5E-05	4.5E-07	37	15	40
INF306	3.5E-05	3.5E-07	35	14	43
INF307	2.6E-05	2.6E-07	32	13	46

Geology Units	Geometric Mean of K_{fs} (cm/s)	Geometric Mean of K_{fs} (m/s)	Infiltration Rate (I) (mm/hr)*	Ratio of Mean Measured Infiltration Rates	Safety Correction Factor (SCF)
Overlying Geology Unit	1.0E-04	1.0E-06	47	1.0	2.5
Underlying Geology Unit (1.5 m below the bottom of trench)	1.0E-04	1.0E-06	47		

Design Infiltration Rate(DIR) (mm/hr)	Minimum	13	**Percolation Time (min/cm)**		20
	Maximum	30			46
	Geometric Mean	**19**			**32**

Note:
Analytical Solutions (CVC and TRCA 2010)

$$Infiltration\ Rate\ (IR) = \left(\frac{K_{fs}}{6x10^{-11}}\right)^{\frac{1}{3.7363}}$$
$$Design\ Infiltration\ Rate\ (DIR) = \frac{IR}{SCF}$$

Kfs: hydraulic conductivity (cm/sec)

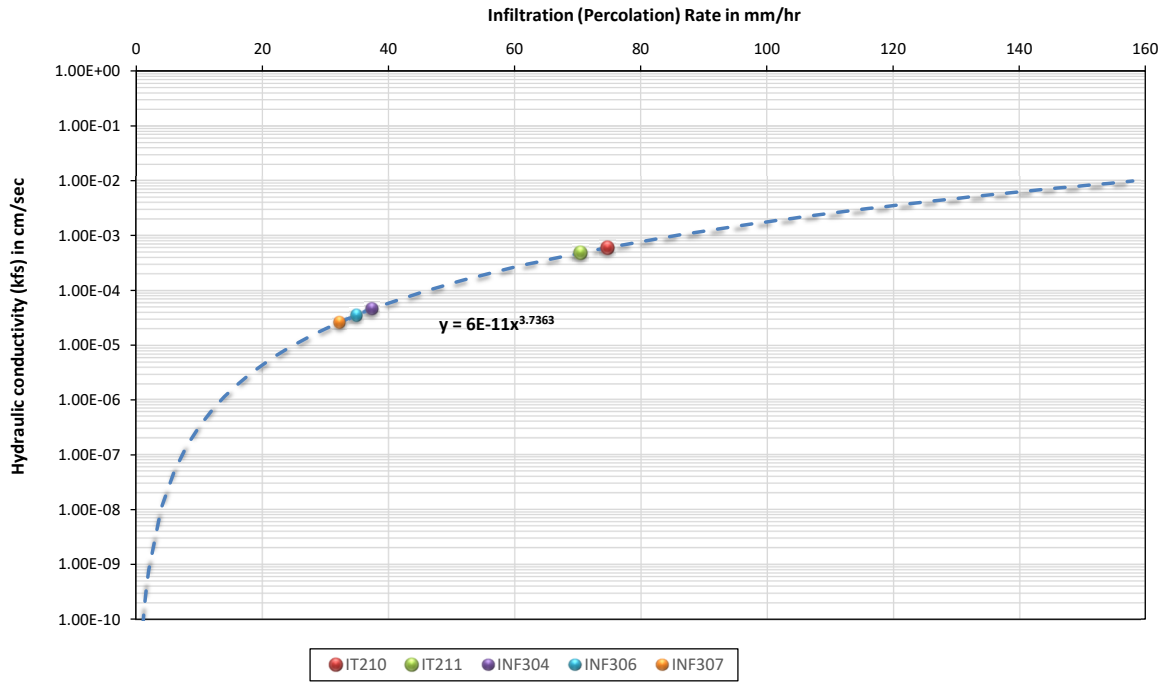
IR: infiltration rate (mm/hr)

DIR: design infiltration rate (mm/hr)

SCF: Safety Correction Factor (based on the chart recommended by CVC and TRCA, 2010)

Appendix J-5 (con't)

Figure : Approximate relationship between infiltration rate and hydraulic conductivity (LID SWM planning and Design Guide, Appendix C1)



Appendix J- 6: Estimate of Infiltration Area of LIDs

15450 Woodbine Avenue, Stouffville, Ontario
GTR-21010864-C2

1. Design Infilteration Rate

Item	Value	Unit
Geometric mean of design infiltration rates	19	mm/h
	448.07	mm/day
	0.45	m/day/m^2
	0.90	m/48 hrs/m^2

2. Climate Data

Total precipitation based on weather station records	851.16	mm/yr
Total rain in an eight (8) month precipitation period	567.44	mm/yr
Based on a 16-week precipitation period	35.46	mm/2 week
Based on a 16-week precipitation period	0.04	m /2 weeks/m^2

3. Roof and Resulted Runoff Volume

Total roof area	62,644	m^2
Rooftop runoff volume in an eight (8) month precipitation period	35,547	m^3/yr
Total rooftop runoff volume per 2 weeks	2,222	m^3/2 week

4. Estimated Deficit Volume

Estimated deficit based on water balance calculations	14,004	m^3/yr
Deficit over available water (roof runoff) for infiltration	39%	-
Min. Storage to infiltrate to meet deficit	875	m^3/ 2 weeks
Storage to infiltrate and retain 5 mm.	830	m^3/2 weeks
mm Retention	5.3	mm

5. LID Area

Area of infiltration system required to mitigate infiltration deficit in 48 hours (rounded)	**980**	m^2
Percentage (%) of total site area	0.59%	

Note: only roof water to be infiltrated (clean water)

Appendix K – Construction Flow Rate Calculations

APPENDIX K: Construction Dewatering Calculations - Slab-on-Grade Buildings Construction (BLOCKS 1 to 7)

15450 Woodbine Avenue, Stouffville, ON
GTR-21010864-C2

Table K-1: Radial Flow

Parameters	Symbols	Unit	Building BLOCK 1	Building BLOCK 2	Building BLOCK 3	Building BLOCK 4	Building BLOCK 5	Building BLOCK 6	Building BLOCK 7
Geological Formation	-	-	Glacial Deposit	Glacial Deposit	Glacial Deposit	Glacial Deposit	Glacial Deposit	Glacial Deposit	Glacial Deposit
Ground Elevation	-	mASL	306.22	304.00	303.00	303.00	303.00	300.00	298.00
Lowest Top Slab Elevation	-	mASL	305.75	304.00	303.00	303.00	303.00	300.00	298.00
Highest Groundwater Elevation	-	mASL	305.93	303.00	302.00	301.00	300.00	299.00	298.00
Lowest Footing Elevation / Excavation Depth	-	mASL	304.25	302.50	301.50	301.50	301.50	298.50	296.50
Base of the Water-Bearing Zone	-	mASL	293	293	293	293	293	293	293
Height of Static Water Table Above the Base of the Water-Bearing Zone	**H**	m	13.23	10.00	9.00	8.00	7.00	6.00	5.00
Dewatering Target Elevation	-	mASL	303.25	301.50	300.50	300.50	300.50	297.50	295.50
Height of Target Water Level Above the Base of Water-Bearing Zone	h_w	m	10.55	8.50	7.50	7.50	7.50	4.50	2.50
Hydraulic Conductivity	**K**	m/s	3.20E-07	3.20E-07	3.20E-07	3.20E-07	3.20E-07	3.20E-07	3.20E-07
Length of Excavation	-	m	113	126	126	127	115	104	160
Width of Excavation	-	m	100	66	66	66	60	70	50
Equivalent Radius (equivalent perimeter)	r_e	m	67.8	61.1	61.1	61.4	55.7	55.4	66.8
Method to Calculate Radius of Influence	-	-	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**	**Cooper-Jacob**
Time (30 days)	**t**	s	5184000	5184000	5184000	5184000	5184000	5184000	5184000
Specific Yield	**Sy**		0.10	0.10	0.10	0.10	0.10	0.10	0.10
Cooper-Jacob's Radius of Influence from Sides of Excavation	**Rcj**	m	22	19	18	17	16	15	14
Radius of Influence	**Ro**	m	90	80	79	79	72	70	81
Dewatering Flow Rate (unconfined radial flow component)	**Q**	m^3/day	**19.5**	**8.8**	**8.2**	**2.7**	**0.0**	**5.7**	**8.8**
Factor of Safety	**fs**	-	2	2	2	2	2	2	2
Dewatering Flow Rate (multiplied by factor of safety)	**Q.fs**	m^3/day	**39.0**	**17.5**	**16.4**	**5.4**	**0.0**	**11.4**	**17.5**
Precipitation Event	-	mm/day	25	25	25	25	25	25	25
Volume from Precipitation	-	m^3/day	282.5	207.9	207.9	209.6	172.5	182.0	200.0
Dewatering Flow Rate With Safety Factor (including stormwater collection)	-	m^3/day	**321.5**	**225.4**	**224.3**	**215.0**	**172.5**	**193.4**	**217.5**

Notes:
mASL - meters above sea level

Analytical Solution for Estimating Radial Flow from an Unconfined Aquifer to a Fully-Penetrating Excavation

$$Q_w = \frac{\pi K(H^2 - h^2)}{Ln\,[\frac{R_o}{r_e}]}$$ (Based on the Dupuit-Forcheimer Equation)

$r_e = \frac{a+b}{\pi}$ $\quad R_o = R_{cj} + r_e$ $\quad R_{cj} = \sqrt{2.25KDt/S}$

Where:

Q_w = Flow rate per unit length of excavation (m^3/s)

K = Hydraulic conductivity (m/s)

H = Height of static water table above base of water-bearing zone (m)

h_w = Height of target water level above the base of water-bearing zone (m)

Rcj=Cooper Jacob Radius of Influence (m)

R_o=Radius of influence (m)

re=Equivalent perimeter (m)

APPENDIX K: Construction Dewatering Calculations - Site Servicing Installations

15450 Woodbine Avenue, Stouffville, ON
GTR-21010864-C2

Table K-2: Flow all Sides of the Excavation

Parameters	Symbols	Unit	Highest K Value	Geomean K Value
Ground Surface Elevation	-	mASL	306.22	306.22
Highest Groundwater Elevation	-	mASL	305.93	305.93
Lowest Excavation Elevation		mASL	301.22	301.22
Dewatered Elevation Target	-	mASL	300.22	300.22
Top of the Water-Bearing Zone	-	mASL	305.93	305.93
Base of the Water-Bearing Zone	-	mASL	293	293
Height of Water Table Above the Base of Water-Bearing Zone	**H**	m	13.23	13.23
Height of Dewatering Target Above the Base of Water-Bearing Zone	**h_w**	m	7.52	7.52
Hydraulic Conductivity	**K**	m/s	1.60E-06	3.20E-07
Length of Excavation	-	m	30	30
Width of Excavation	-	m	5	5
Method to Calculate Radius of Influence	-	-	**Sichardt**	**Sichardt**
Radius of Influence	**Ro**	m	22	10
Distance to Linear Source from Sides of excavation	**Lo=Ro/2**	m	11	5
Dewatering Flow Rate (unconfined linear flow component)	**Q**	m^3/day	**52.9**	**23.7**
Factor of Safety	**FS**	-	2	2
Dewatering Flow Rate (multiplied by factor of safety)	**Q.FS**	m^3/day	105.8	47.3
Precipitation Event	-	mm/day	25	25
Volume from Precipitation	-	m^3/day	3.75	3.75
Dewatering Flow Rate **With Safety Factor** (excluding rainwater collection)	-	m^3/day	**105.8**	**47.3**
Dewatering Flow Rate **With Safety Factor** (including rainwater collection)	-	m^3/day	**109.6**	**51.1**

Notes:

mASL - meters above sea level

Analytical Solution for Estimating Plane Flow from an Unconfined Aquifer to a Fully-Penetrating Excavation

$$Q_w = Kx\frac{H^2 - {h_w}^2}{L_o}$$

(Based on the Dupuit Equation)

Where:

Q_w = Flow rate per unit length of excavation (m^3/s)

K = Hydraulic conductivity (m/s)

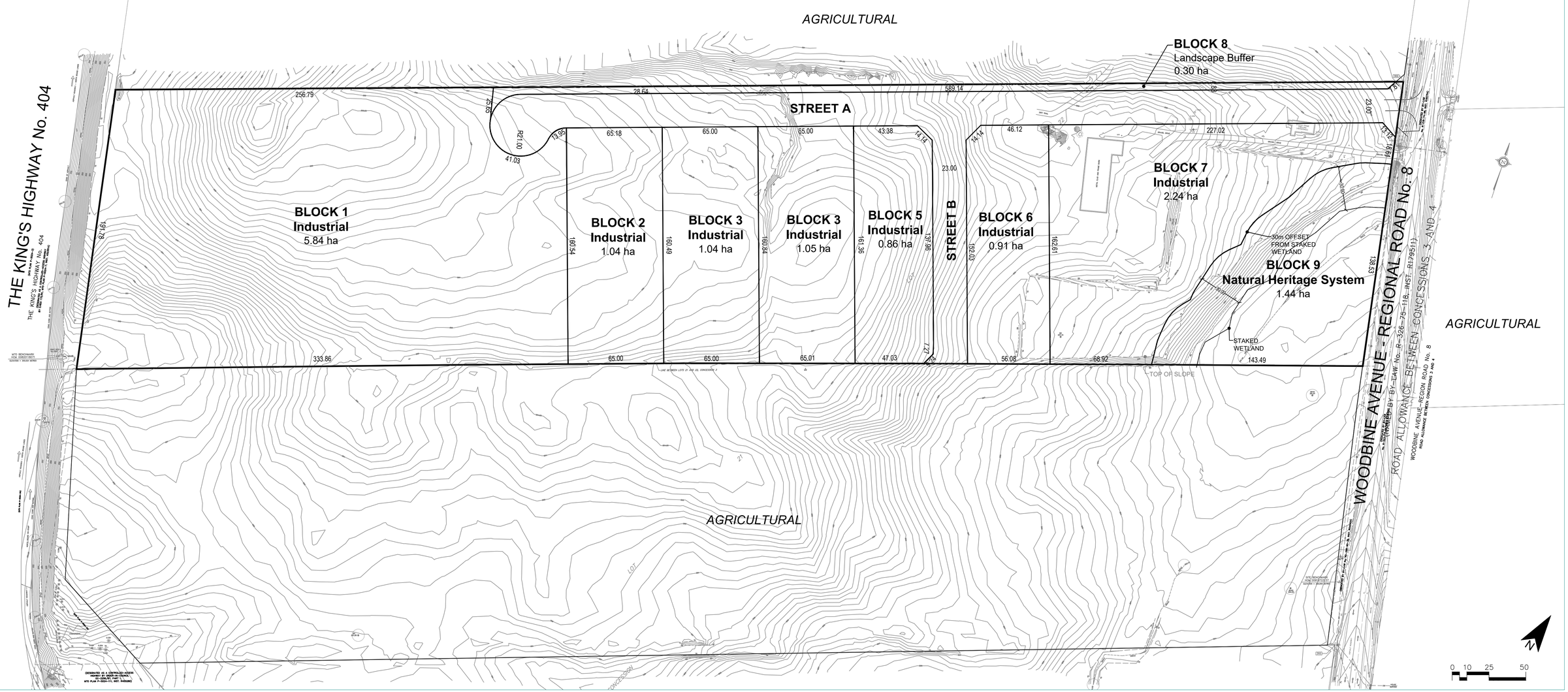
H = Height of static water table above base of water-bearing zone (m)

h_w = Height of target water level above the base of water-bearing zone (m)

L_o=Distance of Influence (m)

x=Length of excavation (m)

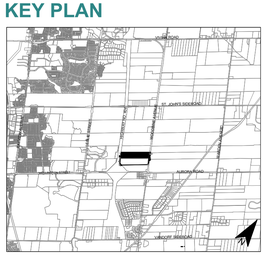
Appendix L – Draft Plan of Subdivision



DRAFT PLAN OF SUBDIVISION

Part of Lot 22
Concession 3
Town of Whitchurch-Stouffville
Regional Municipality of York

KEY PLAN



SUBJECT PROPERTY

SCHEDULE OF LAND USE

Lot / Block	Land Use		AREA ha	AREA ac.
1-7	Industrial Blocks		12.98	32.07
8	Landscape Buffer		0.30	0.74
9	Natural Heritage System		1.44	3.56
Streets A-B	23.0m Industrial Road	784 m	1.87	4.62
	TOTAL	**784 m**	**16.59**	**40.99**

OWNER'S AUTHORIZATION

I hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the Town of Whitchurch-Stouffville.

See Original
Treasure Hill

See Original
Date

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided as shown on this Plan and their relationship to the adjacent lands are accurately and correctly shown.

See Original
Holding Jones Vanderveen Ltd.

See Original
Date

ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13(R.S.O. 1990).

(a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.
(b),(c) - As shown on the Draft and Key Plan.
(d) - Land to be used in accordance with the Schedule of Land Use.
(i) - Soil is silt and clay loam.
(h),(k) - Full municipal services to be provided.

Prepared For:

TREASURE HILL

MGP File No.: 22-3190
Date: April 22, 2024

Date	Revision	By
Aug 26/25	Revise blocks	DR
Feb 5/26	Add block	DR

Malone Given Parsons.
140 Renfrew Drive, Suite 201 | Markham, ON | L3R 6B3
905 513 0170 | mgp.ca