5688 Main Street, Stouffville, Ontario

L4A 2T1

Hydrogeological Investigation and Water Balance Assessment

Client:
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Table of Contents

List of Figures

List of Appendices

1 Introduction

1.1 Project Description

EXP Services Inc. (EXP) was retained by Hyson Properties Inc. to prepare a Hydrogeological Investigation and Water Balance Assessment Report associated with the proposed development located at 5688 Main Street, Stouffville, Ontario (hereinafter referred to as the 'Site').

The Site is currently occupied by a single storey building with paved parking. It is our understanding that the proposal seeks to redevelop the lands with a 13-storey, high-density mixed use building with two (2) levels of Underground parking. The Site location plan is shown on Figure 1.

EXP conducted a Preliminary Geotechnical Investigation in conjunction with this investigation. 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 Preliminary recommendations on construction and long-term dewatering;
- Assess groundwater quality; and
- Prepare a 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;
- Drilled and installed four (4) monitoring wells to an approximate depth range from 6 meters below ground surface (mbgs) to 9 mbgs;
- Drilled and installed one (1) monitoring wells to an approximate depth of 15 mbgs in overburden;
- Installed 50 mm diameter monitoring wells in the geotechnical boreholes;
- Developed and conducted Single Well Response Tests (SWRT) on monitoring wells to assess hydraulic conductivities of the saturated soils at the Site;
- Completed ten (10) rounds of groundwater level measurements at all monitoring wells;
- Collected one (1) groundwater sample for analyses of parameters, as listed in the York Region Sanitary and Storm Sewer Use By-Law and compared also with Provincial Water Quality Objectives (PWQO) parameters;
- Conducted three (3) shallow infiltration tests (less than 1 mbgs) to assess percolation rates;
- 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 construction and long-term dewatering;
- Provided recommendations on the Ministry of Environment, Conservation and Parks (MECP) Water Taking Permits and York Region Sewer Discharge Agreements (SDA) for the construction and post-construction phases;
- Conducted pre- and post-development water balance assessment (Thornthwaite and Mather approach);
- Prepared a Hydrogeological Investigation and Water Balance Assessment Report; and
- Conducted twelve (12) months of groundwater monitoring on a bi-monthly basis (which is ongoing).

The Hydrogeological Investigation and Water Balance Assessment was prepared in accordance with the Ontario Water Resources Act and Ontario Regulation 387/04. The scope of work outlined above was made to assess dewatering and did not include a review of Environmental Site Assessments (ESA).

1.4 Review of Previous Reports

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

- EXP Services Inc. (February 29 2024), Geotechnical Investigation, Proposed Residential Development at 5688 Main Street, Stouffville, ON, prepared for Hyson Properties Inc.

Any past and/or future geotechnical, hydrogeological, environmental and risk assessments, and updated development/architectural plans should be provided to update this hydrogeological report prior to 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 South Slope, and the physiographic landform is named Till Plains (Drumlinized) as shown on Figures 2B and 2C. The South Slope is the southern slope of Oak Ridges Moraine; it includes a strip south of the Peel Plain (Chapman & Putnam, 2007).

2.1.2 Regional Geology and Hydrogeology

The surficial geology can be described as fine textured Till glaciolacustrine deposits consisting of clay to silt-textured till (Ministry of Northern Development and Mines, 2012). The surficial geology of the Site and surrounding areas is shown on Figure 2A. Figure 2D shows the bedrock geology of the Site.

Based on the available regional geology maps, the subsurface stratigraphy of the Site from top to bottom is summarized in Table 2-1 (TRCA, 2008 and Oak Ridge Moraine Groundwater Program, 2023). The overburden thickness is approximately 95 m.

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.	263
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.	258
Newmarket Till (Aquitard)	This lithologic unit mainly consist of a massive and dense silty sand unit.	250
Thorncliffe Formation (Aquifer)	This geology formation generally consists of glaciofluvial (sand, silty sand) or glaciolacustrine deposits (silt, sand, pebbly silt and clay).	191
Sunnybrook Formation (Aquitard)	This lithologic unit was deposited near an ice sheet. It predominately consists of silt and clay.	174
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 sand overlaying silt and clay deposits.	Not Mapped
Georgian Bay Formation	Bedrock primarily consists of interbedded shale, limestone, dolostone and siltstone. It belongs to the Upper Ordovician, (Ministry of Northern Development and Mines, 2012).	168

Regional groundwater across the area flows south, towards Lake Ontario (Oak Ridge Moraine Groundwater Program, 2023). 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 and/or existing subsurface infrastructure.

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 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 indicates that one hundred thirty-one (131) records within a 500 m radius from the Site centroid (Figure 3 and Appendix A). Well distances are calculated relative to the Site centroid, therefore some distances in Appendix A exceed 500 m.

All offsite wells were reportedly identified as monitoring/test holes (77), water supply wells (7), abandoned wells (29) and/or listed with unknown use (18).

The Well Identification Numbers (Well ID No.) of the water supply wells are 6904047, 6904050, 6904054, 6904055, 6923858, 6927350 and 6916108, located between 141 m to 522 m from the Site centroid. It is recommended to complete a baseline residential well survey to verify results of the MECP WWR searches and to confirm current conditions and use of wells in 500 m zone of the Site.

The reported water levels ranged from depths of 2.0 m to 85.0 meters below ground surface (mbgs).

2.1.4 Source Protection Areas

It should be noted that according to the MECP Source Water Protection information, the Site is located within a wellhead protection area (WHPA Q1 and Q2, with moderate stress) of Toronto Source Protection Area (SPA).

The site is outside of Significant Groundwater Recharge Area, Highly Vulnerable Aquifer, Event Based Areas, Issue contributing and Intake Protection Zones.

Based on MECP Source Protection Information Atlas, the Site is outside of WHPA for any municipal water supply wells and is located approximately 2.2 km west from WHPA D for Stouffville Water Supply wells.

2.2 Site Setting

2.2.1 Site Topography

The Site is in an urban land use setting. The topography is considered relatively flat with a regional gradual southwest slope towards Dickson Hill Creek and Lake Ontario. The surface elevation of the Site ranges between approximately 261.99 to 262.60 meters above sea level (masl).

2.2.2 Local Surface Water Features

The Site is located within the Rouge River watershed. No Surface water features exist onsite. The nearest surface water feature is Dickson Hill Creek, approximately located 890 meters southwest of the Site boundary. Lake Ontario is approximately 25 km from the Site boundary to the south.

2.2.3 Local Geology and Hydrogeology

A summary of subsurface soil stratigraphy is provided in the following paragraphs. The soil descriptions are based on the geotechnical investigation report (EXP, February 29, 2024). They 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 B). 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 consist of the following units from top to bottom:

Asphalt

Asphalt with thickness of about 90 to 115 mm was encountered at the ground surface of Boreholes 5, 6, 7 and 8.

Fill

Fill comprising sand and gravel, clayey to sandy silt was encountered at the ground surface of Boreholes 1 to 4 and below the asphalt in Boreholes 5 to 8. Topsoil pockets and layers were noted in the fill samples recovered from Borehole 4. The fill material has moisture contents ranging from about 5 to 38 percent of dry mass and extending to depths ranging from about 1.8 to 3.0 m below existing ground surface (El. ~260.8 to 259.2 m).

Sandy Silt to Silty Sand

The fill was underlain by a sandy silt to silty sand deposit at all borehole locations. This deposit contains a trace of clay, a trace of silt pockets with occasional gravel. It is generally brown in colour and becoming grey with depth and has moisture contents of about 6 to 22 percent of dry mass. With recorded 'N'-value of 0 to 51, this material is in a loose to very dense state of compactness (generally compact). The low 'N'-values recorded are likely affected by hydrostatic pressure when the borehole extended below groundwater table. The sandy silt to silty sand extends to depths ranging from about 10 to 13.3 m below existing ground surface (El. ~252.5 to 248.9 m).

Clayey Silt

A discontinued clayey silt deposit was encountered below the sandy silt to silty sand in Borehole 1. The clayey silt is grey in colour, contains a trace of gravel and a trace of sand. The clayey silt has a very stiff consistency (recorded 'N'-value of 28) and extends to a depth of about 11.7 m below existing grade (El. ~250.8 m).

Sandy Silt Till

A sandy silt till deposit was encountered below the clayey silt in Borehole 1 and below the sandy silt to silty sand in the remining boreholes. This deposit is grey in colour, contains a trace of clay, a trace of gravel and has moisture contents ranging from about 6 to 12 percent of dry mass. Based on recorded 'N'-value of 35 to over 100, the sandy silt till exists in a dense to very dense state of compactness. Boreholes 1 to 7 were terminated in the sandy silt till at depths of about 14 to 19.7 m below existing ground surface (El. ~248.3 to 242.5 m). In Borehole 8, the sandy silt till extends to a depth of 16.2 m below existing ground surface (El. ~245.8 m).

Gravelly Sand

The sandy silt till in Borehole 8 was underlain by a gravelly sand deposit. This deposit is grey in colour, wet and exists in a very dense state of compactness (recorded 'N'-value of over 100). The gravelly sand extends to the termination depth of about 17 m below ground surface in Borehole 8 (El. ~245.0 m).

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

3 Results

3.1 Monitoring Well Details

The monitoring well network was installed as part of the Geotechnical Investigations at the Site. It consists of the following:

- Four (4) shallow overburden monitoring wells (BH1, BH2, BH3 and BH8) were installed to an approximate depth range from 6 to 9 mbgs;
- One (1) deep monitoring well (BH4) was installed to an approximate depth of 15 mbgs.

The diameter of all monitoring wells is 50 mm. All wells were installed with a flush mount protective casing. Borehole logs and monitoring well installation details are provided in Appendix B. The monitoring well locations are shown on Figure 4.

3.2 Water Level Monitoring

As part of the Hydrogeological Investigation and Water Balance Assessment, static water levels in the monitoring wells were recorded in ten (10) monitoring events between February 8, 15 and 28, March 28, April 29, May 21, June 13, August 6, October 25 and December 10 of 2024. A summary of all static water level data as it relates to the elevation survey is given in Table 3-1 below.

The seasonal (one year) groundwater level monitoring is currently ongoing, and the report will be updated once the seasonal monitoring is completed.

The groundwater elevation recorded in the shallow wells ranged from 259.94 masl to 261.73 masl. The groundwater elevation recorded for the deep well ranged from 260.01 masl to 260.25 masl.

Table 3-1: Summary of Measured Groundwater Elevations

Monitoring Well ID	Ground Surface Elevation (masl)	Approximate Full Well Depth (mbgs)	Depth	8-Feb-24	15-Feb-24	28-Feb-24	28-Mar-24	29-Apr-24	21-May-24	13-Jun-24	6-Aug-24	25-Oct-24	10-Dec-24
BH1	262.48	7.6	mbgs	0.75	2.24	2.18	2.18	2.12	2.20	2.25	2.31	-	2.33
			masl	261.73	260.24	260.30	260.30	260.36	260.28	260.23	260.17	-	260.15
BH2	262.60	6.21	mbgs	2.34	2.35	2.32	2.31	2.28	2.27	2.14	2.38	-	-
			masl	260.26	260.25	260.28	260.29	260.32	260.33	260.46	260.22	-	-
BH3	262.20	9.20	mbgs	2.06	2.07	2.04	-	2.00	-	2.09	2.11	2.12	2.11
			masl	260.14	260.13	260.16	-	260.20	-	260.11	260.09	260.08	260.09
BH4	262.20	15.06	mbgs	1.99	2.08	1.99	1.99	1.95	1.99	2.05	2.14	2.17	2.19
			masl	260.21	260.12	260.21	260.21	260.25	260.21	260.15	260.06	260.03	260.01
BH8	262.01	9.28	mbgs	1.73	1.72	1.71	1.69	1.61	1.74	1.78	1.91	2.04	2.07
			masl	260.28	260.29	260.30	260.32	260.40	260.27	260.23	260.10	259.97	259.94

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

One (1) map was created for the Site to show groundwater contours of the shallow water-bearing zones (Figures 6). Accordingly, the groundwater flow direction in this zone is interpreted to be south of the Site, towards Dickson Hill Creek.

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 flow.

3.3 Hydraulic Conductivity Testing

Five (5) Single Well Response Tests (SWRT's) were completed on monitoring wells on February 15 and 28, 2024. The tests were completed to estimate the saturated hydraulic conductivity (K) of the soils at the well screen depths utilizing data loggers, preprogramed to take measurement in one second intervals.

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 of the 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 C.

A summary of the hydraulic conductivities (K-values) estimated from the SWRTs are provided in Table 3-2.

Table 3-2: Summary of Hydraulic Conductivity Testing

Monitoring Well	Measured Well Depth (mbgs)	Screen Interval (mbgs)		Soil formation Screened	Estimated Hydraulic Conductivity (m/s)
		from	to		
BH1	7.6	4.6	7.6	Sandy Silt to Silty Sand	$3.7x10^{-5}$
BH2	6.2	3.2	6.2	Sandy Silt to Silty Sand	$3.9x10^{-5}$
BH3	9.2	6.2	9.2	Sandy Silt to Silty Sand	$2.8x10^{-5}$
BH4	15.1	12.1	15.1	Sandy Silt Till	$6.8x10^{-8}$
BH8	9.3	6.3	9.3	Sandy Silt to Silty Sand	$3.3x10^{-5}$
				Highest Estimated K Value	$3.9x10^{-5}$
				Arithmetic Mean of Estimated K values	$2.7x10^{-5}$
				Geometric Mean of Estimated K values	$9.8x10^{-6}$

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 3-2, the highest K-value of the tested water-bearing zone is $3.9x10^{-5}$ m/s, and the arithmetic and geometric mean of the K-values are $2.7x10^{-5}$ m/s and $9.8x10^{-6}$ respectively.

3.4 Groundwater Quality

To assess the suitability for discharging pumped groundwater into the sewers owned by the York Region during dewatering activities, one (1) groundwater sample was collected from selected monitoring well (BH8) using a peristaltic pump. 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 to Bureau Veritas Laboratory, a CALA certified independent laboratory in Mississauga, Ontario. Analytical results are provided in Appendix D.

Table 3-3 summarizes exceedance(s) of the Sanitary (Table 1) and Storm (Table 2) Sewer Use By-Law parameters.

The following parameters exceeded the York Region Sanitary Sewer Discharge Criteria (Table 1): none.

The following parameters exceeded the York Region Storm Sewer Discharge Criteria (Table 2): Total Suspended Solids and Total Manganese.

The following parameters exceeded the Provincial Water Quality Objectives (PWQO) Criteria: Total Cobalt, Total Phosphorus, Total Sulphide and Sulphide (H_2S).

Reporting detection limits (RDLs) were below the Sewer Use By-Law parameter criteria of Tables 1 and 2. Reporting detection limit exceeded for the following PWQO parameters: Bis(2-ethylexyl)phthalate, Nonylphenol (Total), Total Phosphorous and Total PCB.

Table 3-3: Summary of Analytical Results

Parameter	Units	York Region Sanitary Sewer Discharge Limit (Table 1)	York Region Storm Sewer Discharge Limit (Table 2)	PWQO Criteria	Concentration BH8 February 15, 2024
Total Suspended Solids (TSS)	mg/L	350	15	-	**56**
Total Manganese (Mn)	µg/L	5,000	150	-	**360**
Total Cobalt	µg/L	-	5000	0.9	**4.2**
Total Phosphorous (P)	µg/L	10,000	400	10	***63***
Total Sulphide	mg/L	-	-	0.002	***0.0068***
Sulphide (H_2S)	mg/L	-	-	0.002	***0.0020***

Bold – Exceeds York Region Storm Sewer Discharge Limit (Table 2).
Bold and Italic – Exceeds PWQO Criteria
Bold & underlined – Exceeds York Region Sanitary Sewer Discharge Limit (Table 1).

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.

For the short-term and long-term dewatering discharge to the sanitary sewer system and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the short-term and long-term dewatering discharge to the storm sewer system and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

For the short-term and long-term dewatering discharge to the natural environment and based on the water quality results against PWQO, it is recommended to implement a suitable pre-treatment, as required.

For discharge to the natural environment (e.g.: surface water, drainage feature), the treatment systems will require Environmental Compliance Approvals (ECA) for construction and post construction phases.

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 City/Region.

An agreement to discharge into the sewers owned by the York Region will be required prior to releasing dewatering effluent.

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

3.5 Infiltration Testing

EXP completed three (3) infiltration tests (INF1, INF2 and INF7) within the Site area on March 28, 2024, which were conducted in proximity of the monitoring wells BH1, BH2 and BH7, respectively. INF1, INF2 and INF7 were tested at hand augured holes upto approximate depths of 0.82 mbgs.

The stratigraphy of the shallow subsurface comprises a clayey to sandy silt. Table 3-4 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, Appendix C. The estimated field saturated K-values were correlated to infiltration rates based on the relationship provided in Table C2 (Appendix C) of the guideline.

Infiltration testing locations are shown on Figure 4.

Table 3-4: Summary of Infiltration Testing Results

Infiltration Test Location/ MW ID	Depth of Hole (mbgs)	Formation tested	Field Saturated Hydraulic Conductivity, K_{fs} (cm/s)	Designed Infiltration Rates (mm/hr)
INF1	0.82	Clayey Silt	1.3E-06	6
INF2	0.78	Sandy Silt	7.8E-07	5
INF7	0.77	Clayey to Sandy Silt	1.2E-05	11
Geometric Mean			2.32E-6	7
Design Infiltration Rate				7

The estimated design infiltration rate based on percolation rate testing for the Site is 7 mm/hr. The results of infiltration tests completed are presented in Appendix E.

4 Water Balance Assessment (Site Specific)

4.1 Methodology

The Thornthwaite water balance (Thornthwaite, 1948; Mather, 1978; 1979) is a counting 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. Inputs to the model are monthly temperature, precipitation, and Site latitude. 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 evapo-transpire (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 runoff. When long-term averages of P, R, I and ET are used, no net change in groundwater storage (ST) is assumed. 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 runoff
I = infiltration
ST = change in groundwater storage

For this assessment, the Thornthwaite and Mather method was used to estimate average annual infiltration rates.

Infiltration is governed by the surficial soil types, topography, and land cover. If the water table is at surface, as measured in shallow monitoring wells, then the percolation rate of precipitation into the shallow soils is considered negligible.

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

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 Richmond Hill (Station ID No. 6157012) climatic station (elevation 240 masl).

Meteorological data of 30 years from 1977 to 2006 was utilized for the assessment. Summary of input data is provided in Appendix F-1.

4.3 Pre- and Post-Development Site Characteristics

4.3.1 Pre-Development Site Characteristics

The property occupies an area of approximately 0.4 hectares (0.99 acres). It is assumed that the Site will be a proposed to redevelop the lands with a 13-storey, high-density mixed use building with two (2) levels of Underground parking. A summary of the existing (pre-development) landscape features is provided in Table 4-1:

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

Description	Pre-Construction (Existing) (m^2)	Percentage %
Buildings	700	17.5%
Site Area Available for Infiltration (Landscaped)	2,100	52.5%
Paved Surfaces	1,200	30.0%
Total Site Area	4,000	100%

The areas provided in Table 4-1 above were determined based on a review of available Site plans and these estimates are considered appropriate for estimating the water balance. As evident from the information provided in Table 4.1, under pre-development conditions 52.5% of the Site area is pervious and available for groundwater infiltration (Figure 7).

4.3.2 Post-Development Site Characteristics

As provided in the Site Plan, Table 4-2 provides a summary of the post-development Site characteristics.

Table 4-2: Post-Development Site Characteristics

Description	Impervious Areas m^2	Pervious Areas available for Infiltration m^2	Total Areas Post-Construction (Proposed) m^2
Paved Surfaces (roads, sidewalks, parking)	1,300	0	1,300
Building roofs	2,100	0	2,100
Landscaped areas	0	600	600
Totals	3,400	600	4,000
Percentage %	85.0	15.0	100

Under post-development conditions, the total pervious area is reduced from 52.5% to 15% of the total Site area (Tables 4-1 and 4-2 and Figure 8).

4.4 Pre-Development Water Balance Estimates

4.4.1 Climate Data Analysis

The mean annual water surplus was calculated by using the Thornthwaite and Mather (1955) method. Monthly average precipitation values were obtained for 30 years (1977 to 2006) from the National Climate Data and Information Archive (Environment Canada) for the Richmond Hill (Station ID No. 6157012) climatic station (elevation 240 masl).

Moisture storage of 200 mm/year was assumed for soils and considered to be representative of pre-construction Site conditions. The closest latitude to the Site is 44^0, which was used in the USGS model (2007).

Table 4.3 summarizes the climatic water balance analysis. Appendix F-1 and F-2 provide the model input and output, respectively.

Table 4.3: Climatic Water Balance Analysis in Pre-Development Conditions

Soil Moisture Storage (mm/yr)	Precipitation (mm/yr)	Actual ET (mm/yr)	Surplus (mm/yr)
200 mm/yr	897.37	574.62	322.75

Note: ET = Evapotranspiration

The results of the climatic water balance analysis for the Site suggest that a surplus of 322.75 mm/year of water is available for surface runoff 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 runoff and infiltration based on the controlling factors provided by MOE (1995). The controlling factors provided by the MOE were used for estimating infiltration factors.

Using this method, a total infiltration factor for the Site was estimated by using the individual sub-factors, which are representative of the topography, soil type and land cover conditions (Figures 2A and 7). Appendix F-3 provides a summary of the sub factors and total factor based on the Site conditions. The infiltration sub-factors were determined for estimating pre-development infiltration rates of the entire Site.

The estimated pre-development total infiltration factor of 0.44 (or 44%) represents the fraction of the water surplus available for infiltration. The complementary fraction of the available water for runoff is 0.56. The infiltration factor is utilized to calculate the amount of annual infiltration (in units of m^3/yr) at the Site by multiplying it with the average yearly water surplus estimate and with the Site area available for infiltration.

Applying the infiltration factor of 0.44 and a water surplus of 322.75 mm/yr, the estimated pre-development infiltration rate of the whole Site is 142.01 mm/yr.

In areas with water table at or above surface and less than approximately 1.0 m below surface, the infiltration rate would be considered negligible for existing and proposed grade. Water levels above ground surface or less than 1 m below ground surface were not reported while monitoring water levels at this Site except at BH1 (0.75 mbgs) at the north eastern side of the boundary on February 8, 2024.

4.4.3 Pre-Development Water Balance Analysis

The water balance analysis is based on available information on a regional scale and deemed representative for the Site. Table 4-4 provides the water balance analysis for the Site.

Table 4-4: Pre-Development Water Balance Results

Location	Total Site Area (m^2)	Area Available for Infiltration (m^2)	Total Precipitation (m^3/yr)	Actual Evapo-transpiration (m^3/yr)	Runoff (m^3/yr)	Infiltration (m^3/yr)
Total Site	4,000	2,100	3,589	2,298	993	298
Percentage of Total Precipitation			100%	64%	28%	8%

The total property area was used to estimate the annual precipitation volume of the Site (Appendix F-4). As summarized in Table 4-4, the breakdown of the pre-development water balance is as follows: 64% of the total precipitation is subject to evapotranspiration, 28% to runoff, and 8% to infiltration.

The pre-development water balance, on a weighted average depth basis (in mm/year) is as follows:

$$P\ (897.37) = ET\ (574.62) + R\ (248.2) + I\ (74.55) + ST\ (0)$$

4.5 Post-Development Water Balance Estimates

4.5.1 Post-Development Water Balance

Based on the proposed development drawings, the total area of pervious surfaces under post-development conditions is approximately 800 m^2, representing approximately 20% of the total Site area of 4,000 m^2 (Table 4-2). The remaining 3,200 m^2 will not contribute to infiltration in the post-development phase (approximately 80% of the total land area).

Post-development infiltration sub-factors were determined in a similar manner as for estimating infiltration sub-factors for pre-development Site conditions, both based on the method recommended by MOE (1995). For post-development infiltration sub-factors, the landscaped areas were assumed to be consistent with cultivated cover with an infiltration sub-factor of 0.14 (Appendix F-3). The estimated post-development total infiltration factor of 0.44 (or 44%).

Table 4-5 presents a summary of the overall post-development water balance assessment.

Table 4-5: Post-Development Water Balance Forecast

Location	Total Site Area (m^2)	Area Available for Infiltration (m^2)	Total Precipitation (m^3/yr)	Evapo-transpiration (m^3/yr)	Runoff (m^3/yr)	Infiltration (m^3/yr)
Total Site	4,000	800	3,589	460	3,016	114
Percentage of Total Precipitation			100%	12.8%	84.0%	3.2%

If no remedial measures are implemented to maintain infiltration, it is expected that the annual infiltration volume will be reduced from approximately 298 m^3/year to 114 m^3/year in post-development, resulting in a deficit of 185 m^3/year (Appendix F-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 infiltration deficit of 185 m^3/year can be mitigated under the post-development Site conditions under engineered conditions. Reasonable mitigation measures onsite are therefore recommended to maintain the pre-development infiltration under post-development Site conditions.

Under unmitigated post-development conditions, a reduction in annual infiltration volume may occur, as compared to pre-development conditions. Consequently, water contribution from infiltration to downgradient drainage features would decrease.

The post-development water balance, on a weighted average depth basis (in mm/year) is as follows:

$$P\ (897.37) = ET\ (114.92) + R\ (754.04) + I\ (28.40) + ST\ (0)$$

4.6 Impact Assessment and Proposed Mitigation Measures

Mitigation measures should be implemented to balance the estimated post-development infiltration rate deficit of 185 m^3/year (Appendix F-4). To offset the noted deficit, approximately 15% from the available runoff from roof-top water of 1,256 m^3/year (in 8 months) would need be infiltrated. This could be accommodated in Low Impact Development (LID) facilities, such as infiltration galleries and enhanced grass swales implemented onsite to maintain the pre-development infiltration rates during the post-development phase.

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.

The following mitigation measures are proposed to be implemented onsite to maintain the pre-development infiltration rates during the post-development phase:

- **Infiltration Galleries and Enhanced Grass Swales and Rain Gardens**

To balance the infiltration deficit in 8 months per year a LID system (infiltration gallery) with a total of approximately 35 m^2 in size would be required. The LID area is based on the estimated design infiltration rate of 7 mm/hr, on the assumption that precipitation is evenly distributed during the year over two-week interval, and bi-weekly volumes from roof will be infiltrated in 48-hour. The infiltration system will need to have a minimum storage of 11.54 m^3 to store two weeks of precipitation to meet the pre-development infiltration levels. (Appendix F-2 and F-5).

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

5 Dewatering Assessment

For this assessment, it was assumed that the proposed construction plans include an excavation with shoring extending to the Site boundaries. EXP should be retained to review the assumptions outlined in this section, should the assumed shoring design change.

5.1 Dewatering Flow Rate Estimate and Zone of Influence

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. 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.

5.2 Cooper-Jacob's Radius of Influence

The radius of influence (Rcj) for the construction dewatering was calculated based on Cooper-Jacob's equation. 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:

$$\mathrm{R}_{cj} = \sqrt{2.25KDt/s}$$

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)

5.3 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 F.

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 excavation's 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 two (2) and a one hundred (100) year storm event over a 24-hour period are approximately 57.8 and 126.8 mm.

5.4 Results of Dewatering Rate Estimates

5.4.1 Construction Dewatering Rate Estimate

For this assessment, it was assumed that the proposed construction plans include an excavation with shoring extending to the Site boundaries. EXP should be retained to review the assumptions outlined in this section, should the assumed shoring design change.

Short-term (construction) dewatering calculations are presented in Appendix F.

Pits (elevator, 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 5-1 Summary of Construction Dewatering Assumptions and Rate

Input Parameter	Assumption	Units	Notes
Number of Subgrade Levels	2 Levels	-	
Ground Elevations	262.22	masl	Average of boreholes elevations on site
Top of Slab Elevation	254.55	masl	Setion 1 (Drawing No. A-301) prepared by TAES Architects Inc. date not mentioned
Lowest Footing Elevation	253.05	masl	Assumed to be approximately 1.5 m below the top of slab elevation

Input Parameter	Assumption	Units	Notes
Excavation Area (Length x Width)	(105 x 36)	m^2 (m x m)	Approximate area (length x width) of Site for the proposed development provided drawing for the underground parking plan prepared by TAES Architects Inc. date not mentioned
Short Term Dewatering			
With Safety Factor and Precipitation	2,083,000	L/day	25 mm of precipitation
With Safety Factor	1,988,000	L/day	Safety factor of 2 and without precipitation
Without Safety Factor	994,210	L/day	Without precipitation
Long Term Dewatering			
With Safety Factor	768,000	L/day	Safety Factor of 1.5

The peak dewatering flow rates does not account for flow from utility beddings and variations in hydrogeological properties beyond those encountered during this investigation.

Local dewatering may be required for pits (elevator pits, sump pits), if these extend deeper than the dewatering target. Local dewatering is not considered to be part of this assessment. Dewatering estimates should be reviewed once the pit dimensions are available.

Local dewatering may be required for pits (elevator pits, sump pits, raft) and for localized areas with permeable, soft, or wet soil conditions. Local dewatering is not considered to be part of this assessment, but contractor 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 the systems and ramp/site access to redirect runoff away from excavation.

The dewatering assumptions are based on using shoring system without open cuts and sloped excavations.

If groundwater cutoff systems (ex: caisson walls, sheet piles) are installed, these should be designed for maximal hydrostatic pressure for shallow and deep water levels, without dewatering on the outer side of the groundwater cutoff. Soldier pile and lagging and caisson wall systems should be designed to account for shallow groundwater conditions and take into consideration that dewatering systems may not provide fully dewatered soil conditions.

If groundwater cutoff systems are used for decreasing long-term dewatering rates, these should be designed as permanent structures to cutoff groundwater inflow in the long-term. All perforations should be sealed permanently (ex: tiebacks, breaches, and cold joints) with no leakages and inspected. Fillers should extend into low permeability deposits (ex: sound bedrock or till) to cutoff groundwater from water bearing zones. Inspections should be conducted to confirm the depth of low permeability deposits along shoring system and that fillers are keyed into low permeability soil deposits.

The 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.

5.4.2 Post-Construction Dewatering Rate Estimate

It is our understanding that the development plan includes a permanent foundation sub-drain system that will ultimately discharge to the municipal sewer system if conventional footings are installed.

The long-term dewatering was based on the same equations as construction dewatering shown in Section 5.1.

The calculation for the estimated flow to the future sub-drain system (with no cutoff walls) is provided in Appendix F. The dewatering target for the foundation drainage system is taken at 0.5 m below the lowest slab elevation.

The foundation drain analysis provides a flow rate estimate. Once the foundation drain is built, actual flow rate measurements of the sump discharge will be required to confirm the estimated flow rate.

Based on the assumptions provided in this report, the estimated sub-drain discharge volumes are summarized in Appendix F. Seasonal and daily fluctuations are expected. These estimates may be affected by hydrogeological conditions beyond those encountered at this time, fluctuations in groundwater regimes, surrounding Site alterations, and existing and future infrastructures.

Intermittent cycling of sump pumps and seasonal fluctuation in groundwater regimes should be considered for pump specifications. A safety factor was applied to the flow rate to account for water level fluctuations due to seasonal changes.

These estimates assume that pits (elevator and/or sump pits) are made as watertight structures (without drainage), if their depths extend below the dewatering target, as previously stated. The dewatering assumptions are based on using shoring system without open cuts. Open cuts can act as preferential groundwater pathways in the long-term and cause foundation drainage volumes to increase.

The sub-drain rate estimate is based on the assumptions outlined in this report. Any variations in hydrogeological conditions beyond those encountered as part of this investigation may significantly influence the sub-drain discharge volumes.

5.5 MECP Water Taking Permits

5.5.1 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 50,000 L/day but less than 400,000 L/day, then an online registration in the Environmental Activity and Sector Registry (EASR) with the MECP will be required. If groundwater dewatering rates onsite exceed 400,000 L/day, a Category 3 Permit to Take Water (PTTW) will be required from the MECP.

As of July 1, 2021, an amendment of O. Reg. 63/16 has come into effect and replaced the former subsection 7 (5) such that the EASR water taking limit of 400,000 L/day would apply to groundwater takings of each dewatered work area only, excluding stormwater.

The dewatering estimate including a safety factor is greater than 400, 000 L/day as shown in Table 5-1. The MECP construction dewatering rate excludes the precipitation amount and is the rate used for the permit application. Based on the MECP construction dewatering a PTTW will be required to facilitate the construction dewatering program of the Site.

A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. Monitoring of both water quantity and water quality must be carried out for the entire duration of the construction dewatering phase. During this phase, the Discharge Plan and the daily water taking records must be available onsite.

The PTTW, Discharge Plan, hydrogeological investigation report, and geotechnical assessment of settlements must also be available at the construction Site during the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since the PTTW will need to be updated to reflect these modifications. Altogether, the hydrogeological report, PTTW, Discharge Plan and geotechnical assessment constitute the Water Taking Plan which needs to be available onsite during the construction dewatering.

5.5.2 Long-Term Discharge Rate (Post Construction Phase)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering is more than 50,000 L/day, then an application for a Category 3 Permit to Take Water (PTTW) will be required from the MECP.

Based on the dewatering estimate shown in Table 5-1 greater than 50,000 L/day, a Category 3 Permit to Take Water (PTTW) will be required to facilitate the post-development phase. City of Stouffville may not allow any long-term dewatering in which case the underground structures can be designed as watertight structures. If the structures are designed watertight, PTTW will not be required for the post-development phase.

The safety factor for construction (short-term) dewatering is selected larger than for long-term to account for anticipated greater groundwater volumes during initial dewatering. The applied analytical formula is adequate for long-term (steady state) conditions as it omits specific yield and time dependency. When the formula is used for short-term conditions a larger safety factor is recommended to cover a larger initial dewatering rate, which is required to remove stored groundwater. Moreover, a large initial construction dewatering rate is favorable, as it supports reducing the time to reach the dewatering target elevation.

6 Environmental Impact

6.1 Surface Water Features

The Site is located within the Rouge River watershed. No surface water features exist onsite. The nearest surface water feature is Dickson Hill Creek, approximately located 890 meters southwest of the Site boundary. Lake Ontario is approximately 25 km from the Site boundary to the south.

Due to the limited extent of zone of influence and the wide distance to the nearest surface water feature, no detrimental impacts on surface water features are expected during construction activities.

6.2 Groundwater Sources

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. The Well Identification Numbers (Well ID No.) of the water supply wells are 6904047, 6904050, 6904054, 6904055, 6923858, 6927350 and 6916108, located between 141 m to 522 m from the Site centroid. It is recommended to complete a baseline residential well survey to verify results of the MECP WWR searches and to confirm current conditions and use of wells in 500 m zone of the Site.

6.3 Geotechnical Considerations

As per the MECP technical requirement for PTTW, 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.

6.4 Groundwater Quality

It is our understanding that the potential effluent from the dewatering system during the construction will be released to the municipal sewer system. As such, the quality of groundwater discharge is required to conform the York Region Sewer Use By-Law.

Dewatering (short and long-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.

For the short-term and long-term dewatering discharge to the sanitary sewer system and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the short-term and long-term dewatering discharge to the storm sewer system and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

For discharge to the natural environment (e.g.: surface water, drainage feature), the treatment systems will require Environmental Compliance Approvals (ECA) for construction and post construction phases.

For discharge to the natural environment (e.g.: surface water, drainage feature), the treatment systems will require Environmental Compliance Approvals (ECA) for construction and post construction phases.

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 City/Region.

An agreement to discharge into the sewers owned by the York Region will be required prior to releasing dewatering effluent.

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

6.5 Well Decommissioning

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.

7 Monitoring/Contingency Plan

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 construction.

For the construction dewatering, monitoring and mitigation programs must be implemented prior to, during and after construction. This will include both water quality and water quantity monitoring for surface and groundwater resources. The monitoring will confirm the ZOI from the dewatering system, assist in documenting changes over time and help to evaluate whether any changes are a result of construction dewatering.

Discharge rates from each water taking source will be monitored using calibrated flow meters with daily water taking rates to be maintained and be available on Site for entire duration of construction dewatering. Daily precipitation records to be maintained also, as per MECP requirements.

Table 7-1 below presents the monitoring, mitigation and contingency plan including monitoring frequencies, triggers for mitigation and contingency measures.

Table 7-1: Recommended Monitoring, Mitigation and Contingency Plan

Period	Monitoring Location	Monitoring Frequency	Method	Triggers for Mitigation	Mitigation/Contingency
WATER LEVELS AND FLOW RATES / VOLUME					
During Construction	On/off-site groundwater levels	Datalogger to be installed at an existing well at the beginning of dewatering. Manual WLs to be taken at the beginning of dewatering activities (within first week), monthly for first quarter, quarterly thereafter from all on-site monitoring wells.	Manual / Data logger	Water Level Drawdown >100% of Target Drawdowns	*Onsite:* If drawdown exceeds 100% of target drawdown, then adjust dewatering rate to reduce drawdown to target if applicable. *Offsite:* Monitor offsite wells at properties who participated in private well survey, using a datalogger. If private wells are impacted negatively, the applicant must provide an alternate water supply source.
	Discharge rate volume at each point of discharge	Daily (collected by contractor)	Flow Meter Totalizer (read daily; data provided monthly to hydrogeologist)	Flow approaches maximum daily permissible limits	Reduce discharge to maintain flow below maximum permissible limits.
WATER QUALITY					

Period	Monitoring Location	Monitoring Frequency	Method	Triggers for Mitigation	Mitigation/Contingency
During Construction	Discharge from dewatering at each point of discharge	Once at the beginning of dewatering activities (within first week), monthly for first quarter, quarterly thereafter (at the discretion of the City of Barrie.	Test effluent for parameters listed in York Region Storm use by-law standards.	Discharge quality exceeds York Region Storm sewer use by-law.	If exceedance, confirmatory samples to be taken with 48 hrs (on rush turnaround). If confirmed adjust treatment system, and resume weekly sampling for one month.
SHUTDOWN PROTOCOL					
During Construction	Discharge from dewatering at each point of discharge	Daily	Discharge tracking based on monthly discharge logs and water samples	If water quality exceeds the sewer use by-law, and/or discharge volume exceeds maximum limit, and mitigation efforts are not successful, then the shutdown dewatering system if safe to do so.	Reassess impacts, mitigation measures, and dewatering system setup/pumping capacity before recommissioning system.
SETTLEMENT MONITORING – As specified by Geotechnical Engineer					

8 Conclusions and Recommendations

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

- The Site is located within the Rouge River watershed. The Site is within a physiographic region known as the South Slope, and the physiographic landform is named Till Plains (Drumlinized).
- The main overburden soil types encountered during on-site drilling program include sandy silt to silty sand and sandy silt till.
- The nearest surface water feature is Dickson Hill Creek, approximately located 890 meters southwest of the Site boundary. Lake Ontario is approximately 25 km from the Site boundary to the south.
- The one-year seasonal groundwater monitoring is currently ongoing, and this report will be updated with results. The data to date suggests that the groundwater elevations at approximate foundations levels ranged from 259.97 masl to 261.73 masl.
- The direction of shallow groundwater flow is interpreted to be directed to be generally southward of the Site.
- The highest hydraulic conductivity (K-value) of the tested water-bearing zone is $3.9x10^{-5}$ m/s, and the arithmetic and geometric mean of the K-values are $2.7x10^{-5}$ m/s and $9.8x10^{-6}$ respectively.
- The following parameters exceeded the York Region Sanitary Sewer Discharge Criteria (Table 1): none.
- The following parameters exceeded the York Region Storm Sewer Discharge Criteria (Table 2): Total Suspended Solids and Total Manganese.
- The following parameters exceeded the Provincial Water Quality Objectives (PWQO) Criteria: Total Cobalt, Total Phosphorus, Total Sulphide and Sulphide (H_2S).
- Based on water balance assessment for the Site, mitigation measures should be implemented to balance the estimated post-development infiltration rate deficit of 185 m^3/year. To balance the infiltration deficit in 8 months per year a LID system (infiltration gallery) with a total of approximately 35 m^2 in size would be required. The LID area is based on the estimated design infiltration rate of 7 mm/hr, on the assumption that precipitation is evenly distributed during the year over two-week interval, and bi-weekly volumes from roof will be infiltrated in 48-hour. The infiltration system will need to have a minimum storage of 11.54 m^3 to store two weeks of precipitation to meet the pre-development infiltration levels.
- Based on the assumptions outlined in this report, the estimated peak dewatering rate for proposed construction activities is approximately 2,083,000 L/day. This is the rate which will be required to be discharged to the municipal sewer system.
- The estimated MECP dewatering rate for proposed construction activities is approximately 1,988,000 L/day. As the dewatering flow rate estimate is greater than 400,000 L/day, a Category 3 PTTW will be required to facilitate the construction dewatering program for the Site.
- Since a Category 3 Permit to Take Water will be needed, 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 the time and help to evaluate whether any changes are a result of construction dewatering.
- The long-term flow rate of the foundation sub-drain is estimated to be approximately 768,000 L/day. It is recommended that once the sub-drain system is in place, a flow meter be installed at the sump(s) to record daily discharge volumes during the commissioning stage of the system. Regular maintenance/cleaning of the sub-drain system is recommended to ensure its proper operation. A PTTW will be required for long-term discharge. City of Stouffville may not allow any long-term dewatering in which case the underground structures can be designed as watertight structures. If the structures are designed watertight, PTTW will not be required for the post-development phase.

- The construction dewatering and long-term estimate of sub-drain discharge volumes 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.
- 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.
- For the short-term and long-term dewatering discharge to the sanitary sewer system and based on the water quality test results, the water is suitable to be discharged without a treatment system.
- For the short-term and long-term dewatering discharge to the storm sewer system and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.
- For discharge to the natural environment (e.g.: surface water, drainage feature), the treatment systems will require Environmental Compliance Approvals (ECA) for construction and post construction phases.
- As per the MECP technical requirement for PTTW, 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.
- An agreement to discharge into the sewers owned by the York Region will be required prior to releasing dewatering effluent.
- 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 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 PTTW, Discharge Plan, hydrogeological investigation report, and geotechnical assessment of settlements 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. The hydrogeological report, PTTW, Discharge Plan and geotechnical assessment constitutes the Water Taking Plan which needs to be available onsite for the duration of construction dewatering.
- 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. This report is solely intended for the construction and long-term dewatering assessments. Any changes to the design concept may result in a modification to the recommendations provided in this report.

9 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.

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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.

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Senior Hydrogeologist
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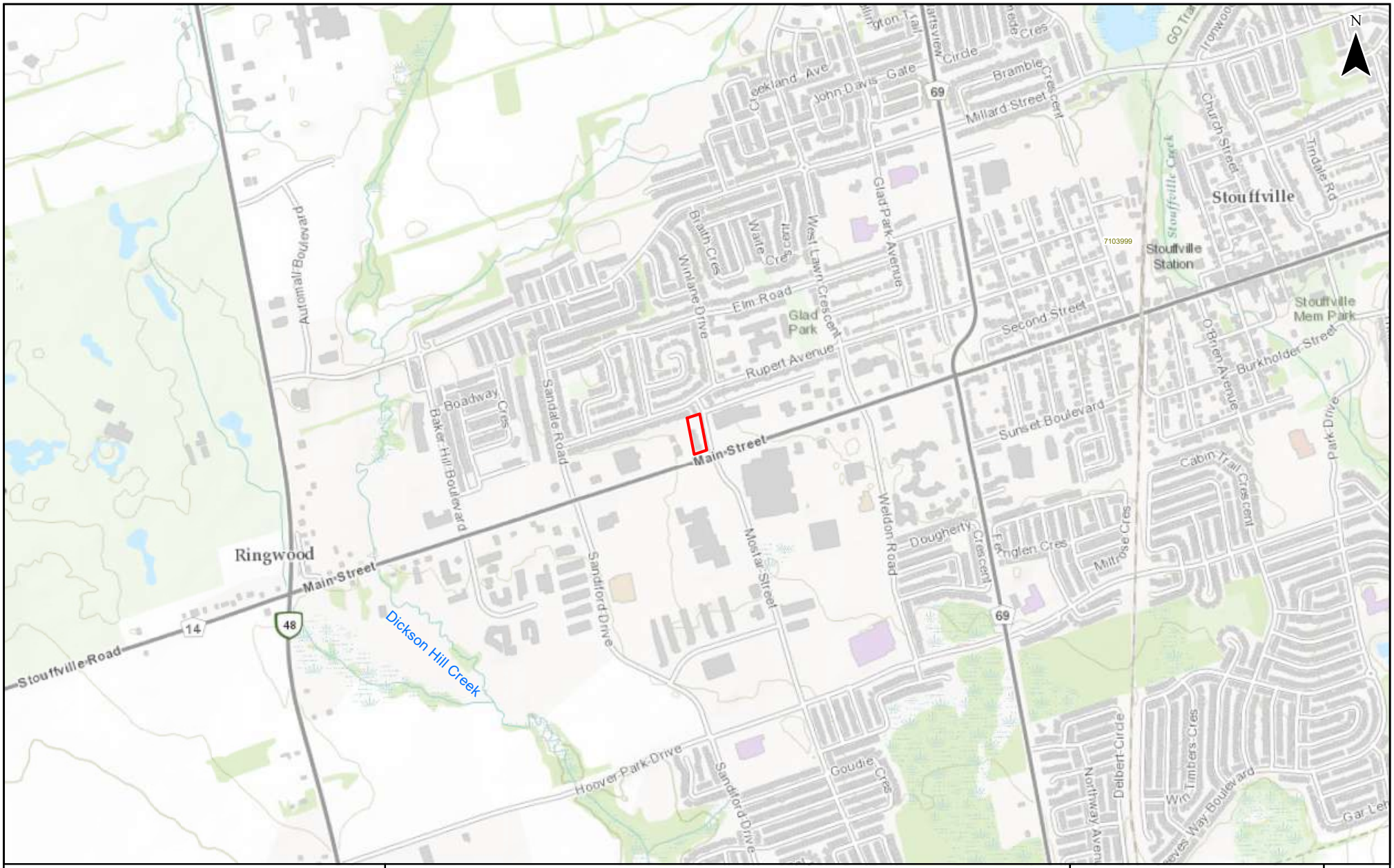
- EXP Services Inc. (February 29, 2024), Geotechnical Investigation, Proposed Residential Development at 5688 Main Street, Stouffville, ON, prepared for Hyson Properties Inc.

Figures



SCALE:

0 150 300 450 600 750 m

LEGEND:

APPROXIMATE SITE BOUNDARY

SITE LOCATION PLAN

FIGURE: 1

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

DRAWN BY:	CHECKED BY:
AC	AN

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024

SCALE:

0 100 200 300 400 500 m

SOURCE:

BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2010

exp.

DRAWN BY:	CHECKED BY:
AC	AN

LEGEND:

- APPROXIMATE SITE BOUNDARY
- 8A: FINE-TEXTURED GLACIOLACUSTRINE DEPOSITS
- 5D: GLACIOLACUSTRINE-DERIVED SILTY TO CLAYEY TILL

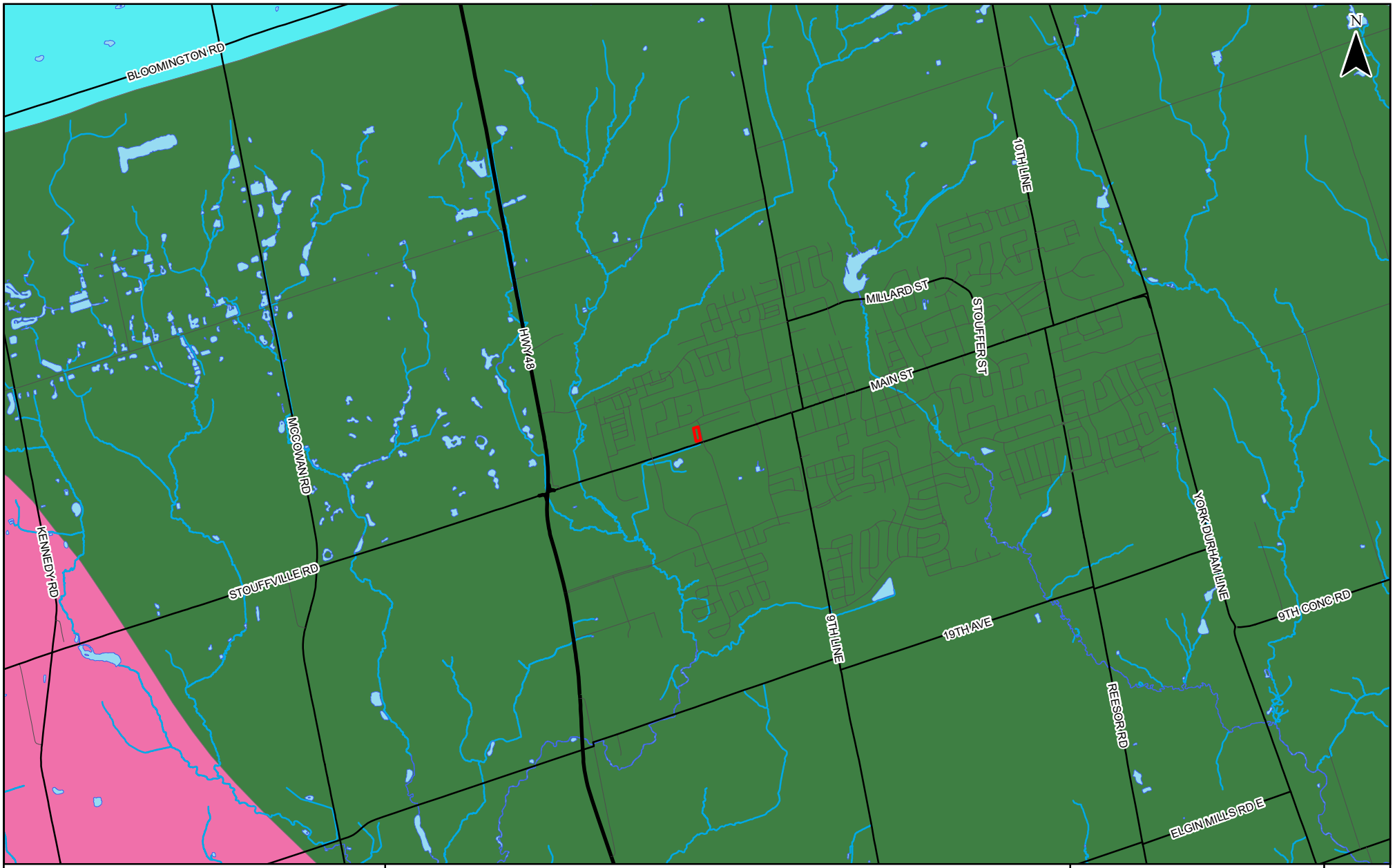
QUATERNARY GEOLOGY

FIGURE: 2A

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024



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	AN

LEGEND:
- APPROXIMATE SITE BOUNDARY
- OAK RIDGES MORAINE
- PEEL PLAIN
- SOUTH SLOPE

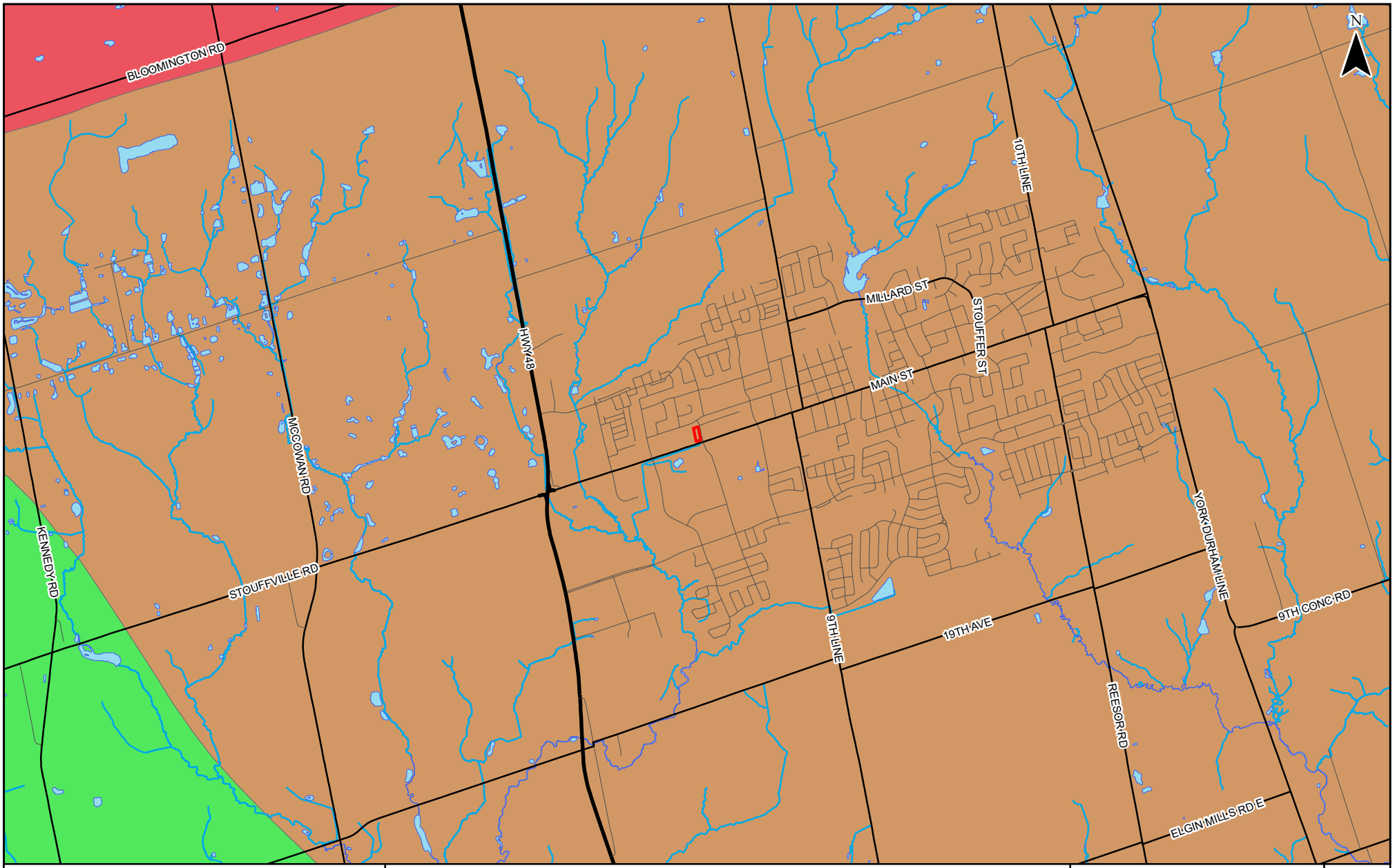
PHYSIOGRAPHIC REGIONS

FIGURE: 2B

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024



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	AN

LEGEND:
- APPROXIMATE SITE BOUNDARY
- BEVELLED TILL PLAINS
- KAME MORAINES
- TILL PLAINS (DRUMLINIZED)

PHYSIOGRAPHIC LANDFORMS

FIGURE: 2C

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024

SCALE:
0 100 200 300 400 500 m

SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2011

exp.

DRAWN BY:	CHECKED BY:
AC	AN

LEGEND:
- APPROXIMATE SITE BOUNDARY
- 55b: SHALE, LIMESTONE, DOLOSTONE, SILTSTONE

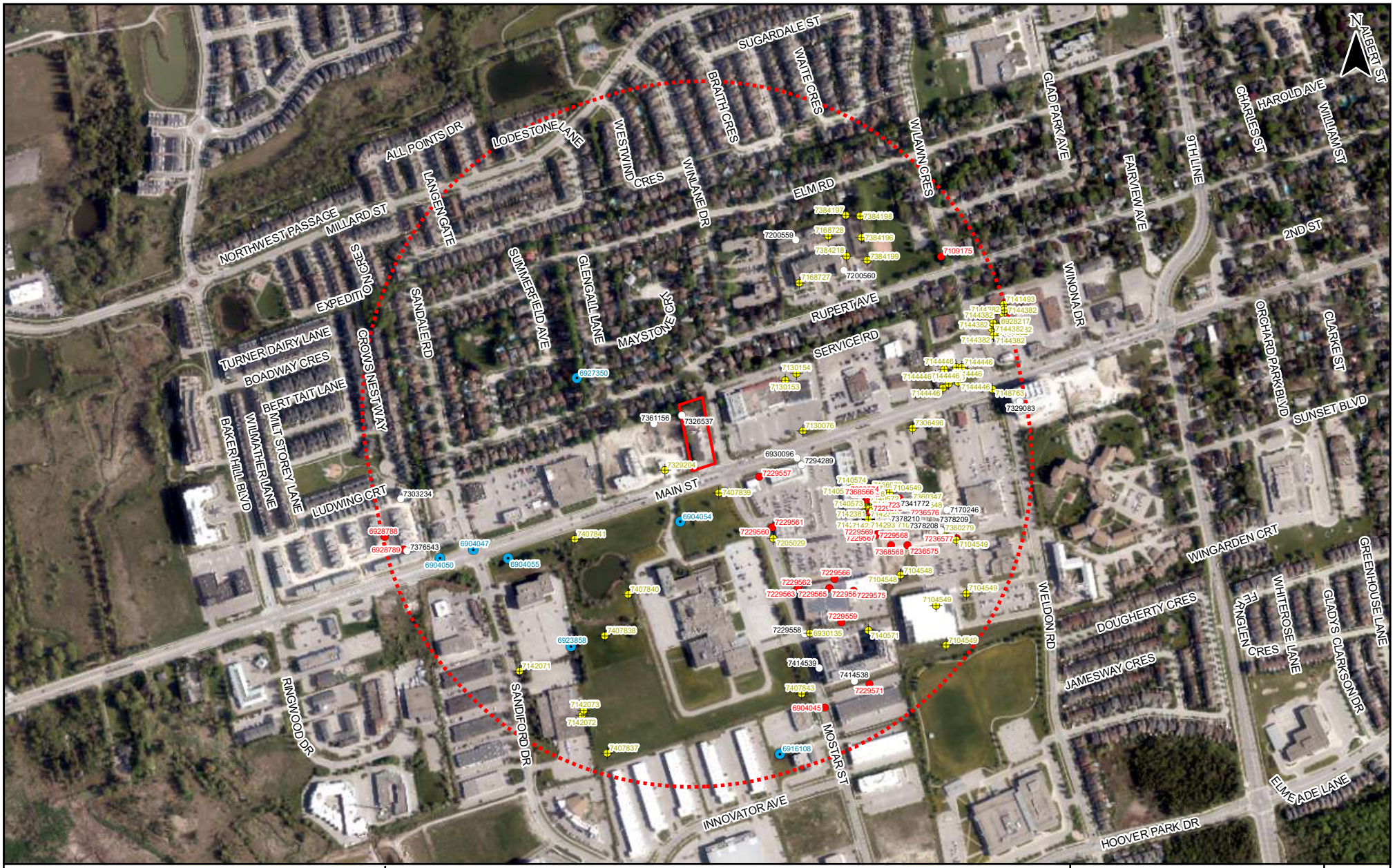
BEDROCK GEOLOGY

FIGURE: 2D

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024



SCALE:

0 100 200 300 400 500 m

SOURCE:

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

exp.

DRAWN BY:	CHECKED BY:
AC	AN

LEGEND:

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

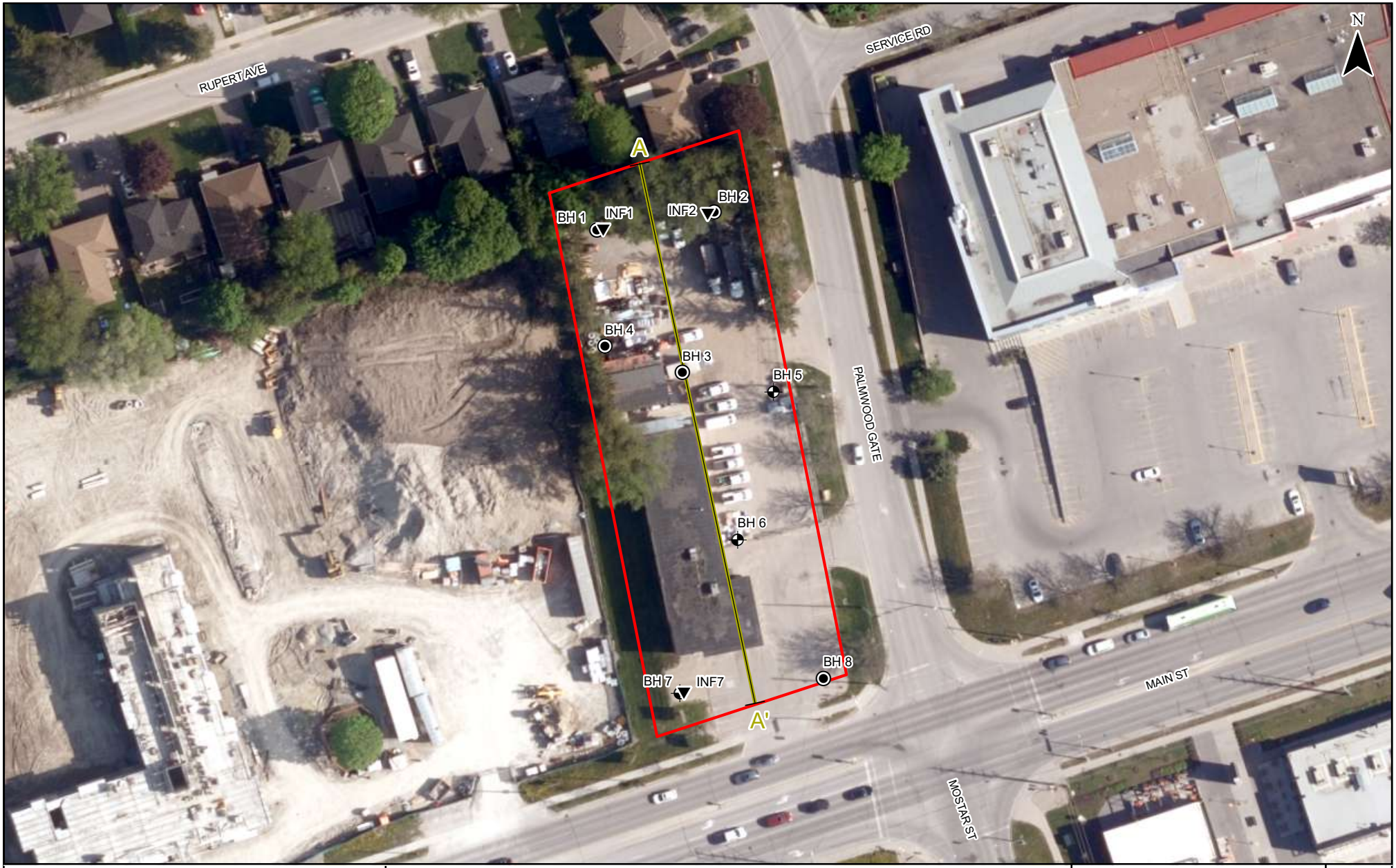
MECP WATER WELL RECORDS MAP

FIGURE: 3

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024



SCALE:

0 10 20 30 40 50 m

LEGEND:

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

DRAWN BY:	CHECKED BY:
AC	AN

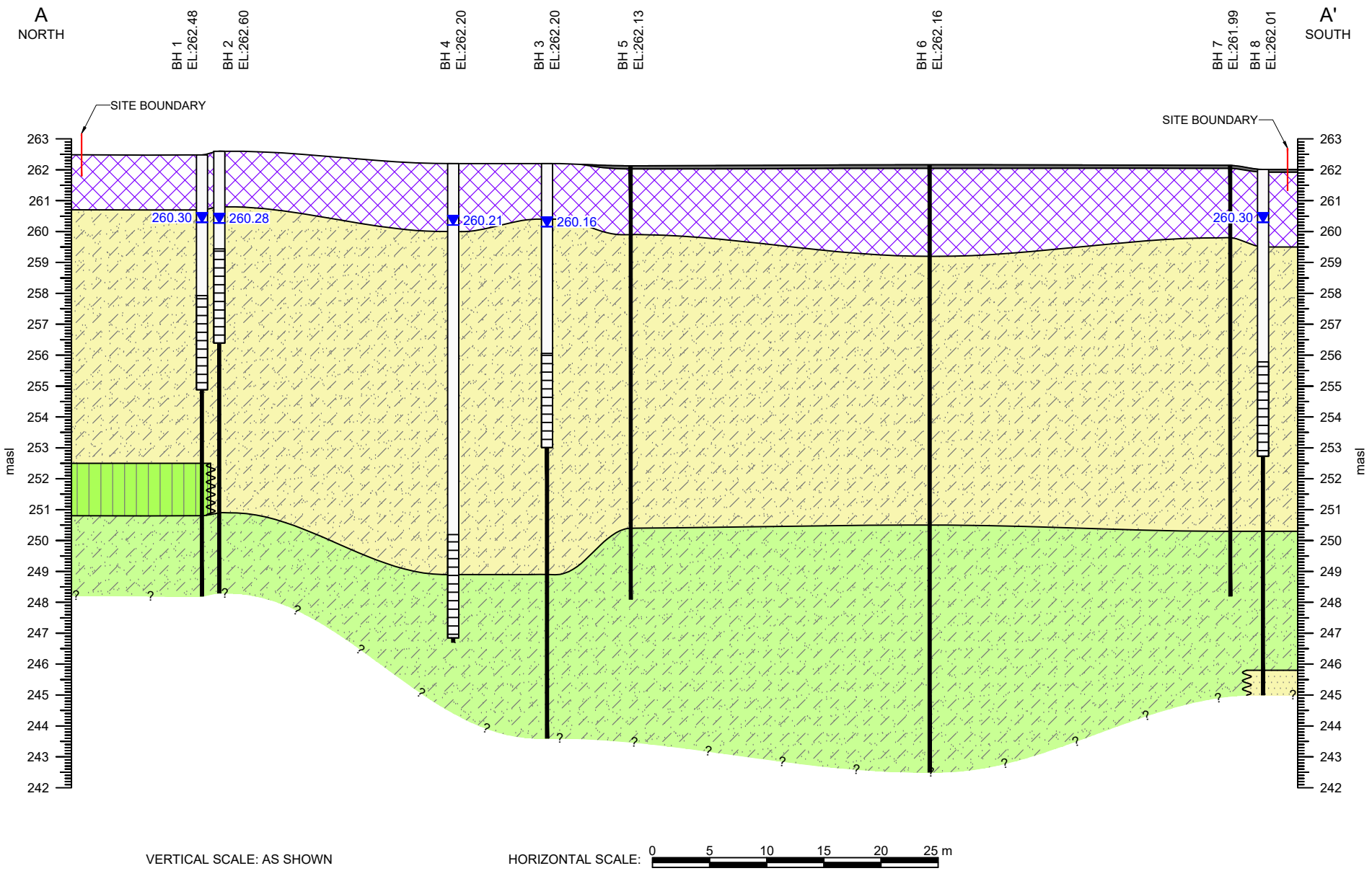
BOREHOLE / MONITORING WELL LOCATION PLAN

FIGURE: 4

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: NOVEMBER 2024



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LEGEND:

- ASPHALT / PATIO STONE
- FILL
- CLAYEY SILT
- SANDY SILT TO SILTY SAND
- GRAVELLY SAND
- SANDY SILT TILL

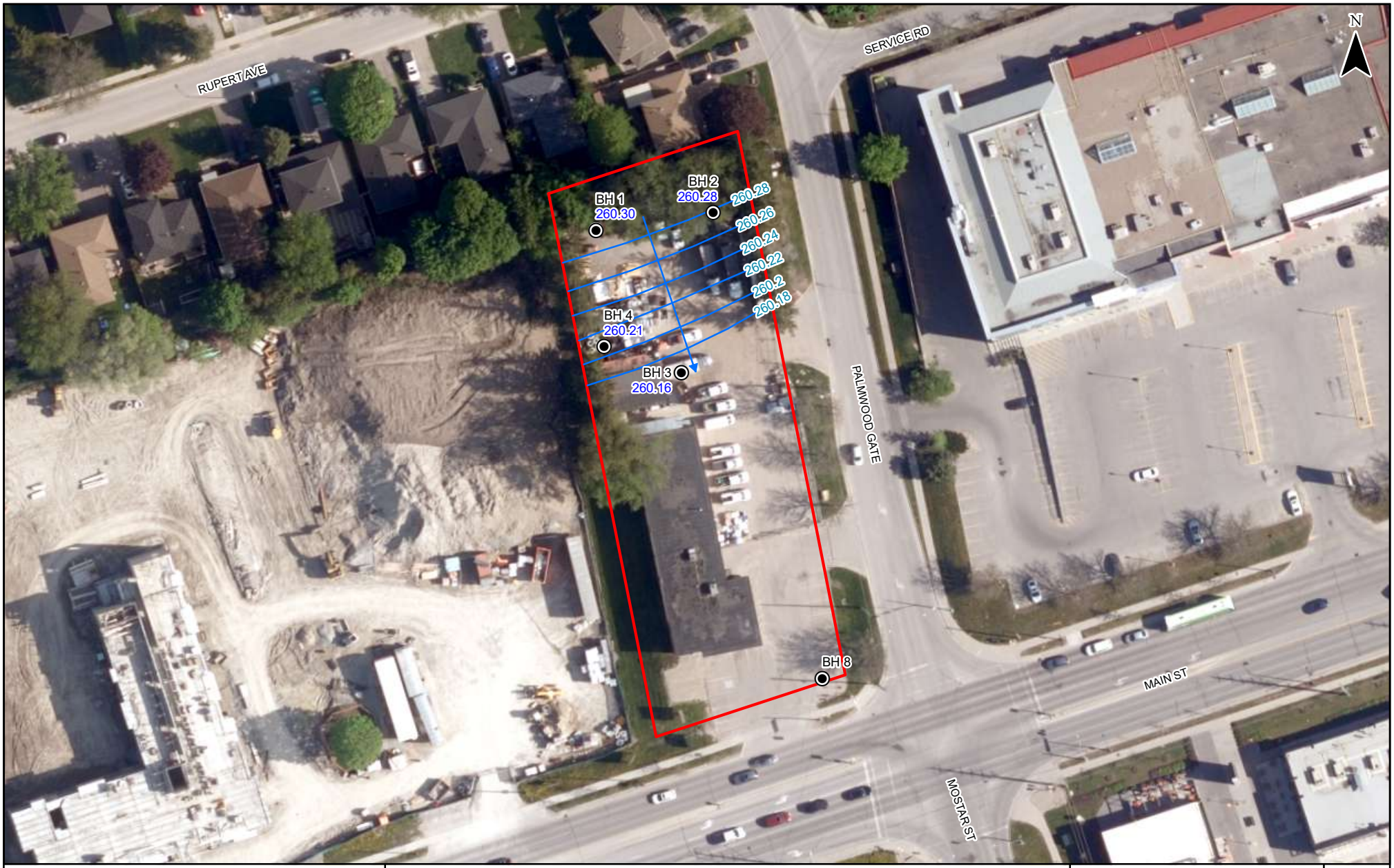
GROUNDWATER ELEVATION (masl) AS MEASURED ON FEBRUARY 28, 2024

TITLE AND LOCATION:

CROSS SECTION A-A'
HYDROGEOLOGICAL INVESTIGATION
AND WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NO.: BRM-23014306-A0	DWN.: JA
SCALE: AS NOTED	CK: AN
DATE: FEBRUARY 2024	FIG. NO.: 5

E:\BRM\BRM-23014306-A0\60 Execution\65 Drawings_Env\HG\Cross Sections\BRM-23014306-A0.dwg



SCALE:

0 10 20 30 40 50 m

LEGEND:

- BOREHOLE / MONITORING WELL (EXP, 2024)
- GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION
- [XX.XX] GROUNDWATER ELEVATION (m asl) AS MEASURED ON FEBRUARY 28, 2024
- APPROXIMATE SITE BOUNDARY

exp.

DRAWN BY:	CHECKED BY:
AC	AN

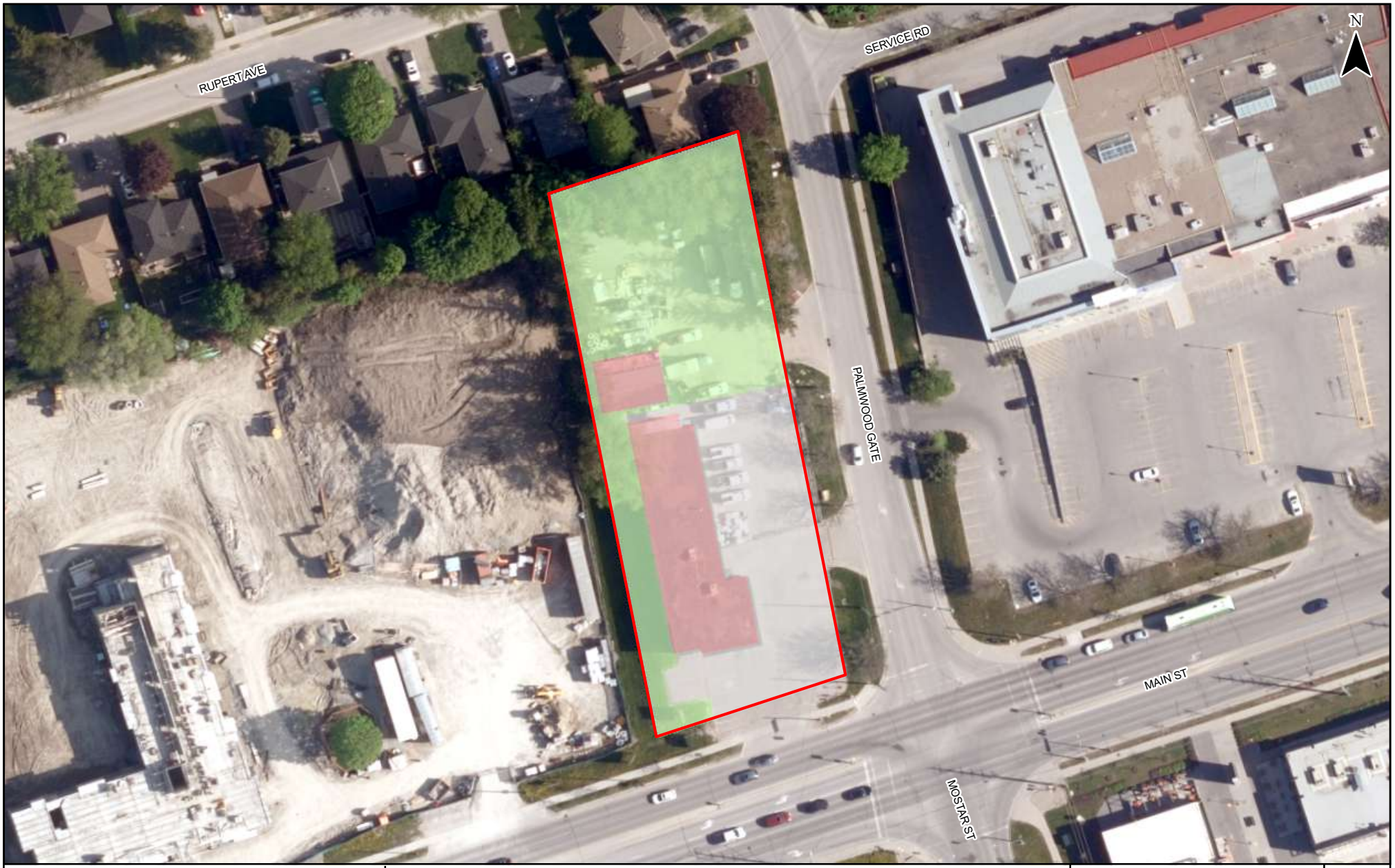
GROUNDWATER CONTOUR PLAN

FIGURE: 6

HYDROGEOLOGICAL INVESTIGATION AND WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024



SCALE:

0 10 20 30 40 50 m

LEGEND:

- BUILDING
- LANDSCAPE
- PAVEMENT
- APPROXIMATE SITE BOUNDARY

DRAWN BY:	CHECKED BY:
AC	AN

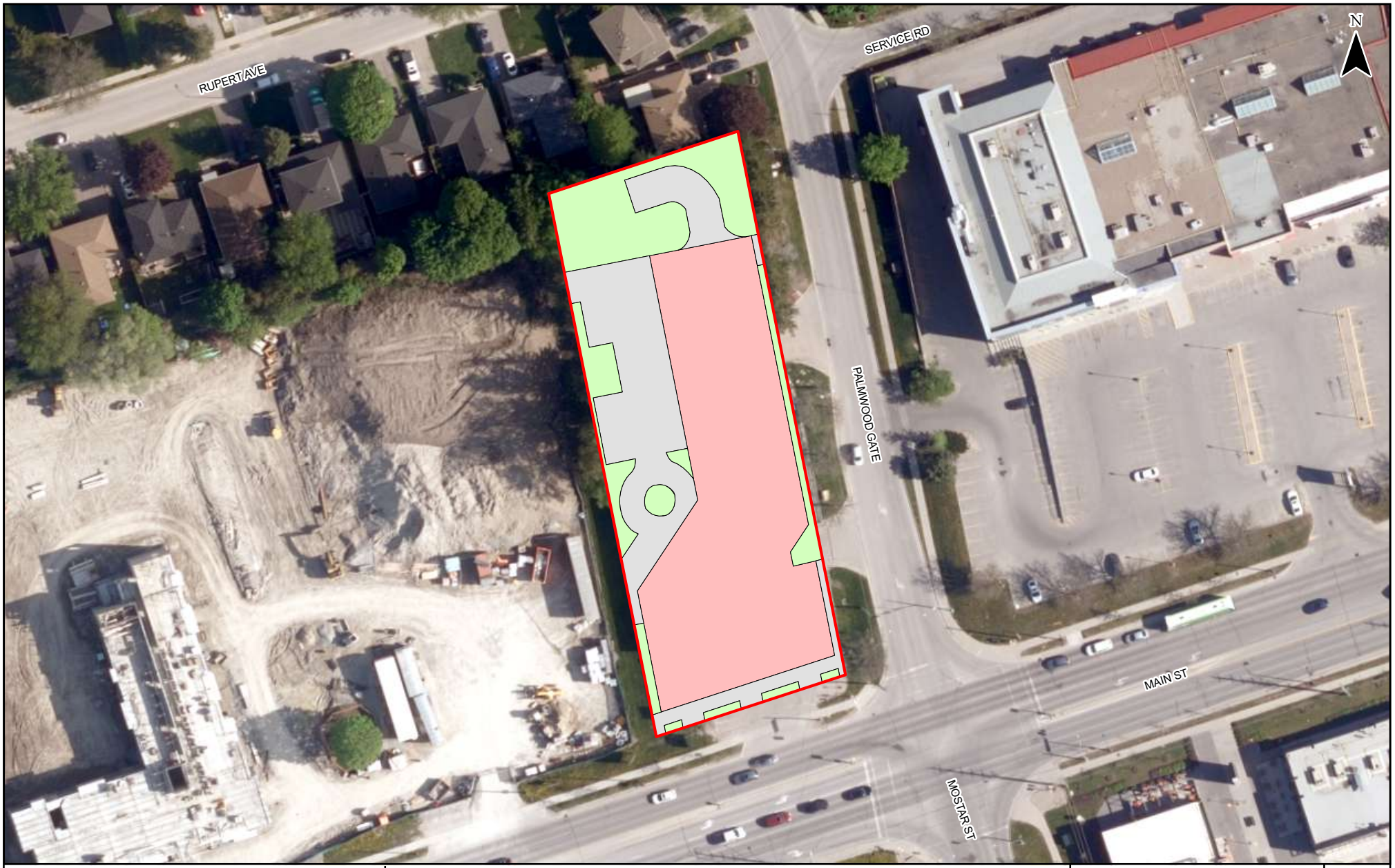
EXISTING LAND USE

FIGURE: 7

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: FEBRUARY 2024



SCALE:

0 10 20 30 40 50 m

SOURCE:

PROPOSED LAND USE BASED ON SITE PLAN - 5688 MAIN STREET.
TAES ARCHITECTS INC, 2023. PROJECT No.: T2022062. DRAWING No.: A-001

exp.

DRAWN BY:	CHECKED BY:
AC	AN

LEGEND:

- BUILDING
- LANDSCAPE
- PAVEMENT
- APPROXIMATE SITE BOUNDARY

PROPOSED LAND USE

FIGURE: 8

HYDROGEOLOGICAL INVESTIGATION AND
WATER BALANCE ASSESSMENT
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0

DATE: NOVEMBER 2024

SCALE:
0 20 40 60 80 100 m

SOURCE:
TOPOGRAPHIC CONTOURS BASED ON
PUBLIC SECTOR INFORMATION MADE AVAILABLE UNDER
THE REGIONAL MUNICIPALITY OF YORK'S OPEN DATA LICENCE.

exp.

DRAWN BY:	CHECKED BY:
AC	AN

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
5688 MAIN STREET
STOUFFVILLE, ONTARIO

PROJECT NUMBER: BRM-23014306-A0
DATE: FEBRUARY 2024

Appendix A – MECP WWR Summary Table

Off-Site																
BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
10494772	6904047	8/15/1952	638731	4869566	257.4	margin of error : 100 m - 300 m			398	Jetting	17.7	17.4		Livestock	Domestic	Water Supply
10494775	6904050	5/30/1956	638678	4869552	257.3	UTM very unreliable			451	Cable Tool	14.9	14.9	15.2	Commerical		Water Supply
10494779	6904054	9/24/1961	639058	4869610	261.3	margin of error : 100 m - 300 m			141	Cable Tool	18.9	18.3	12.7	Commerical		Water Supply
10494780	6904055	10/22/1967	638786	4869552	257.8	margin of error : 100 m - 300 m			357	Boring	7.0	6.1	86.4	Domestic		Water Supply
10514159	6923858	12/24/1996	638885	4869413	255.5	UTM very unreliable			390	Rotary (Convent.)	80.5	77.4	20.3	Commerical		Water Supply
10548531	6927350	10/21/2003	638894	4869837	263.6	UTM very unreliable			210	Rotary (Convent.)	90.5	85.3	15.2	Domestic		Water Supply
11180064	6928217	6/7/2004	639560	4869919	267.6	margin of error : 10 - 30 m	5892 MAIN STREET	STOUFFVILLE	506	Boring	6.0	2.1	5.0	Not Used		Test Hole
1001710688	7109175	6/15/2007	639469	4870030	267.7	margin of error : 10 - 30 m	WARDEN	GORMLEY	477				13.0	Other		Abandoned-Other
1002723580	7130076	8/19/2009	639251	4869754	264.6	margin of error : 30 m - 100 m	5758 MAIN ST.	STOUFFVILLE	167	Direct Push	5.8		4.0	Monitoring and Test Hole		Monitoring and Test Hole
1002724725	7130153	8/13/2009	639223	4869834	265.8	margin of error : 30 m - 100 m	5738 MAIN STREET	STOUFFVILLE	163	Rotary (Convent.)	6.1		4.0			Monitoring and Test Hole
1002724728	7130154	8/13/2009	639241	4869844	265.8	margin of error : 100 m - 300 m			184	Rotary (Convent.)	6.1		4.0			Monitoring and Test Hole
1002942249	7140571	1/21/2010	639354	4869439	260.6	margin of error : 30 m - 100 m	5679 MAIN STREET	STOUFFVILLE	411	Direct Push	3.7		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1002942252	7140572	1/21/2010	639353	4869638	263.1	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	291	Direct Push	3.7		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1002942255	7140573	1/21/2010	639350	4869630	263.0	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	291	Direct Push	3.7		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1002942258	7140574	1/22/2010	639331	4869667	263.5	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	260	Direct Push	3.7		5.1	Monitoring and Test Hole		
1002942261	7140575	1/22/2010	639334	4869666	263.5	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	263	Direct Push	3.7		5.1	Monitoring and Test Hole		
1002952695	7142071	2/9/2010	638804	4869374	255.6	margin of error : 10 - 30 m	111 SANDIFORD DRIVE	STOUFFVILLE	468	Direct Push	5.2		3.8	Monitoring and Test Hole		Monitoring and Test Hole
1002952697	7142072	2/9/2010	638902	4869304	255.8	margin of error : 10 - 30 m	111 SANDIFORD DRIVE	STOUFFVILLE	480	Direct Push	5.2		3.8	Monitoring and Test Hole		Monitoring and Test Hole
1002952699	7142073	2/9/2010	638905	4869312	255.8	margin of error : 10 - 30 m	111 SANDIFORD DRIVE	STOUFFVILLE	472	Direct Push	6.1		3.8	Monitoring and Test Hole		Monitoring and Test Hole
1002954459	7142377	3/8/2010	639354	4869646	263.1	margin of error : 100 m - 300 m	5769 MAIN ST	STOUFFVILLE	289	Direct Push	3.0		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1002954461	7142378	3/8/2010	639356	4869631	262.2	margin of error : 30 m - 100 m	5769 MAIN ST.	STOUFFVILLE	296	DIRECT PUSH	3		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1002954463	7142379	3/9/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 MAIN ST.	STOUFFVILLE	302	DIRECT PUSH	3.7		4.4	Monitoring		
1002954465	7142380	3/9/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 MAIN ST.	STOUFFVILLE	302	DIRECT PUSH	3.7		4.4	Monitoring and Test Hole		Monitoring and Test Hole
1002954467	7142381	3/9/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 MAIN ST.	STOUFFVILLE	302	DIRECT PUSH	3.7		4.4	Monitoring		
1002954469	7142382	3/9/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 MAIN ST.	STOUFFVILLE	302	DIRECT PUSH	3.7		5.1	Monitoring and Test Hole		Monitoring and Test Hole
1002954471	7142383	3/9/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 MAIN STREET	STOUFFVILLE	302	DIRECT PUSH	3.7		4.4	Monitoring and Test Hole		Monitoring and Test Hole
1002954473	7142384	3/10/2010	639356	4869631	262.2	margin of error : 30 m - 100 m	5769 MAIN ST.	STOUFFVILLE	296	DIRECT PUSH	3.7		4.4	Monitoring		
1002954475	7142385	3/9/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 MAIN ST	STOUFFVILLE	302	Direct Push	3.7		4.4	Monitoring		
1002954477	7142386	3/11/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 MAIN ST	STOUFFVILLE	302	Direct Push	3.7		4.4	Monitoring		
1002956383	7142931	3/10/2010	639354	4869614	262.2	margin of error : 100 m - 300 m	5769 STOUFFVILLE MAIN STREET	STOUFFVILLE	302	DIRECT PUSH	3.7		4.4	Monitoring		
1003307350	7144446	3/4/2010	639484	4869838	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	410	Boring		3.0	5.1	Monitoring		Test Hole
1003307314	7144446	3/8/2010	639496	4869830	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	420	Boring		3.0	5.1	Monitoring		Test Hole
1003307359	7144446	3/4/2010	639511	4869847	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	438	Boring		3.0	5.1	Monitoring		Test Hole
1003307368	7144446	3/10/2010	639472	4869822	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	395	Boring		3.0	5.1	Monitoring		Test Hole
1003307323	7144446	3/8/2010	639481	4869828	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	405	Boring		3.0	5.1	Monitoring		Test Hole
1002977900	7144446	3/8/2010	639493	4869855	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	423	Boring	4.5	3.0	5.1	Monitoring		Test Hole
1003307332	7144446	3/4/2010	639474	4869851	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	403	Boring		3.0	5.1	Monitoring		Test Hole
1003307305	7144446	3/8/2010	639502	4869854	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	431	Boring		3.0	5.1	Monitoring		Test Hole
1003307341	7144446	3/4/2010	639460	4869840	266.8	margin of error : 30 m - 100 m	5842 MAIN ST	STOUFFVILLE	387	Boring		3.0	5.1	Monitoring		Test Hole
1003212049	7148763	5/27/2010	639550	4869820	266.6	margin of error : 30 m - 100 m	5827 MAIN STREET	STOUFFVILLE	472	Boring	6.1		5.1	Monitoring		Observation Wells
1003547292	7166979	7/19/2011	639358	4869660	263.5	margin of error : 10 - 30 m	5827 MAIN ST	STOUFFVILLE	288	Rotary (Convent.)			5.1	Test Hole		Test Hole
1003567714	7168727	7/22/2011	639245	4869988	267.1	margin of error : 10 - 30 m	481 RUPERT AVE	STOUFFVILLE	289	Boring	9.3	5.6	13.1	Test Hole		Test Hole
1003567716	7168728	7/22/2011	639291	4870062	266.8	margin of error : 30 m - 100 m	481 RUPERT AVE	STOUFFVILLE	376	Boring	9.0	5.0	13.1		Test Hole	Test Hole
1003618028	7173337	7/30/2010	639357	4869653	263.5	margin of error : 30 m - 100 m	5679 MAIN ST.	STOUFFVILLE	289	Boring	9.1		5.1	Monitoring		Test Hole
1004276337	7200559	3/27/2013	639240	4870056	267.1	margin of error : 30 m - 100 m	481 RUPERT AVE	STOUFVILLE	345	Rotary (Convent.)		4.9	5.1			
1004276340	7200560	3/27/2013	639316	4870008	268.3	margin of error : 10 - 30 m	481 RUPERT AVE	STOUFVILLE	348	Rotary (Convent.)		4.9	5.1			
1004444235	7205029	5/15/2013	639204	4869584	262.2	margin of error : 30 m - 100 m	5769 MAIN ST	STOUFFVILLE	204	Rotary (Convent.)			3.2	Test Hole		Test Hole
1005163087	7229557	9/12/2014	639182	4869681	262.4	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	119							Abandoned-Other
1005163128	7229558	9/10/2014	639254	4869433	260.3	margin of error : 30 m - 100 m			358							
1005163279	7229559	9/10/2014	639312	4869451	260.4	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	375							Abandoned-Other
1005163285	7229560	9/10/2014	639203	4869601	262.2	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	190							Abandoned-Other
1005163288	7229561	9/10/2014	639203	4869601	262.2	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	190							Abandoned-Other
1005163294	7229562	9/10/2014	639243	4869505	261.9	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	291							Abandoned-Other
1005163300	7229563	9/10/2014	639243	4869505	261.9	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	291							Abandoned-Other
1005163306	7229564	9/10/2014	639293	4869505	261.9	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	321							Abandoned-Other
1005163312	7229565	9/10/2014	639293	4869505	261.9	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	321							Abandoned-Other
1005163315	7229566		639301	4869520	262.6	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	315							Abandoned-Other
1005163318	7229567	9/10/2014	639370	4869591	262.5	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	327							Abandoned-Other
1005163324	7229568		639366	4869589	262.5	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	324							Abandoned-Other
1005163327	7229569	9/10/2014	639366	4869603	262.5	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	317							Abandoned-Other
1005163333	7229570	9/10/2014	639357	4869625	262.2	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	300	Not Known						Abandoned-Other
1005163336	7229571	9/10/2014	639356	4869354	259.8	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	479							Abandoned-Other
1005163339	7229572	9/10/2014	639352	4869645	263.1	margin of error : 30 m - 100 m	5769 MAIN ST	STOUFFVILLE	287							Abandoned-Other
1005163345	7229573	9/14/2014	639352	4869648	263.1	margin of error : 30 m - 100 m	5769 MAIN ST	STOUFFVILLE	286							Abandoned-Other
1005163348	7229574	9/10/2014	639351	4869652	263.1	margin of error : 30 m - 100 m		STOUFFVILLE	284							Abandoned-Other
1005163351	7229575	9/22/2014	639331	4869501	261.7	margin of error : 30 m - 100 m	5769 MAIN ST	STOUFFVILLE	350							Abandoned-Other
1005298123	7236574	10/31/2014	639381	4869628	262.2	margin of error : 30 m - 100 m	5827 MAIN STREET	STOUFFVILLE	321							Abandoned-Other
1005298126	7236575	10/31/2014	639416	4869573	263.2	margin of error : 30 m - 100 m	5827 MAIN STREET	STOUFFVILLE	376							Abandoned-Other
1005298129	7236576	10/31/2014	639417	4869616	263.4	margin of error : 30 m - 100 m	5827 MAIN STREET	STOUFFVILLE	358							Abandoned-Other
1005298132	7236577	10/31/2014	639494	4869584	263.3	margin of error : 30 m - 100 m	5827 MAIN STREET	STOUFFVILLE	442							Abandoned-Other
1006719382	7294289	8/29/2017	639249	4869700	264.3	margin of error : 30 m - 100 m	MAW ST. & MOSTAR ST.	WHITCHURCH - STOUFFVILLE	172							
1006992326	7306496	10/20/2017	639424	4869758	265.3	margin of error : 30 m - 100 m	5847-5859 MAIN ST	STOUFFVILLE	340	Rotary (Convent.)	5.3	2.4	5.1	Test Hole	Monitoring	Observation Wells
1007451369	7329204	9/25/2018	639033	4869692	259.7	margin of error : 30 m - 100 m	5676 main st.	STOUFFVILLE	76	Rotary (Convent.)	16.8	5.5	5.1	Test Hole	Monitoring	Test Hole
1008300610	7360279	5/21/2020	639472	4869592	263.5	margin of error : 30 m - 100 m	5827 Main Street	Stouffville	418	Auger		1.8	3.8	Monitoring		Observation Wells
1008301847	7360347	5/21/2020	639450	4869640	265.2	margin of error : 30 m - 100 m	5917 Main Street	Stouffville	382	Auger		1.8	3.8			Observation Wells
1008323320	7361156	6/18/2020	639016	4869765	260.1	margin of error : 30 m - 100 m	5676 MAIN ST	WHITCHURCH STOUFFVIL	70		4.6		5.1			
1008448577	7368566	8/27/2020	639367	4869649	263.5	margin of error : 30 m - 100 m	5827 Main Street	Stouffville	300			1.5	5.0			Abandoned-Other
1008448580	7368567	8/27/2020	639403	4869647	263.6	margin of error : 30 m - 100 m	5827 Main Street	Stouffville	335			1.5	5.0			Abandoned-Other
1008448583	7368568	8/27/2020	639390	4869573	263.2	margin of error : 30 m - 100 m	5827 Main Street	Stouffville	353			1.5	5.0			Abandoned-Other

Off-Site																
BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
1008599312	7384196	3/24/2021	639343	4870060	268.7	margin of error : 30 m - 100 m	. 465 Rupert Ave, Whitchurch-Stouffville		405	Auger	4.6	4.0	5.1	Monitoring		Observation Wells
1008599315	7384197	3/24/2021	639319	4870095	268.8	margin of error : 30 m - 100 m	. 465 Rupert Ave, Whitchurch-Stouffville		419	Auger	4.6	4.0	5.1	Monitoring		Observation Wells
1008599318	7384198	3/24/2021	639341	4870094	268.5	margin of error : 30 m - 100 m	. 465 Rupert Ave, Whitchurch-Stouffville		431	Auger	4.6	4.0	5.1	Monitoring		Observation Wells
1008599321	7384199	3/24/2021	639352	4870024	268.4	margin of error : 30 m - 100 m	. 465 Rupert Ave, Whitchurch-Stouffville		384	Auger	12.2	6.1	5.1	Monitoring		Observation Wells
1008599619	7384218	3/24/2021	639320	4870031	268.6	margin of error : 30 m - 100 m	. 465 Rupert Ave, Whitchurch-Stouffville		368	Auger	4.6	4.0	5.1	Monitoring		Observation Wells
1008914543	7407837	12/23/2021	638942	4869244	257.0	margin of error : 30 m - 100 m	5691 MAIN STREET	WHITCHURCH-STOUFFVILLE	524	Boring	6.0	5.3	5.1	Monitoring		Observation Wells
1008914546	7407838	12/22/2021	638938	4869430	257.4	margin of error : 30 m - 100 m	5691 MAIN STREET	WHITCHURCH-STOUFFVILLE	350	Boring	5.3	2.2	5.1	Monitoring		Observation Wells
1008914549	7407839	12/21/2021	639118	4869656	261.8	margin of error : 30 m - 100 m	5691 MAIN STREET	WHITCHURCH-STOUFFVILLE	99	Boring	5.3	3.7	5.1	Monitoring		Observation Wells
1008914552	7407840	12/22/2021	638975	4869495	258.2	margin of error : 30 m - 100 m	5691 MAIN STREET	WHITCHURCH-STOUFFVILLE	276	Boring	6.0	3.0	5.1	Monitoring		Observation Wells
1008914555	7407841	12/22/2021	638891	4869583	257.6	margin of error : 30 m - 100 m	5691 MAIN STREET	WHITCHURCH-STOUFFVILLE	254	Boring	5.3	2.2	5.1	Monitoring		Observation Wells
1008914561	7407843	12/23/2021	639249	4869338	259.7	margin of error : 30 m - 100 m	5691 MAIN STREET	WHITCHURCH-STOUFFVILLE	442	Boring	6.0	5.3	5.1	Monitoring		Observation Wells
23052078	7052078	7/25/2007	639358	4869665	263.6	margin of error : 10 - 30 m			287	Other Method			2.5			Observation Wells
10494770	6904045	8/4/1960	639286	4869316	259.3	UTM very unreliable			477	Jetting	16.5		5.1			Abandoned-Supply
10506648	6916108	7/3/1981	639215	4869243	259.0	margin of error : 30 m - 100 m			522	Cable Tool	29.6		30.5			Water Supply
11327757	6928788	2/25/2005	638591	4869586	256.8	margin of error : 30 m - 100 m	5508 STOUFFVILLE RD	STOUFFVILLE	519				76.2			Abandoned-Other
11327758	6928789	2/25/2005	638621	4869566	258.3	margin of error : 30 m - 100 m	5508 STOUFFVILLE RD	STOUFFVILLE	498				76.2			Abandoned-Other
11558896	6930096	3/14/2006	639242	4869711	264.3	margin of error : 30 m - 100 m	5769 MAIN STREET	STOUFFVILLE	162	Other Method	4.6		5.1			
11558935	6930135	3/8/2006	639262	4869434	260.3	margin of error : 10 - 30 m	5769 MAIN ST WEST	STOUFFVILLE	361	Boring	4.6		5.1			Observation Wells
1001582607	7104549	12/20/2007	639388	4869657	263.6	margin of error : 10 - 30 m	5827 MAIN ST.	STOUFFVILLE	318	Direct Push	4.6			Monitoring and Test Hole		Observation Wells
1002662184	7104549	12/20/2007	639493	4869581	263.6	margin of error : 10 - 30 m	5827 MAIN ST.	STOUFFVILLE	442	Direct Push				Monitoring and Test Hole		Observation Wells
1002662194	7104549	12/20/2007	639509	4869497	263.6	margin of error : 10 - 30 m	5827 MAIN ST.	STOUFFVILLE	494	Direct Push				Monitoring and Test Hole		Observation Wells
1002662204	7104549	12/20/2007	639461	4869478	263.6	margin of error : 10 - 30 m	5827 MAIN ST.	STOUFFVILLE	464	Direct Push				Monitoring and Test Hole		Observation Wells
1002662214	7104549	12/20/2007	639477	4869415	263.6	margin of error : 10 - 30 m	5827 MAIN ST.	STOUFFVILLE	516	Direct Push				Monitoring and Test Hole		Observation Wells
1002662174	7104549	12/20/2007	639388	4869657	263.6	margin of error : 10 - 30 m	5827 MAIN ST.	STOUFFVILLE	318	Direct Push				Monitoring and Test Hole		Observation Wells
1001582604	7104548	1/2/2008	639405	4869526	262.3	margin of error : 10 - 30 m	5237 MAIN ST.	STOUFFVILLE	391	Direct Push	4.6			Monitoring and Test Hole		Observation Wells
1002662070	7104548	1/2/2008	639451	4869606	262.3	margin of error : 10 - 30 m	5237 MAIN ST.	STOUFFVILLE	394	Direct Push				Monitoring and Test Hole		Observation Wells
1002662097	7104548	1/2/2008	639420	4869637	262.3	margin of error : 10 - 30 m	5237 MAIN ST.	STOUFFVILLE	354	Direct Push				Monitoring and Test Hole		Observation Wells
1002662088	7104548	1/2/2008	639370	4869640	262.3	margin of error : 10 - 30 m	5237 MAIN ST.	STOUFFVILLE	306	Direct Push				Monitoring and Test Hole		Observation Wells
1002662079	7104548	1/2/2008	639360	4869627	262.3	margin of error : 10 - 30 m	5237 MAIN ST.	STOUFFVILLE	302	Direct Push				Monitoring and Test Hole		Observation Wells
1002662061	7104548	1/2/2008	639405	4869526	262.3	margin of error : 10 - 30 m	5237 MAIN ST.	STOUFFVILLE	391	Direct Push				Monitoring and Test Hole		Observation Wells
1003284919	7141493		639568	4869954	267.9	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	526	PIONJAR			3.2	Not Used	Monitoring	Test Hole
1002976095	7144382	4/27/2010	639552	4869905	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	494		3.4		3.2	Monitoring		Test Hole
1003306564	7144382	4/27/2010	639549	4869915	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	494				3.2	Monitoring		Test Hole
1003306573	7144382	4/27/2010	639557	4869919	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	503				3.2	Monitoring		Test Hole
1003306555	7144382	4/27/2010	639562	4869908	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	504				3.2	Monitoring		Test Hole
1003306546	7144382	4/27/2010	639552	4869905	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	494				3.2	Monitoring		Test Hole
1003306600	7144382	4/27/2010	639567	4869939	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	519				3.2	Monitoring		Test Hole
1003306609	7144382	4/27/2010	639569	4869945	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	523				3.2	Monitoring		Test Hole
1003306591	7144382	4/27/2010	639557	4869944	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	512				3.2	Monitoring		Test Hole
1003306582	7144382	4/27/2010	639551	4869924	268.0	margin of error : 30 m - 100 m	5892 MAIN ST	STOUFFVILLE	499				3.2	Monitoring		Test Hole
1003496849	7161906	3/8/2010	639401	4869638	263.6	margin of error : 10 - 30 m			336							
1003586388	7170246	9/7/2011	639478	4869629	266.1	margin of error : 10 - 30 m			412							
1006967087	7303234	11/14/2017	638616	4869646	259.6	margin of error : 30 m - 100 m			479							
1007347643	7326537	8/18/2018	639060	4869778	261.2	margin of error : 30 m - 100 m			38							
1007388884	7329083	12/20/2018	639593	4869800	267.3	margin of error : 30 m - 100 m			512							
1007640927	7341772	7/26/2019	639400	4869639	263.6	margin of error : 30 m - 100 m			335							
1008558249	7376543	10/23/2020	638626	4869564	258.3	margin of error : 30 m - 100 m			494							
1008606846	7378208	12/3/2020	639469	4869596	263.5	margin of error : 30 m - 100 m			414							
1008606849	7378209	12/2/2020	639462	4869621	263.2	margin of error : 30 m - 100 m			399							
1008606852	7378210	12/2/2020	639385	4869609	262.7	margin of error : 30 m - 100 m			332							
1009006268	7414538	11/2/2019	639332	4869358	259.3	margin of error : 100 m - 300 m			463							
1009006271	7414539	6/22/2020	639277	4869379	260.0	margin of error : 30 m - 100 m			417							

	COUNT
Monitoring Well / Test Hole	77
Dewatering Well	0
Water Supply Well	7
Abandoned Well	29
Unclassified / Unfinished Well	18
TOTAL	131

Appendix B – Borehole Logs

Log of Borehole 1

Project No. BRM-23014306-A0 | Drawing No. 2

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

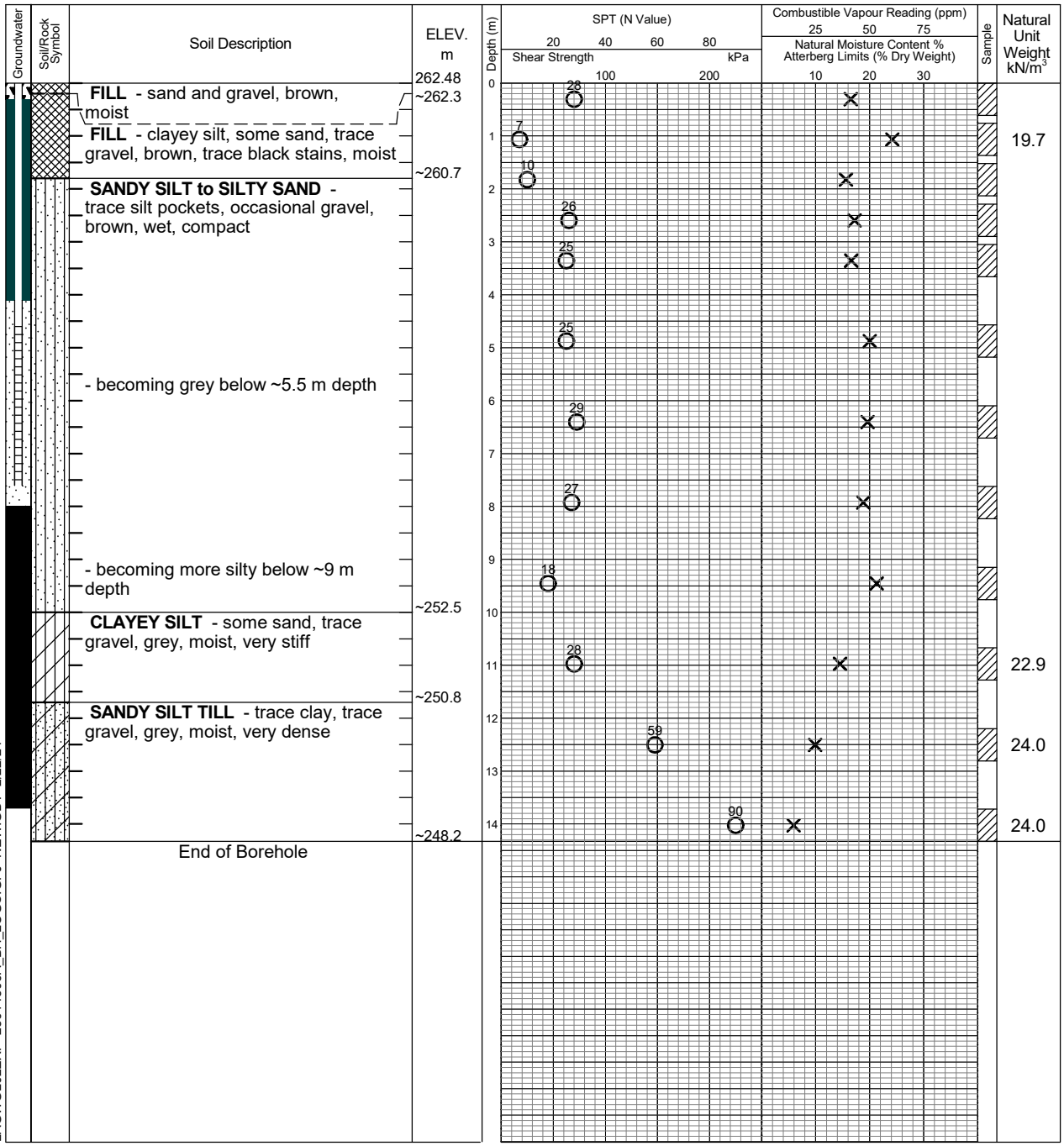
Date Drilled: January 26, 2024

Drill Type: Mud Rotary

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



LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Notes:
1. Borehole advanced to completion at ~14.3 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp.
Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)
February 8, 2024	~0.8	Well
February 15, 2024	~2.2	Well

Log of Borehole 2

Project No. BRM-23014306-A0 | Drawing No. 3

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

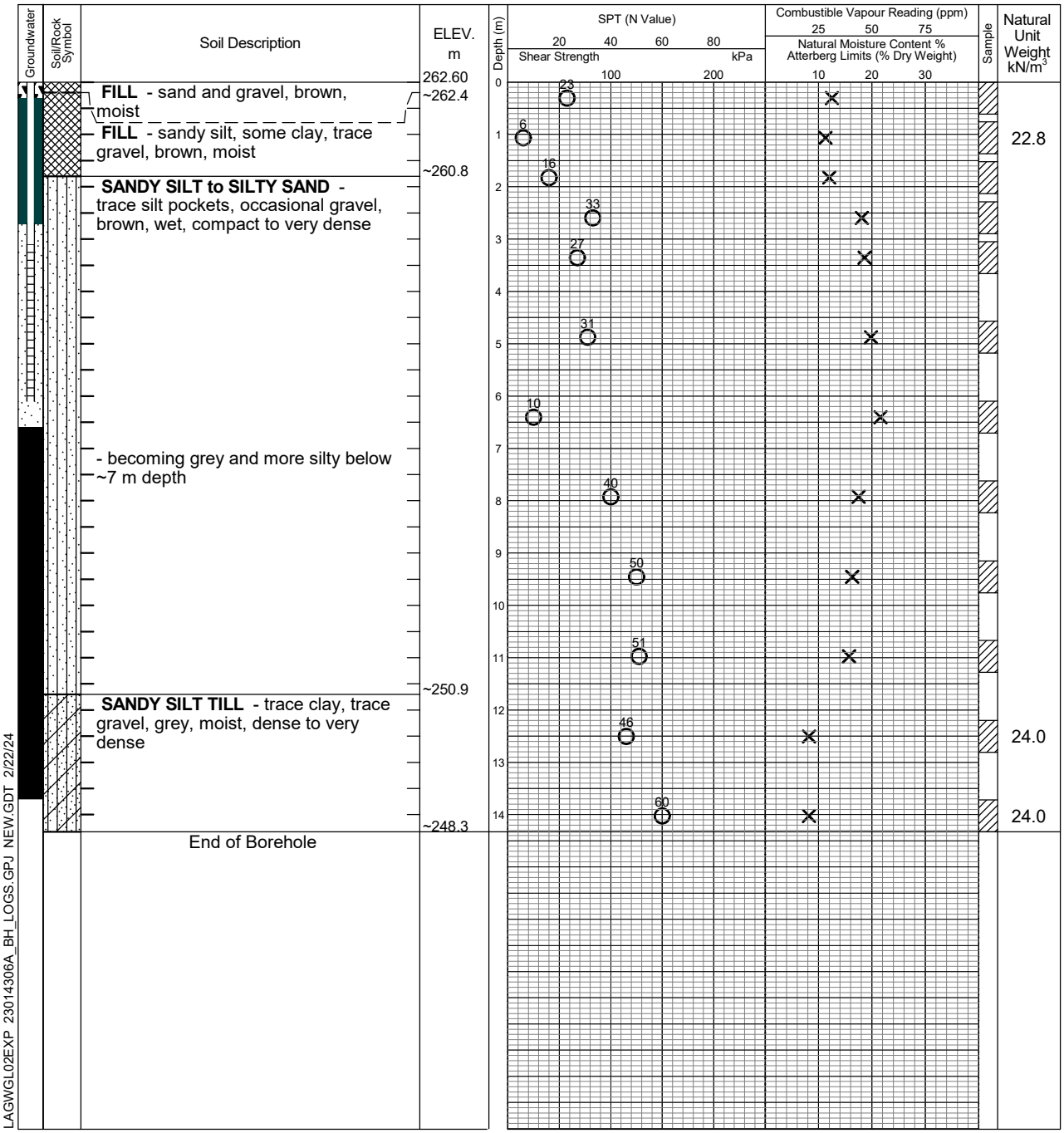
Date Drilled: January 26, 2024

Drill Type: Mud Rotary

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



LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Notes:
1. Borehole advanced to completion at ~14.3 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp.
Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)
February 8, 2024	~2.3	Well
February 15, 2024	~2.4	Well

Log of Borehole 3

Project No. BRM-23014306-A0 | Drawing No. 4

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

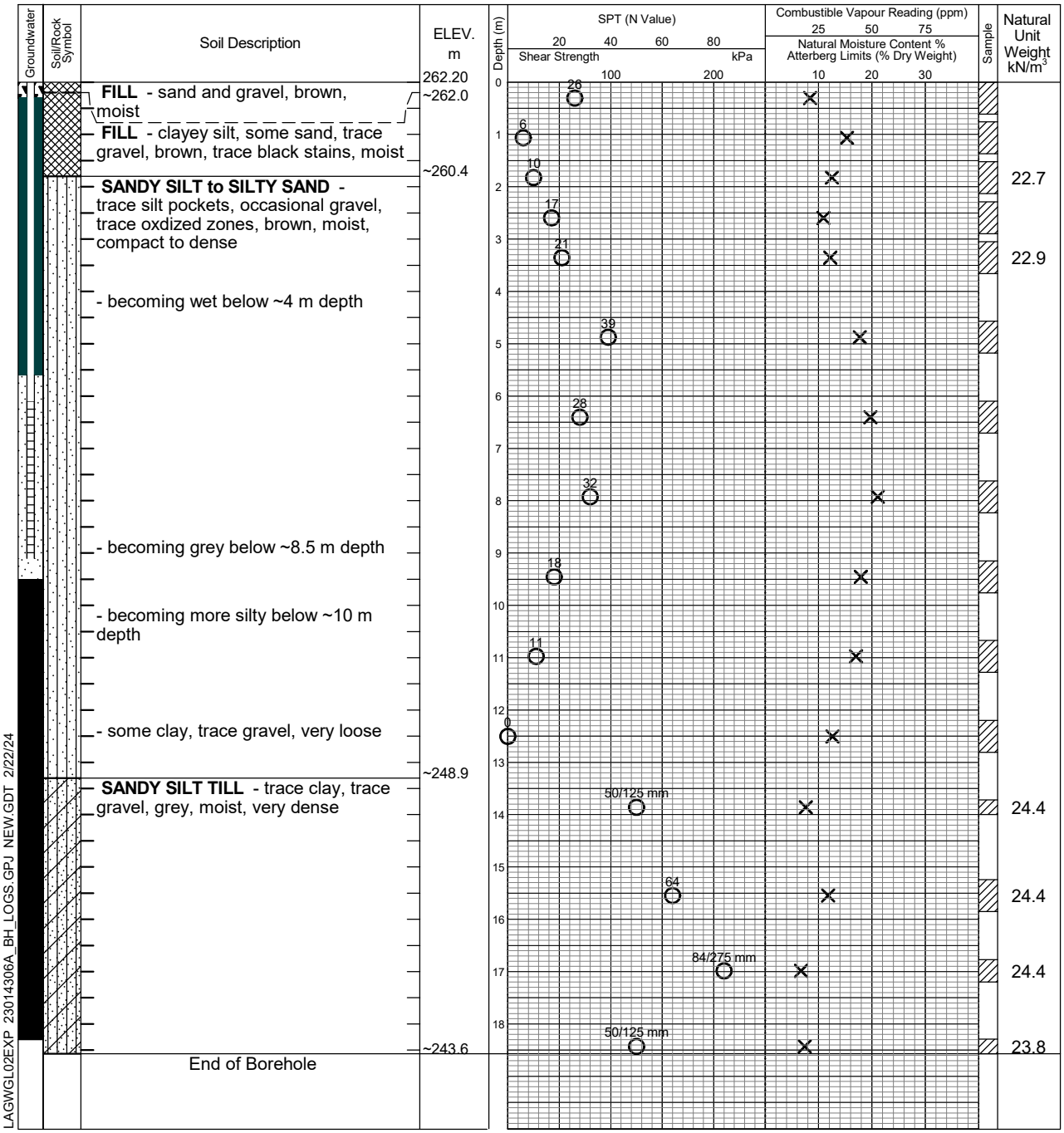
Date Drilled: January 30, 2024

Drill Type: Mud Rotary

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



LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Notes:
1. Borehole advanced to completion at ~18.6 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp.
Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)
February 8, 2024	~2.1	Well
February 15, 2024	~2.1	Well

Log of Borehole 4

Project No. BRM-23014306-A0 | Drawing No. 5

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

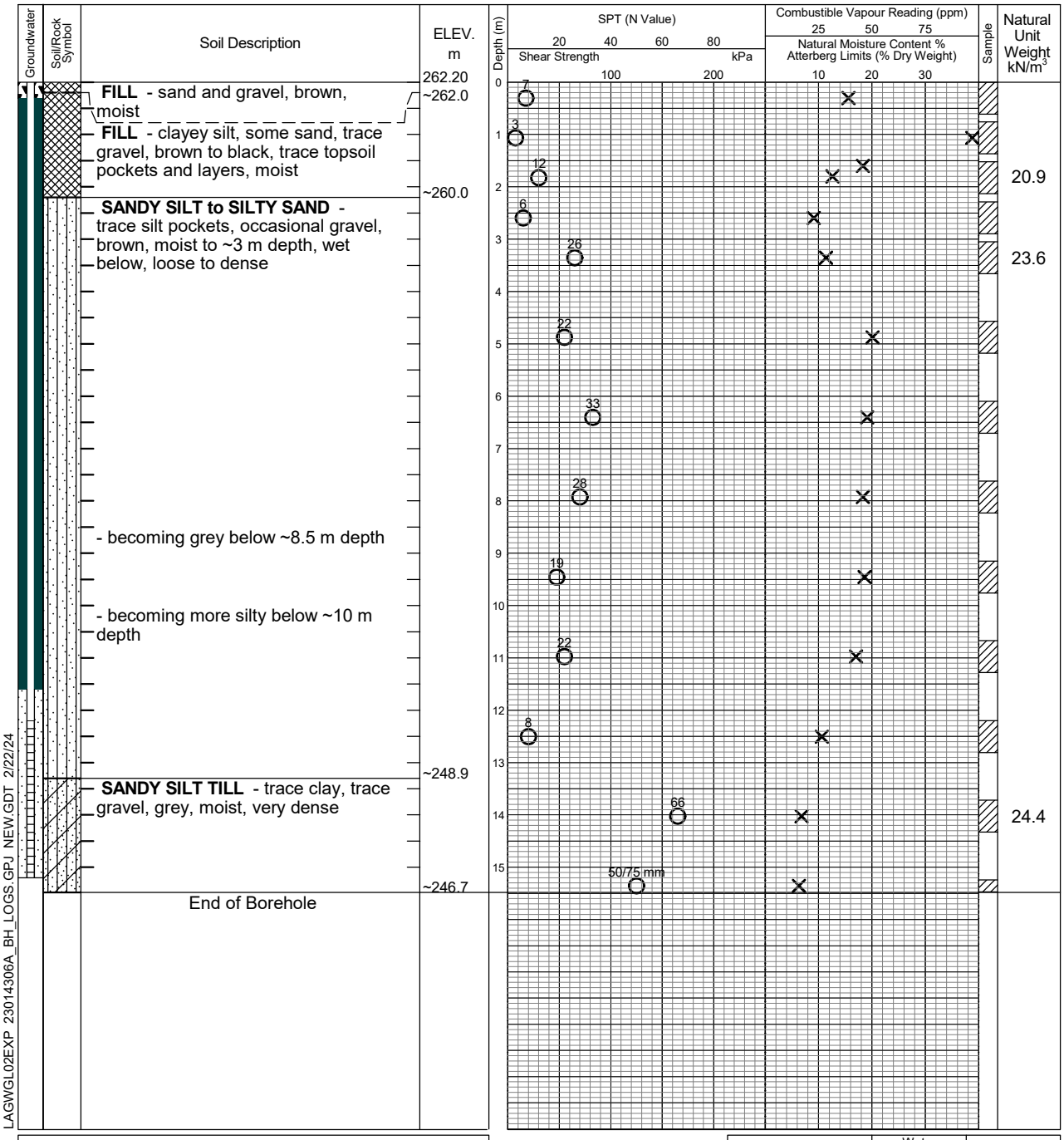
Date Drilled: January 31, 2024

Drill Type: Mud Rotary

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. Borehole advanced to completion at ~15.5 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp. Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)
February 8, 2024	~2.0	Well
February 15, 2024	~2.1	Well

LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Log of Borehole 5

Project No. BRM-23014306-A0 | Drawing No. 6

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

Date Drilled: January 31, 2024

Drill Type: Mud Rotary

Datum: Geodetic

Auger Sample ☒ | Combustible Vapour Reading □

SPT (N) Value ○ ▨ | Natural Moisture ×

Dynamic Cone Test — | Plastic and Liquid Limit ⊢○

Shelby Tube ■ | Undrained Triaxial at % Strain at Failure ⊕

Field Vane Test S | Penetrometer ▲

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)	SPT (N Value) / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Sample	Natural Unit Weight kN/m³
		~100 mm **ASPHALT** over	262.13	0				
		FILL - sand and gravel, brown, moist	~261.8					
		FILL - clayey to sandy silt, trace gravel, brown, moist		1	7, 6			22.0
			~259.9	2	4, 18			23.2
		SANDY SILT to SILTY SAND - trace silt pockets, occasional gravel, trace clay, brown, moist to ~3 m depth, wet below, loose to dense		3	33			22.3
				4				21.6
				5	36			
				6	41			
		- becoming grey below ~7 m depth		7				
				8	34			
		- becoming more silty below ~8.5 m depth		9	27			
				10				
				11	6			23.1
			~250.4	12				
		SANDY SILT TILL - trace clay, trace gravel, grey, moist, dense to very dense		13	48			24.0
			~248.1	14	50/125 mm			23.9
		End of Borehole						

LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Notes:
1. Borehole advanced to completion at ~14.0 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp.

Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)

Log of Borehole 6

Project No. BRM-23014306-A0 | Drawing No. 7

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

Date Drilled: January 30, 2024

Drill Type: Mud Rotary

Datum: Geodetic

Auger Sample ☒ | Combustible Vapour Reading □

SPT (N) Value ○ ▨ | Natural Moisture ×

Dynamic Cone Test — | Plastic and Liquid Limit —○—

Shelby Tube ■ | Undrained Triaxial at % Strain at Failure ⊕

Field Vane Test S | Penetrometer ▲

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)	SPT (N Value) / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Sample	Natural Unit Weight kN/m³
		~115 mm **ASPHALT** over **FILL** - sand and gravel, brown, moist	262.16 ~261.8	0	16			
		FILL - clayey to sandy silt, trace gravel, brown to black, moist		1	3			
				2	8			22.5
			~259.2	3	3			
		SANDY SILT to SILTY SAND - trace silt pockets, occasional gravel, trace clay, brown to grey, moist, compact to dense		4	11			22.4
				5	38			
		- becoming wet below ~6 m depth		6	33			22.4
				7				
				8	44			
				9	34			
				10				
		- becoming more silty below ~11 m depth		11	23			22.3
		SANDY SILT TILL - trace clay, trace gravel, grey, moist, dense to very dense	~250.5	12	35			23.5
				13				
				14	50/125 mm			24.0
				15	85/275 mm			
				16				
				17	67			24.3
				18	50/100 mm			
				19				
			~242.5		50/75 mm			
		End of Borehole						

LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Notes:
1. Borehole advanced to completion at ~19.7 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp.

Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)

Log of Borehole 7

Project No. BRM-23014306-A0 | Drawing No. 8

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

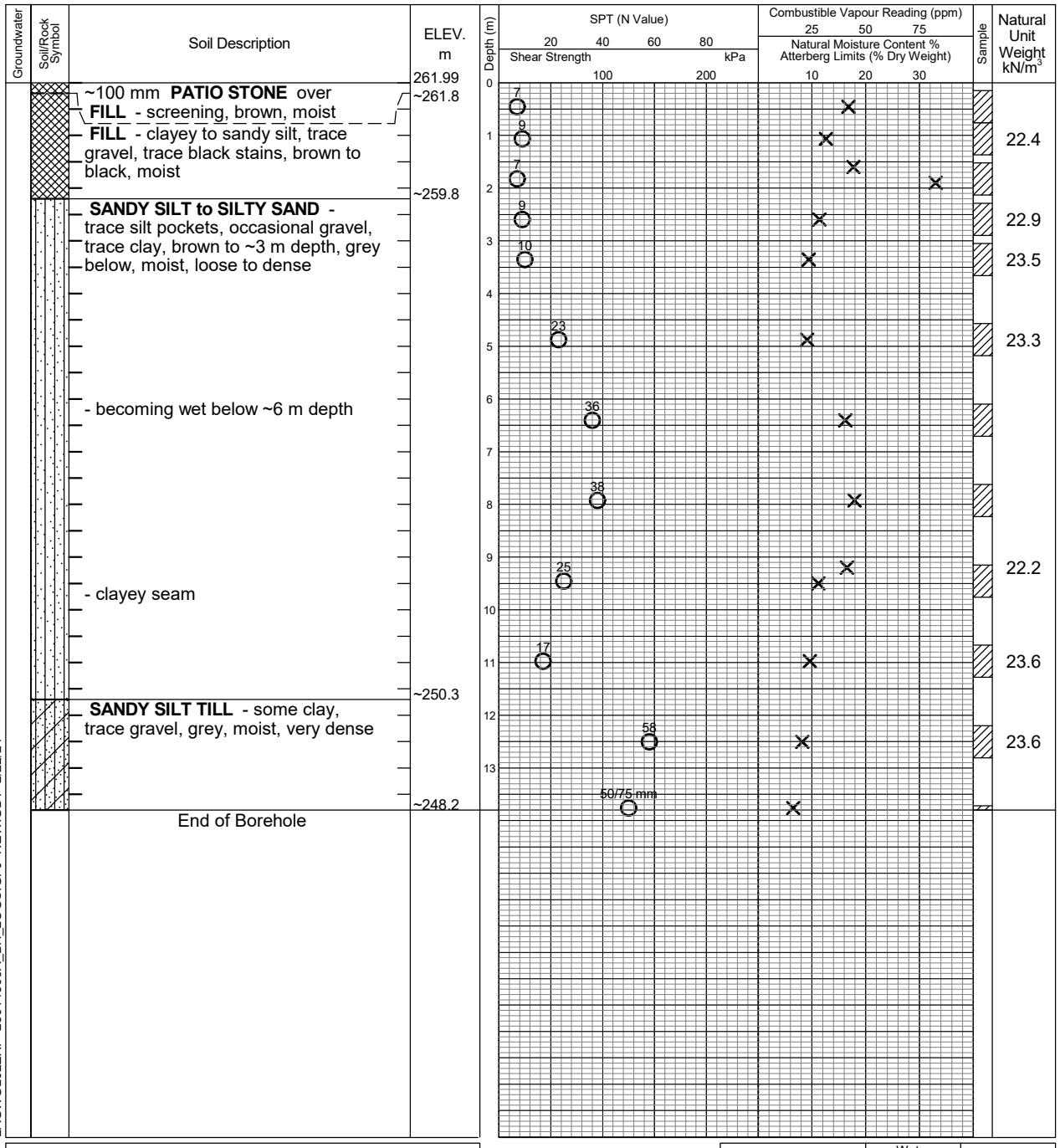
Date Drilled: January 29, 2024

Drill Type: Mud Rotary

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



LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Notes:
1. Borehole advanced to completion at ~13.8 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp.
Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)

Log of Borehole 8

Project No. BRM-23014306-A0 | Drawing No. 9

Project: Geotechnical and Hydrogeological Investigations | Sheet No. 1 of 1

Location: 5688 Main Street, Stouffville, Ontario

Date Drilled: January 29, 2024

Drill Type: Mud Rotary

Datum: Geodetic

Auger Sample ☒ | Combustible Vapour Reading □

SPT (N) Value ○ ▨ | Natural Moisture ×

Dynamic Cone Test ——— | Plastic and Liquid Limit ⊢—○

Shelby Tube ■ | Undrained Triaxial at % Strain at Failure ⊕

Field Vane Test S | Penetrometer ▲

Groundwater	Soil/Rock Symbol	Soil Description	ELEV. m	Depth (m)	SPT (N Value) / Shear Strength kPa	Combustible Vapour Reading (ppm) / Natural Moisture Content % / Atterberg Limits (% Dry Weight)	Sample	Natural Unit Weight kN/m³
		~90 mm **ASPHALT** over	262.01	0	18			
		FILL - sand and gravel, brown, moist	~261.6	1	7			
		FILL - clayey silt, some sand, trace gravel, brown to black, moist		2	4			22.4
			~259.5		14			23.7
		SANDY SILT to SILTY SAND - trace silt pockets, occasional gravel, trace clay, brown, moist to ~4 m depth, wet below, compact		3	34			
				4				
				5	35			
				6	28			
				7				
				8	25			
		- becoming grey below ~9 m depth		9	26			
				10				
				11	24			23.4
			~250.3					
		SANDY SILT TILL - trace clay, trace gravel, grey, moist, dense to very dense		12	56			23.7
				13				
				14	50/100 mm			
				15	50/125 mm			
			~245.8	16				
		GRAVELLY SAND - grey, wet, very dense	~245.0	17	50/75 mm			
		End of Borehole						

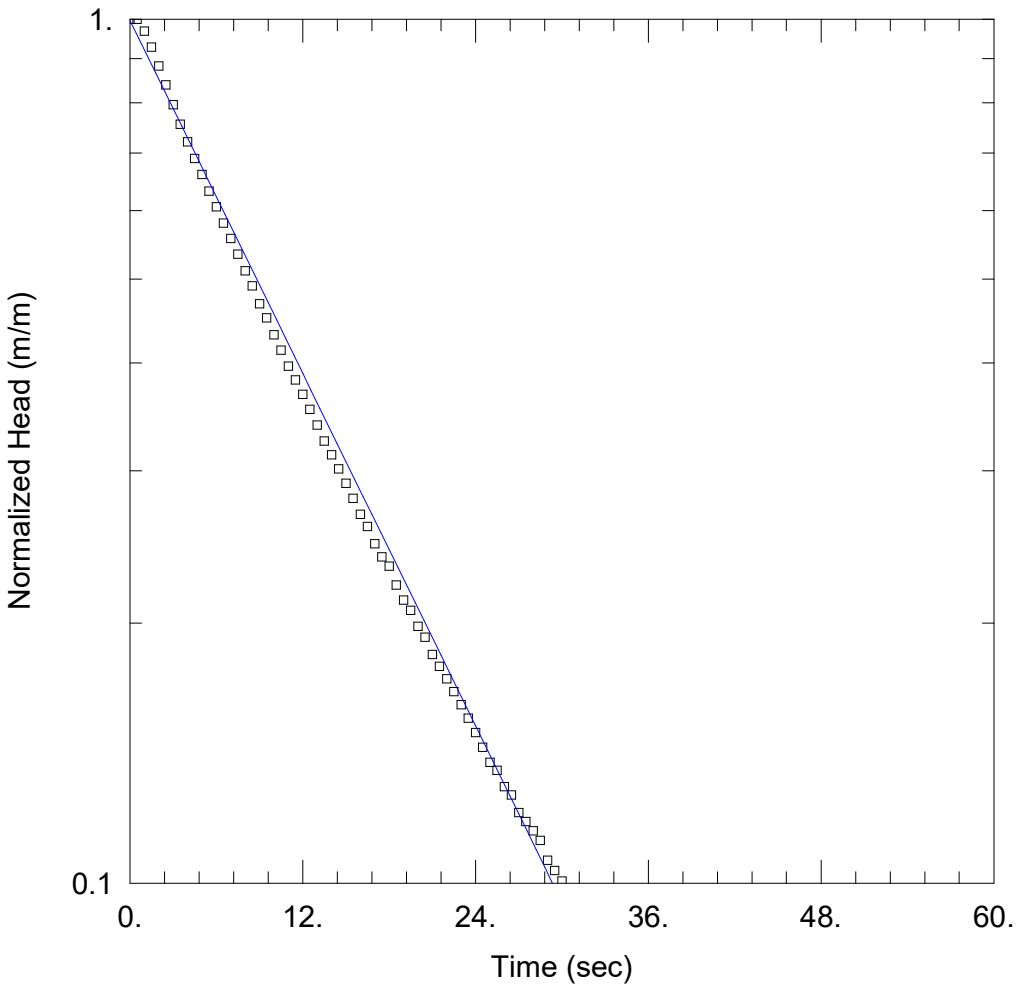
LAGWGL02EXP 23014306A_BH_LOGS.GPJ NEW.GDT 2/22/24

Notes:
1. Borehole advanced to completion at ~17.0 m depth by conventional soil sampling methods using a specialist drilling subcontractor. For borehole definitions, see notes prior to logs.
2. This drawing forms part of and must be read in conjunction with the subject report (Ref. No.: BRM-23014306-A0); borehole data requires interpretation assistance by exp professional staff before use by others.

exp.
Brampton

Elapsed Time	Water Level (m)	Hole Open to (m)
February 8, 2024	~1.7	Well
February 15, 2024	~1.7	Well

Appendix C – SWRT Procedures and Results



BH1 FALLING HEAD SWRT

Data Set: E:\...\BH1.aqt
Date: 02/29/24 Time: 10:41:08

PROJECT INFORMATION

Company: EXP Services Inc
Client: Hyson Developments Inc.
Project: BRM-23014306-A0
Location: 5688 Main St Stouffville
Test Well: BH1
Test Date: February 28, 2024

AQUIFER DATA

Saturated Thickness: 5. m Anisotropy Ratio (Kz/Kr): 1.

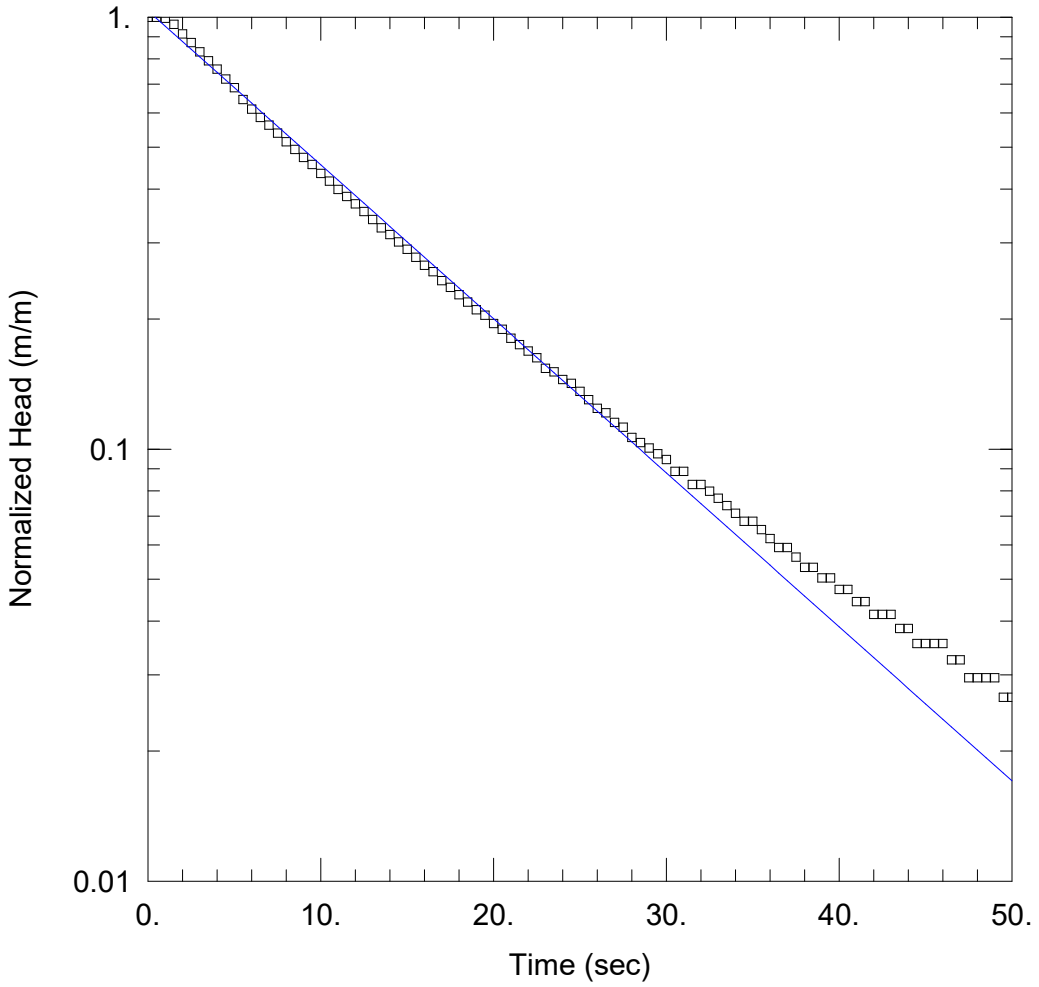
WELL DATA (BH 1)

Initial Displacement: 1.044 m
Total Well Penetration Depth: 5. m
Casing Radius: 0.0254 m
Static Water Column Height: 5. m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 3.677E-5 m/sec y0 = 1.04 m



BH 2 FALLING HEAD SWRT

Data Set: E:\...\BH2.aqt
Date: 02/29/24 Time: 10:44:20

PROJECT INFORMATION

Company: EXP Services Inc
Client: Hyson Developments Inc.
Project: BRM-23014306-A0
Location: 5688 Main St Stouffville
Test Well: BH2
Test Date: February 28, 2024

AQUIFER DATA

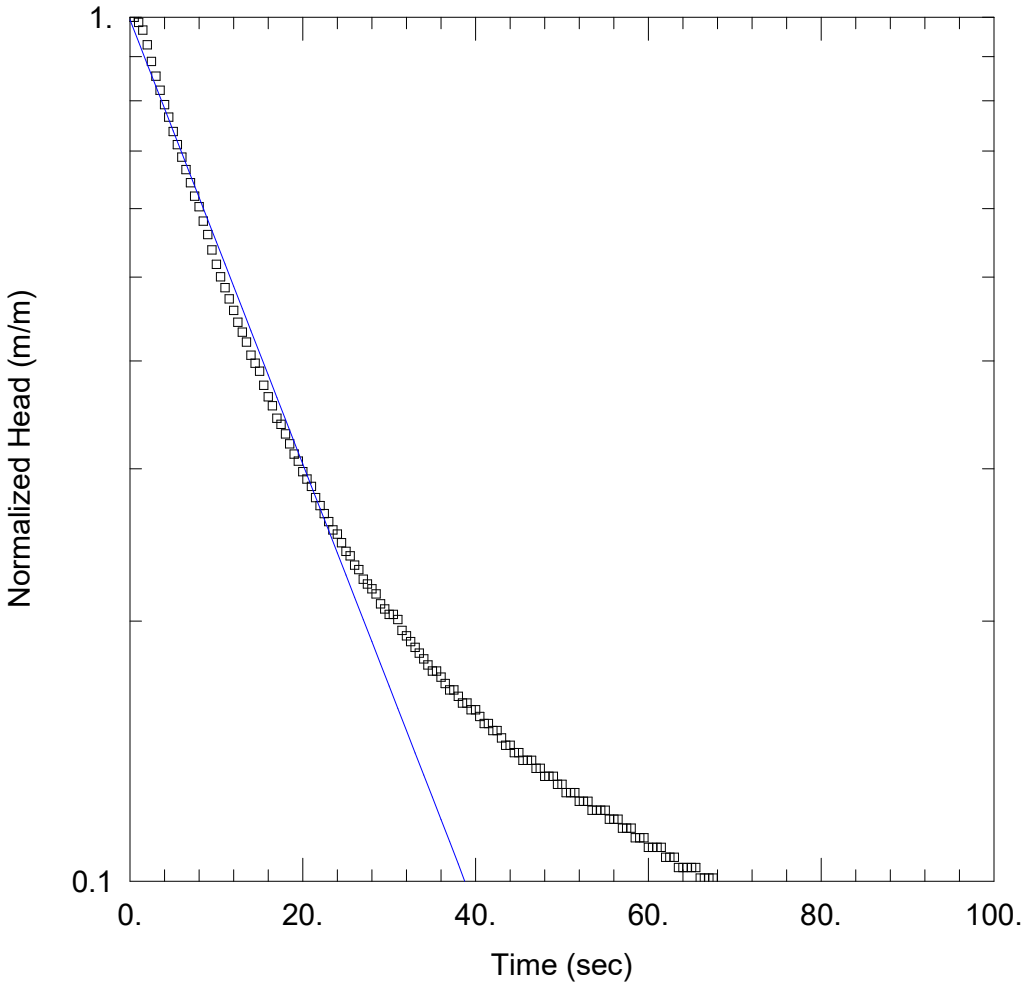
Saturated Thickness: 3.83 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH2)

Initial Displacement: 1.014 m
Total Well Penetration Depth: 3.83 m
Casing Radius: 0.0254 m
Static Water Column Height: 3.83 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 3.854E-5 m/sec
y0 = 1.049 m



BH3 FALLING HEAD SWRT

Data Set: E:\...\BH3.aqt
Date: 02/29/24 Time: 10:47:30

PROJECT INFORMATION

Company: EXP Services Inc
Client: Hyson Developments Inc.
Project: BRM-23014306-A0
Location: 5688 Main St Stouffville
Test Well: BH3
Test Date: February 28, 2024

AQUIFER DATA

Saturated Thickness: 6.74 m Anisotropy Ratio (Kz/Kr): 1.

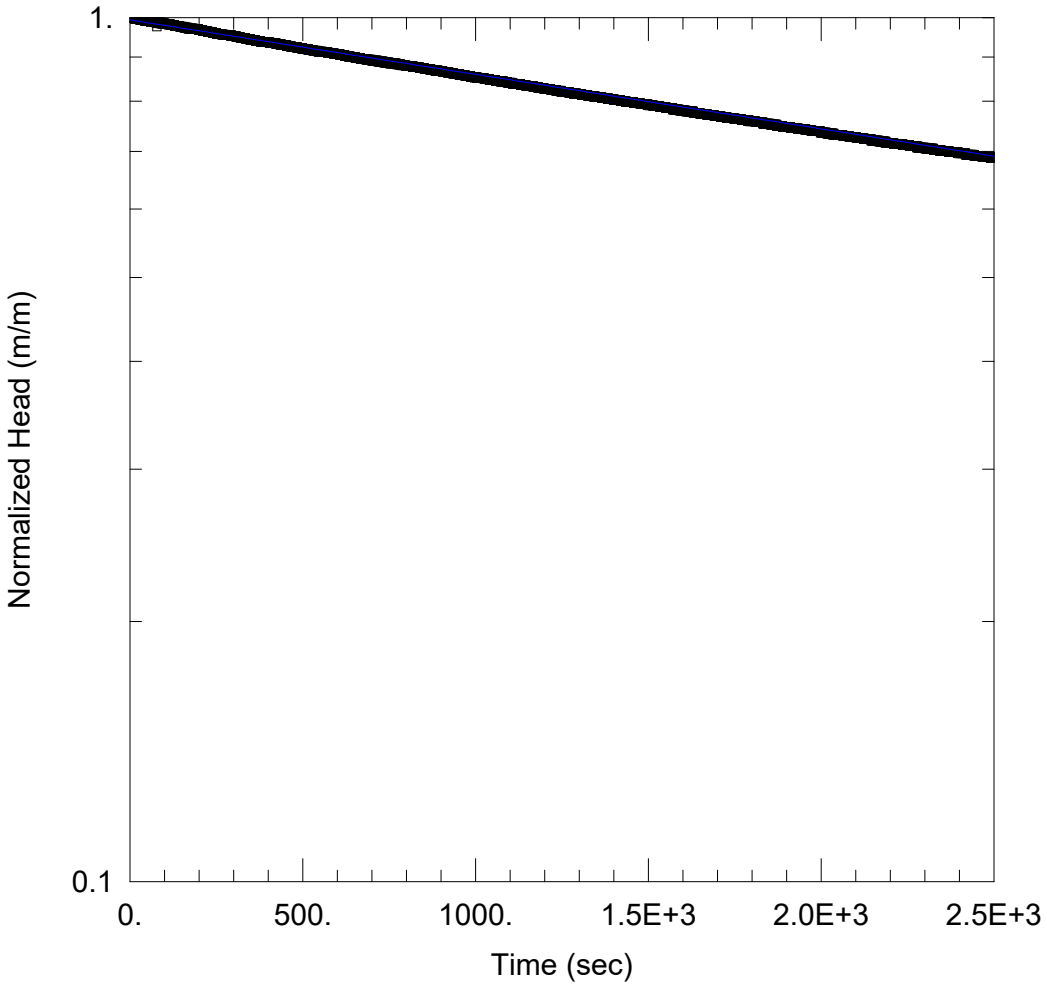
WELL DATA (BH3)

Initial Displacement: 1.051 m
Total Well Penetration Depth: 6.74 m
Casing Radius: 0.0254 m
Static Water Column Height: 6.74 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 2.779E-5 m/sec y0 = 1.044 m



BH 4 FALLING HEAD TEST

Data Set: E:\...\BH 4.aqt
Date: 02/29/24 Time: 07:54:06

PROJECT INFORMATION

Company: EXP Services Inc
Client: Tom Zheng
Project: BRM-23014306-A0
Location: 5688 Main St, Stouffville
Test Well: BH 4
Test Date: February 15, 2024

AQUIFER DATA

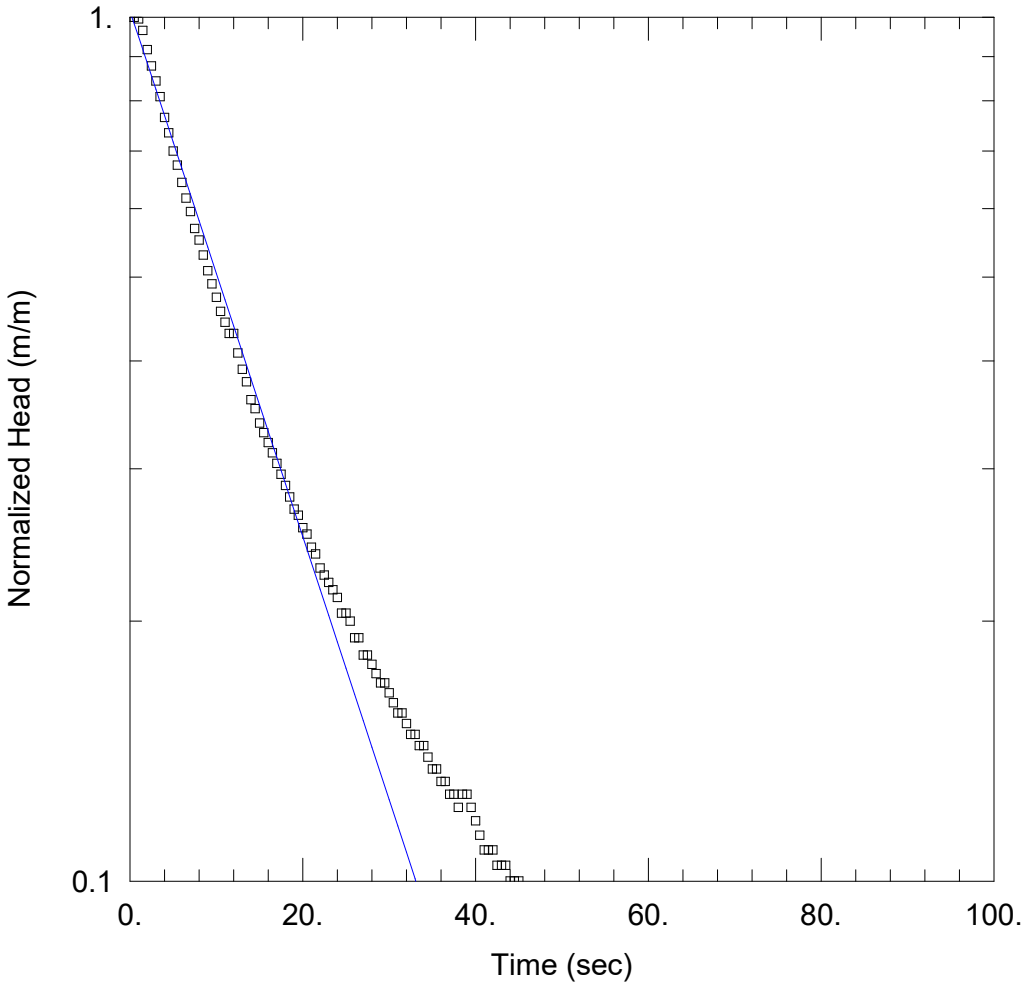
Saturated Thickness: 3.8 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH 4)

Initial Displacement: 1.353 m Static Water Column Height: 13.83 m
Total Well Penetration Depth: 13.83 m Screen Length: 3. m
Casing Radius: 0.0254 m Well Radius: 0.0762 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
K = 6.819E-8 m/sec y0 = 1.344 m



BH8 FALLING HEAD SWRT

Data Set: E:\...\BH8.aqt
Date: 02/29/24 Time: 10:50:41

PROJECT INFORMATION

Company: EXP Services Inc
Client: Hyson Developments Inc.
Project: BRM-23014306-A0
Location: 5688 Main St Stouffville
Test Well: BH8
Test Date: February 28, 2024

AQUIFER DATA

Saturated Thickness: 7.57 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH8)

Initial Displacement: 0.69 m
Total Well Penetration Depth: 7.57 m
Casing Radius: 0.0254 m
Static Water Column Height: 7.57 m
Screen Length: 3. m
Well Radius: 0.0762 m

SOLUTION

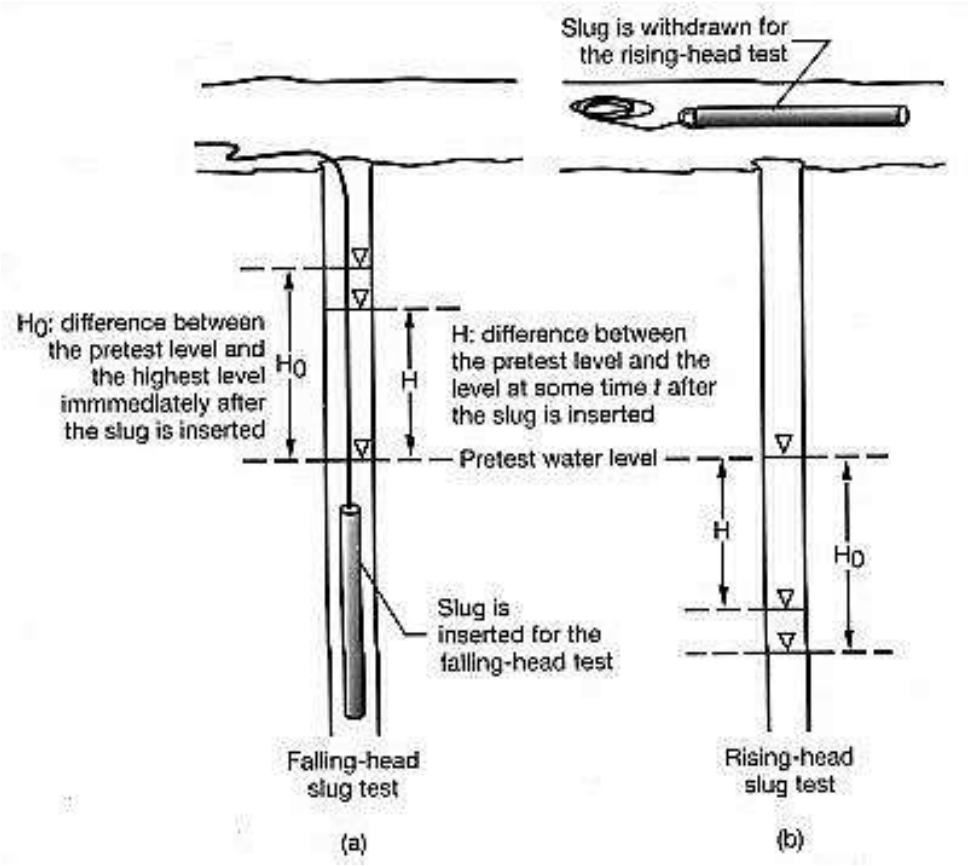
Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 3.292E-5 m/sec
y0 = 0.7024 m

Single Well Response Test Procedure

A Single Well Response Test (SWRT), also known as a bail test or a slug test, is conducted in order to determine the saturated hydraulic conductivity (K) of an aquifer. The method of the SWRT is to characterize the change of groundwater level in a well or borehole over time.

In order to ensure consistency and repeatability, all **exp** employees are to follow the procedure outlined in this document when conducting SWRTs.

The figure below depicts a schematic of a slug and bail test and the respective water level changes.



Initials ___

Slug Test Procedure

Equipment Required

- Copy of a signed health and safety plan
- Copy of the work program
- 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

Testing Procedure

1. Remove cap from well and collect static water level
2. Remove waterra tubing/bailer and place in garbage bag. Record static water level measurement again.
3. Lower the slug into the well and record the dynamic water level.
4. Record the drawdown (for the slug test) at set five (5) second intervals for the first five (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown until 95% recovery is reached. To calculate this value: Find the difference between the dynamic water level and the static water level, then multiply by 95% (.95). Add the resulting value to the dynamic water level.

   (Static Water Level – Dynamic Water Level).95 + Static Water Level = 95% Recovery Value
6. Once complete, replace the waterra tubing/bailer and re-secure the well cap.

Note: If the well is deep, more than one slug may be inserted by attaching the slugs to a series.

Slugs must be washed with methanol, then lab grade soap, and then rinsed with de-ionized water after each use.

Based on the recorded observations, the hydraulic conductivity (in m/s) of the aquifer will be determined. In order to determine the hydraulic conductivity; the well diameter, radius of the borehole and length of the screen will also be required.

Bail Test Procedure

Equipment Required

- 20 L (5 gal) Graduated pail
- Stop watch or watch with seconds
- Garbage bags
- Water level meter
- Field sheets/log book
- Latex Gloves
- Bailer and Rope

Procedure

1. Remove cap from well and collect static water level.
2. If using a **bailer**:
    a. Affix the rope to the bailer.
    b. Remove the waterra tubing and place in garbage bag
    c. Record static water level measurement again.
    d. Record how much water was removed by either counting the number of full bailers or emptying removed water into a container.
    e. Quickly lower the bailer into the well and remove.
    f. Continue this process until the water level will reduce no further.
    g. Record the dynamic water level.
3. If using **waterra** to bail the water:
    a. Pump the water into graduated bucket until the water level will reduce no further.
    b. Record how much water has been removed.
    c. Record the dynamic water level.
4. Record the recovery at set five (5) second intervals for the first (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown/recovery until 95% recovery is reached.
6. Once complete, replace any waterra tubing that may have been removed from the well and re-secure the well cap.

Appendix D – Laboratory's Certificates of Analysis

Your P.O. #: ENV-BRM
Your Project #: BRM-23014306-A0
Site#: PHASE 103
Site Location: 5688 MAIN ST
Your C.O.C. #: C#976632-01-01

Attention: Jeffrey Leon

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/02/27
Report #: R8044370
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C448209
Received: 2024/02/15, 18:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2024/02/20	2024/02/21	CAM SOP-00301	EPA 8270 m
Dissolved Aluminum (0.2 u, clay free)	1	N/A	2024/02/21	CAM SOP-00447	EPA 6020B m
Alkalinity	1	N/A	2024/02/20	CAM SOP-00448	SM 24 2320 B m
Carbonaceous BOD	1	2024/02/17	2024/02/22	CAM SOP-00427	SM 24 5210B m
Chromium (VI) in Water	1	N/A	2024/02/23	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	1	N/A	2024/02/21	CAM SOP-00457	OMOE E3015 m
Total Cyanide	1	2024/02/21	2024/02/22	CAM SOP-00457	OMOE E3015 5 m
Dissolved Oxygen	1	2024/02/16	2024/02/16	CAM SOP-00427	SM 24 4500 O G m
Fluoride	1	2024/02/17	2024/02/20	CAM SOP-00449	SM 24 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2024/02/22	CAM SOP 00102/00408/00447	SM 2340 B
Mercury in Water by CVAA	1	2024/02/22	2024/02/23	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2024/02/22	2024/02/22	CAM SOP-00447	EPA 6020B m
Sulphide (as H2S) (1)	1	N/A	2024/02/25	AB WI-00065	Auto Calc
Total Sulphide (1)	1	N/A	2024/02/24	AB SOP-00080	SM 24 4500 S2-A D Fm
Total Ammonia-N	1	N/A	2024/02/21	CAM SOP-00441	USGS I-2522-90 m
Total Nonylphenol in Liquids by HPLC	1	2024/02/18	2024/02/20	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2024/02/18	2024/02/20	CAM SOP-00313	Bureau Veritas
Animal and Vegetable Oil and Grease	1	N/A	2024/02/22	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2024/02/22	2024/02/22	CAM SOP-00326	EPA1664B m,SM5520B m
Polychlorinated Biphenyl in Water	1	2024/02/21	2024/02/22	CAM SOP-00309	EPA 8082A m
Phenols (4AAP)	1	N/A	2024/02/20	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	1	N/A	2024/02/23		Field pH Meter
pH	1	2024/02/17	2024/02/20	CAM SOP-00413	SM 24th-4500H+ B
Sulphate by Automated Turbidimetry	1	N/A	2024/02/21	CAM SOP-00464	SM 24 4500-SO42- E m
Field Temperature (2)	1	N/A	2024/02/23		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2024/02/21	2024/02/22	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2024/02/21	2024/02/21	CAM SOP-00407	SM 24 4500-P I
Mineral/Synthetic O & G (TPH Heavy Oil) (3)	1	2024/02/22	2024/02/22	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2024/02/21	2024/02/22	CAM SOP-00428	SM 24 2540D m
Turbidity	1	N/A	2024/02/17	CAM SOP-00417	SM 24 2130 B

Your P.O. #: ENV-BRM
Your Project #: BRM-23014306-A0
Site#: PHASE 103
Site Location: 5688 MAIN ST
Your C.O.C. #: C#976632-01-01

Attention: Jeffrey Leon

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/02/27
Report #: R8044370
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C448209
Received: 2024/02/15, 18:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Un-ionized Ammonia (4)	1	2024/02/16	2024/02/23	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2024/02/20	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, 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. 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) This test was performed by Bureau Veritas Calgary (19th), 4000 19th Street NE , Calgary, AB, T2E 6P8
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease
(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

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 #: BRM-23014306-A0
Site#: PHASE 103
Site Location: 5688 MAIN ST
Your C.O.C. #: C#976632-01-01

Attention: Jeffrey Leon

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/02/27
Report #: R8044370
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C448209
Received: 2024/02/15, 18:30

Encryption Key

Patricia Legette
Project Manager
27 Feb 2024 16:58:01

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

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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 #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

PWQO METALS AND INORGANICS (WATER)

Bureau Veritas ID				YKB542			YKB542		
Sampling Date				2024/02/15 12:00			2024/02/15 12:00		
COC Number				C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	Criteria-2	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	-	-	810	1.0	9225491			
Sulphide (as H2S)	mg/L	-	-	0.0072	0.0020	9233437			
Total Un-ionized Ammonia	mg/L	-	-	ND	0.00061	9225495			
Field Measurements									
Field Temperature	Celsius	-	-	8.3	N/A	ONSITE			
Field Measured pH	pH	6.0:9.0	6.0:10.5	6.69		ONSITE			
Inorganics									
Total Ammonia-N	mg/L	-	-	ND	0.050	9230342			
Dissolved Oxygen	mg/L	-	-	7.92	0.050	9226238			
Total Phosphorus	mg/L	0.400	10	0.063	0.004	9232150			
Total Sulphide	mg/L	-	-	0.0068	0.0018	9240493			
Turbidity	NTU	-	-	16	0.1	9227194			
WAD Cyanide (Free)	ug/L	-	-	ND	1	9231278			
Alkalinity (Total as CaCO3)	mg/L	-	-	310	1.0	9229298	310	1.0	9229298
Metals									
Dissolved (0.2u) Aluminum (Al)	ug/L	-	50000	ND	5	9230232			
Chromium (VI)	ug/L	-	-	ND	0.50	9228792	ND	0.50	9228792

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
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.
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 #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID				YKB542			YKB542		
Sampling Date				2024/02/15 12:00			2024/02/15 12:00		
COC Number				C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	Criteria-2	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Total Animal/Vegetable Oil and Grease	mg/L	-	150	ND	0.50	9224498			
Inorganics									
Total Carbonaceous BOD	mg/L	15	300	ND	2	9226884	ND	2	9226884
Fluoride (F-)	mg/L	-	10	ND	0.10	9229304	ND	0.10	9229304
Total Kjeldahl Nitrogen (TKN)	mg/L	1	100	0.27	0.10	9232109			
pH	pH	6.0:9.0	6.0:10.5	7.56		9227204	7.56		9227204
Phenols-4AAP	mg/L	0.008	1	ND	0.0010	9229254			
Total Suspended Solids	mg/L	15	350	**56**	10	9231040			
Dissolved Sulphate (SO4)	mg/L	-	1500	69	1.0	9227291			
Total Cyanide (CN)	mg/L	0.020	2	ND	0.0050	9231275			
Petroleum Hydrocarbons									
Total Oil & Grease	mg/L	-	-	ND	0.50	9233712			
Total Oil & Grease Mineral/Synthetic	mg/L	-	15	ND	0.50	9233713			
Miscellaneous Parameters									
Nonylphenol Ethoxylate (Total)	mg/L	-	0.2	ND	0.025	9227831	ND	0.025	9227831
Nonylphenol (Total)	mg/L	-	0.02	ND	0.001	9227829			
Metals									
Mercury (Hg)	mg/L	0.0004	0.01	ND	0.00010	9234630			
Total Aluminum (Al)	ug/L	-	50000	620	4.9	9233972			
Total Antimony (Sb)	ug/L	-	5000	ND	0.50	9233972			
Total Arsenic (As)	ug/L	20	1000	ND	1.0	9233972			
Total Cadmium (Cd)	ug/L	8	700	ND	0.090	9233972			
Total Chromium (Cr)	ug/L	80	2000	ND	5.0	9233972			
Total Cobalt (Co)	ug/L	-	5000	4.2	0.50	9233972			
Total Copper (Cu)	ug/L	50	3000	2.3	0.90	9233972			
Total Lead (Pb)	ug/L	120	1000	1.3	0.50	9233972			

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
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID				YKB542			YKB542		
Sampling Date				2024/02/15 12:00			2024/02/15 12:00		
COC Number				C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	Criteria-2	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
Total Manganese (Mn)	ug/L	150	5000	**360**	2.0	9233972			
Total Molybdenum (Mo)	ug/L	-	5000	1.1	0.50	9233972			
Total Nickel (Ni)	ug/L	80	2000	3.7	1.0	9233972			
Total Phosphorus (P)	ug/L	400	10000	ND	100	9233972			
Total Selenium (Se)	ug/L	20	1000	ND	2.0	9233972			
Total Silver (Ag)	ug/L	120	5000	ND	0.090	9233972			
Total Tin (Sn)	ug/L	-	5000	ND	1.0	9233972			
Total Titanium (Ti)	ug/L	-	5000	23	5.0	9233972			
Total Zinc (Zn)	ug/L	40	2000	8.5	5.0	9233972			
Semivolatile Organics									
Bis(2-ethylhexyl)phthalate	ug/L	8.8	12	ND	2.0	9229972			
Di-N-butyl phthalate	ug/L	15.0	80	ND	2.0	9229972			
Volatile Organics									
Benzene	ug/L	2.0	10	ND	0.20	9228092			
Chloroform	ug/L	2.0	40	ND	0.20	9228092			
1,2-Dichlorobenzene	ug/L	5.6	50	ND	0.40	9228092			
1,4-Dichlorobenzene	ug/L	6.8	80	ND	0.40	9228092			
cis-1,2-Dichloroethylene	ug/L	5.6	4000	ND	0.50	9228092			
trans-1,3-Dichloropropene	ug/L	5.6	140	ND	0.40	9228092			
Ethylbenzene	ug/L	2.0	160	ND	0.20	9228092			
Methylene Chloride(Dichloromethane)	ug/L	5.2	2000	ND	2.0	9228092			
Methyl Ethyl Ketone (2-Butanone)	ug/L	-	8000	ND	10	9228092			
Styrene	ug/L	-	200	ND	0.40	9228092			
1,1,2,2-Tetrachloroethane	ug/L	17.0	1400	ND	0.40	9228092			
Tetrachloroethylene	ug/L	4.4	1000	ND	0.20	9228092			
Toluene	ug/L	2.0	270	ND	0.20	9228092			
Trichloroethylene	ug/L	8.0	400	ND	0.20	9228092			

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
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID				YKB542			YKB542		
Sampling Date				2024/02/15 12:00			2024/02/15 12:00		
COC Number				C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	Criteria-2	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
p+m-Xylene	ug/L	-	-	ND	0.20	9228092			
o-Xylene	ug/L	-	-	ND	0.20	9228092			
Total Xylenes	ug/L	4.4	1400	ND	0.20	9228092			
PCBs									
Total PCB	ug/L	0.4	1	ND	0.05	9232258			
Surrogate Recovery (%)									
2,4,6-Tribromophenol	%	-	-	73		9229972			
2-Fluorobiphenyl	%	-	-	61		9229972			
2-Fluorophenol	%	-	-	28		9229972			
D14-Terphenyl	%	-	-	94		9229972			
D5-Nitrobenzene	%	-	-	63		9229972			
D5-Phenol	%	-	-	20		9229972			
Decachlorobiphenyl	%	-	-	82		9232258			
4-Bromofluorobenzene	%	-	-	99		9228092			
D4-1,2-Dichloroethane	%	-	-	109		9228092			
D8-Toluene	%	-	-	95		9228092			

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
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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

TEST SUMMARY

Bureau Veritas ID: YKB542
Sample ID: BH8
Matrix: Water

Collected: 2024/02/15
Shipped:
Received: 2024/02/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
ABN Compounds in Water by GC/MS	GC/MS	9229972	2024/02/20	2024/02/21	Milijana Avramovic
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9230232	N/A	2024/02/21	Thuy Linh Nguyen
Alkalinity	AT	9229298	N/A	2024/02/20	Gurparteek KAUR
Carbonaceous BOD	DO	9226884	2024/02/17	2024/02/22	Amrutha Anilkumar
Chromium (VI) in Water	IC	9228792	N/A	2024/02/23	Surleen Kaur Romana
Free (WAD) Cyanide	SKAL/CN	9231278	N/A	2024/02/21	Jency Sara Johnson
Total Cyanide	SKAL/CN	9231275	2024/02/21	2024/02/22	Jency Sara Johnson
Dissolved Oxygen	DO	9226238	2024/02/16	2024/02/16	Nusrat Naz
Fluoride	ISE	9229304	2024/02/17	2024/02/20	Gurparteek KAUR
Hardness (calculated as CaCO3)		9225491	N/A	2024/02/22	Automated Statchk
Mercury in Water by CVAA	CV/AA	9234630	2024/02/22	2024/02/23	Aswathy Neduveli Suresh
Total Metals Analysis by ICPMS	ICP/MS	9233972	2024/02/22	2024/02/22	Azita Fazaeli
Sulphide (as H2S)	CALC	9233437	N/A	2024/02/25	Automated Statchk
Total Sulphide	SPEC	9240493	N/A	2024/02/24	Ly Vu
Total Ammonia-N	LACH/NH4	9230342	N/A	2024/02/21	Prabhjot Kaur
Total Nonylphenol in Liquids by HPLC	LC/FLU	9227829	2024/02/18	2024/02/20	Dennis Boodram
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	9227831	2024/02/18	2024/02/20	Dennis Boodram
Animal and Vegetable Oil and Grease	BAL	9224498	N/A	2024/02/22	Automated Statchk
Total Oil and Grease	BAL	9233712	2024/02/22	2024/02/22	Navneet Singh
Polychlorinated Biphenyl in Water	GC/ECD	9232258	2024/02/21	2024/02/22	Debashis Saha
Phenols (4AAP)	TECH/PHEN	9229254	N/A	2024/02/20	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2024/02/23	Patricia Legette
pH	AT	9227204	2024/02/17	2024/02/20	Gurparteek KAUR
Sulphate by Automated Turbidimetry	SKAL	9227291	N/A	2024/02/21	Massarat Jan
Field Measured pH	PH	ONSITE	N/A	2024/02/23	Patricia Legette
Total Kjeldahl Nitrogen in Water	SKAL	9232109	2024/02/21	2024/02/22	Kruti Jitesh Patel
Total Phosphorus (Colourimetric)	SKAL/P	9232150	2024/02/21	2024/02/21	Muskan
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	9233713	2024/02/22	2024/02/22	Navneet Singh
Total Suspended Solids	BAL	9231040	2024/02/21	2024/02/22	Madhav Somani
Turbidity	AT	9227194	N/A	2024/02/17	Vidhi Khatri
Un-ionized Ammonia	CALC/NH3	9225495	2024/02/23	2024/02/23	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	9228092	N/A	2024/02/20	Gabriella Morrone

Bureau Veritas ID: YKB542 Dup
Sample ID: BH8
Matrix: Water

Collected: 2024/02/15
Shipped:
Received: 2024/02/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9229298	N/A	2024/02/20	Gurparteek KAUR
Carbonaceous BOD	DO	9226884	2024/02/17	2024/02/22	Amrutha Anilkumar
Chromium (VI) in Water	IC	9228792	N/A	2024/02/23	Surleen Kaur Romana
Fluoride	ISE	9229304	2024/02/17	2024/02/20	Gurparteek KAUR
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	9227831	2024/02/18	2024/02/21	Dennis Boodram

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

TEST SUMMARY

Bureau Veritas ID: YKB542 Dup
Sample ID: BH8
Matrix: Water

Collected: 2024/02/15
Shipped:
Received: 2024/02/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH	AT	9227204	2024/02/17	2024/02/20	Gurparteek KAUR

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exp Services Inc
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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C

Sample YKB542 [BH8] : Sample was analyzed past method specified hold time for Total Sulphide. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Results relate only to the items tested.

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

			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
9228092	4-Bromofluorobenzene	2024/02/20	99	70 - 130	99	70 - 130	101	%				
9228092	D4-1,2-Dichloroethane	2024/02/20	108	70 - 130	101	70 - 130	105	%				
9228092	D8-Toluene	2024/02/20	101	70 - 130	104	70 - 130	96	%				
9229972	2,4,6-Tribromophenol	2024/02/21	96	10 - 130	100	10 - 130	62	%				
9229972	2-Fluorobiphenyl	2024/02/21	56	30 - 130	73	30 - 130	67	%				
9229972	2-Fluorophenol	2024/02/21	31	10 - 130	49	10 - 130	30	%				
9229972	D14-Terphenyl	2024/02/21	95	30 - 130	96	30 - 130	89	%				
9229972	D5-Nitrobenzene	2024/02/21	59	30 - 130	88	30 - 130	72	%				
9229972	D5-Phenol	2024/02/21	21	10 - 130	33	10 - 130	22	%				
9232258	Decachlorobiphenyl	2024/02/22	75	60 - 130	71	60 - 130	79	%				
9226238	Dissolved Oxygen	2024/02/16							5.4	30		
9226884	Total Carbonaceous BOD	2024/02/22					ND,RDL=2	mg/L	NC	30	96	80 - 120
9227194	Turbidity	2024/02/17			101	80 - 120	ND, RDL=0.1	NTU	0.32	20		
9227204	pH	2024/02/20			102	98 - 103			0.082	N/A		
9227291	Dissolved Sulphate (SO4)	2024/02/21	NC	75 - 125	101	80 - 120	ND, RDL=1.0	mg/L	0.94	20		
9227829	Nonylphenol (Total)	2024/02/21	95	50 - 130	92	50 - 130	ND, RDL=0.001	mg/L	NC	40		
9227831	Nonylphenol Ethoxylate (Total)	2024/02/21	99	50 - 130	99	50 - 130	ND, RDL=0.025	mg/L	NC	40		
9228092	1,1,2,2-Tetrachloroethane	2024/02/20	114	70 - 130	105	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	1,2-Dichlorobenzene	2024/02/20	97	70 - 130	94	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	1,4-Dichlorobenzene	2024/02/20	106	70 - 130	105	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	Benzene	2024/02/20	96	70 - 130	92	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	Chloroform	2024/02/20	107	70 - 130	102	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	cis-1,2-Dichloroethylene	2024/02/20	104	70 - 130	98	70 - 130	ND, RDL=0.50	ug/L	NC	30		
9228092	Ethylbenzene	2024/02/20	96	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	Methyl Ethyl Ketone (2-Butanone)	2024/02/20	122	60 - 140	109	60 - 140	ND, RDL=10	ug/L	NC	30		
9228092	Methylene Chloride(Dichloromethane)	2024/02/20	102	70 - 130	95	70 - 130	ND, RDL=2.0	ug/L	NC	30		
9228092	o-Xylene	2024/02/20	87	70 - 130	90	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	p+m-Xylene	2024/02/20	105	70 - 130	105	70 - 130	ND, RDL=0.20	ug/L	NC	30		

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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
9228092	Styrene	2024/02/20	109	70 - 130	110	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	Tetrachloroethylene	2024/02/20	96	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	Toluene	2024/02/20	98	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	0.60	30		
9228092	Total Xylenes	2024/02/20					ND, RDL=0.20	ug/L	NC	30		
9228092	trans-1,3-Dichloropropene	2024/02/20	122	70 - 130	114	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	Trichloroethylene	2024/02/20	98	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228792	Chromium (VI)	2024/02/23	103	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9229254	Phenols-4AAP	2024/02/20	104	80 - 120	100	80 - 120	ND, RDL=0.0010	mg/L	4.7	20		
9229298	Alkalinity (Total as CaCO3)	2024/02/20			95	85 - 115	ND, RDL=1.0	mg/L	1.1	20		
9229304	Fluoride (F-)	2024/02/20	91	80 - 120	96	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9229972	Bis(2-ethylhexyl)phthalate	2024/02/21	94	30 - 130	99	30 - 130	ND, RDL=2.0	ug/L	NC	40		
9229972	Di-N-butyl phthalate	2024/02/21	115	30 - 130	119	30 - 130	ND, RDL=2.0	ug/L	NC	40		
9230232	Dissolved (0.2u) Aluminum (Al)	2024/02/21	101	80 - 120	98	80 - 120	ND,RDL=5	ug/L	NC	20		
9230342	Total Ammonia-N	2024/02/21	93	75 - 125	101	80 - 120	ND, RDL=0.050	mg/L	19	20		
9231040	Total Suspended Solids	2024/02/22			97	80 - 120	ND, RDL=10	mg/L	NC	20		
9231275	Total Cyanide (CN)	2024/02/22	87	80 - 120	108	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
9231278	WAD Cyanide (Free)	2024/02/21	107	80 - 120	112	80 - 120	ND,RDL=1	ug/L	NC	20		
9232109	Total Kjeldahl Nitrogen (TKN)	2024/02/22	98	80 - 120	97	80 - 120	ND, RDL=0.10	mg/L	NC	20	92	80 - 120
9232150	Total Phosphorus	2024/02/21	100	80 - 120	100	80 - 120	ND, RDL=0.004	mg/L	NC	20	106	80 - 120
9232258	Total PCB	2024/02/22	63	60 - 130	64	60 - 130	ND, RDL=0.05	ug/L	NC	40		
9233712	Total Oil & Grease	2024/02/22			99	80 - 110	ND, RDL=0.50	mg/L	0.25	25		
9233713	Total Oil & Grease Mineral/Synthetic	2024/02/22			97	65 - 130	ND, RDL=0.50	mg/L	0.52	25		
9233972	Total Aluminum (Al)	2024/02/22	126 (1)	80 - 120	98	80 - 120	ND, RDL=4.9	ug/L	5.1	20		
9233972	Total Antimony (Sb)	2024/02/22	109	80 - 120	106	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9233972	Total Arsenic (As)	2024/02/22	102	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9233972	Total Cadmium (Cd)	2024/02/22	101	80 - 120	101	80 - 120	ND, RDL=0.090	ug/L	NC	20		

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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
9233972	Total Chromium (Cr)	2024/02/22	99	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9233972	Total Cobalt (Co)	2024/02/22	98	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9233972	Total Copper (Cu)	2024/02/22	99	80 - 120	98	80 - 120	ND, RDL=0.90	ug/L	6.6	20		
9233972	Total Lead (Pb)	2024/02/22	98	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9233972	Total Manganese (Mn)	2024/02/22	98	80 - 120	97	80 - 120	ND, RDL=2.0	ug/L	1.4	20		
9233972	Total Molybdenum (Mo)	2024/02/22	106	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	0.77	20		
9233972	Total Nickel (Ni)	2024/02/22	97	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	5.7	20		
9233972	Total Phosphorus (P)	2024/02/22	105	80 - 120	99	80 - 120	ND, RDL=100	ug/L				
9233972	Total Selenium (Se)	2024/02/22	103	80 - 120	105	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9233972	Total Silver (Ag)	2024/02/22	98	80 - 120	98	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9233972	Total Tin (Sn)	2024/02/22	104	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9233972	Total Titanium (Ti)	2024/02/22	101	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9233972	Total Zinc (Zn)	2024/02/22	100	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	5.7	20		
9234630	Mercury (Hg)	2024/02/23	104	75 - 125	104	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
9240493	Total Sulphide	2024/02/24	80	80 - 120	97	80 - 120	ND, RDL=0.0018	mg/L				

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) Matrix Spike exceeds acceptance limits, probable matrix interference

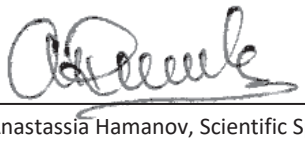
Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C448209
Report Date: 2024/02/27

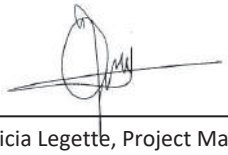
exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

VALIDATION SIGNATURE PAGE

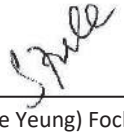
The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager



Suwan (Sze Yeung) Fock, B.Sc., 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 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
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:(905) 817-5777 www.bvna.com

C NONT-2024-02-1198

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#30554 exp Services Inc	Company Name:	EXP Services Inc	Quotation #:	C31679 Stream
Attention:	Accounts Payable	Attention:	Jeffrey Leon/ Francois Chartier	P.O. #:	PHASE 103 ENV-Rk...
Address:	1595 Clark Blvd Brampton ON L6T 4V1	Address:	ryan.alexander@exp.com	Project:	BRM-23014306-A0
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	Fax:	Project Name:	
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	Jeffrey.leon@exp.com, francois.chartier@exp.com	Site #:	5688 Main St
				Sampled By:	RA

Bottle Order #: 976632 | COC #: C#976632-01-01 | Project Manager: Patricia Legette

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): ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___

Other Regulations: ☐ CCME ☒ Sanitary Sewer Bylaw ☒ Storm Sewer Bylaw ☐ MISA Municipality York ☒ PWQO ☐ Reg 406 Table ☐ Other

Special Instructions:

Include Criteria on Certificate of Analysis (Y/N)? YES

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects
Regular (Standard) TAT: X
(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	ANALYSIS REQUESTED (PLEASE BE SPECIFIC): York Sanitary & Storm Sewer (2021-102)	PWQO Metals and Inorganics	# of Bottles	Comments
1		BHP	24/02/15	12:00	GW	NO	X	X	19	Please include COC in final report
2										
3										
4										
5										
6										
7										
8										
9										
10										

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
RYAN ALEXANDER	24/02/15	18:28	VR VIKRAM	2024/02/15	18:30	

Laboratory Use Only: Time Sensitive | Temperature (°C) on Recei 7/5/6 | Custody Seal Present ☐ Yes ☐ No | 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

ICE: ✓ mailed in

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

Exceedance Summary Table – York Storm SUB 2021

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH8	YKB542-13	Total Manganese (Mn)	150	360	2.0	ug/L
BH8	YKB542-08	Total Suspended Solids	15	56	10	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

Your P.O. #: ENV-BRM
Your Project #: BRM-23014306-A0
Site#: PHASE 103
Site Location: 5688 MAIN ST
Your C.O.C. #: C#976632-01-01

Attention: Jeffrey Leon

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/02/27
Report #: R8044617
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C448209
Received: 2024/02/15, 18:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2024/02/20	2024/02/21	CAM SOP-00301	EPA 8270 m
Dissolved Aluminum (0.2 u, clay free)	1	N/A	2024/02/21	CAM SOP-00447	EPA 6020B m
Alkalinity	1	N/A	2024/02/20	CAM SOP-00448	SM 24 2320 B m
Carbonaceous BOD	1	2024/02/17	2024/02/22	CAM SOP-00427	SM 24 5210B m
Chromium (VI) in Water	1	N/A	2024/02/23	CAM SOP-00436	EPA 7199 m
Free (WAD) Cyanide	1	N/A	2024/02/21	CAM SOP-00457	OMOE E3015 m
Total Cyanide	1	2024/02/21	2024/02/22	CAM SOP-00457	OMOE E3015 5 m
Dissolved Oxygen	1	2024/02/16	2024/02/16	CAM SOP-00427	SM 24 4500 O G m
Fluoride	1	2024/02/17	2024/02/20	CAM SOP-00449	SM 24 4500-F C m
Hardness (calculated as CaCO3)	1	N/A	2024/02/22	CAM SOP 00102/00408/00447	SM 2340 B
Mercury in Water by CVAA	1	2024/02/22	2024/02/23	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2024/02/22	2024/02/22	CAM SOP-00447	EPA 6020B m
Sulphide (as H2S) (1)	1	N/A	2024/02/25	AB WI-00065	Auto Calc
Total Sulphide (1)	1	N/A	2024/02/24	AB SOP-00080	SM 24 4500 S2-A D Fm
Total Ammonia-N	1	N/A	2024/02/21	CAM SOP-00441	USGS I-2522-90 m
Total Nonylphenol in Liquids by HPLC	1	2024/02/18	2024/02/20	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2024/02/18	2024/02/20	CAM SOP-00313	Bureau Veritas
Animal and Vegetable Oil and Grease	1	N/A	2024/02/22	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2024/02/22	2024/02/22	CAM SOP-00326	EPA1664B m,SM5520B m
Polychlorinated Biphenyl in Water	1	2024/02/21	2024/02/22	CAM SOP-00309	EPA 8082A m
Phenols (4AAP)	1	N/A	2024/02/20	CAM SOP-00444	OMOE E3179 m
Field Measured pH (2)	1	N/A	2024/02/23		Field pH Meter
pH	1	2024/02/17	2024/02/20	CAM SOP-00413	SM 24th-4500H+ B
Sulphate by Automated Turbidimetry	1	N/A	2024/02/21	CAM SOP-00464	SM 24 4500-SO42- E m
Field Temperature (2)	1	N/A	2024/02/23		Field Thermometer
Total Kjeldahl Nitrogen in Water	1	2024/02/21	2024/02/22	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	1	2024/02/21	2024/02/21	CAM SOP-00407	SM 24 4500-P I
Mineral/Synthetic O & G (TPH Heavy Oil) (3)	1	2024/02/22	2024/02/22	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2024/02/21	2024/02/22	CAM SOP-00428	SM 24 2540D m
Turbidity	1	N/A	2024/02/17	CAM SOP-00417	SM 24 2130 B

Your P.O. #: ENV-BRM
Your Project #: BRM-23014306-A0
Site#: PHASE 103
Site Location: 5688 MAIN ST
Your C.O.C. #: C#976632-01-01

Attention: Jeffrey Leon

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/02/27
Report #: R8044617
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C448209
Received: 2024/02/15, 18:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Un-ionized Ammonia (4)	1	2024/02/16	2024/02/23	Auto Calc.	PWQO
Volatile Organic Compounds in Water	1	N/A	2024/02/20	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, 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. 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) This test was performed by Bureau Veritas Calgary (19th), 4000 19th Street NE , Calgary, AB, T2E 6P8
(2) This is a field test, therefore, the results relate to items that were not analysed at Bureau Veritas.
(3) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease
(4) Un-ionized ammonia is calculated using the total ammonia result and field data provided by the client for pH and temperature.

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 #: BRM-23014306-A0
Site#: PHASE 103
Site Location: 5688 MAIN ST
Your C.O.C. #: C#976632-01-01

Attention: Jeffrey Leon

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2024/02/27
Report #: R8044617
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C448209
Received: 2024/02/15, 18:30

Encryption Key

Patricia Legette
Project Manager
27 Feb 2024 17:16:36

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.

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

PWQO METALS AND INORGANICS (WATER)

Bureau Veritas ID			YKB542			YKB542		
Sampling Date			2024/02/15 12:00			2024/02/15 12:00		
COC Number			C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
Calculated Parameters								
Hardness (CaCO3)	mg/L	-	810	1.0	9225491			
Sulphide (as H2S)	mg/L	0.002	**0.0072**	0.0020	9233437			
Total Un-ionized Ammonia	mg/L	0.02	ND	0.00061	9225495			
Field Measurements								
Field Temperature	Celsius	-	8.3	N/A	ONSITE			
Field Measured pH	pH	6.5:8.5	6.69		ONSITE			
Inorganics								
Total Ammonia-N	mg/L	-	ND	0.050	9230342			
Dissolved Oxygen	mg/L	-	7.92	0.050	9226238			
Total Phosphorus	mg/L	0.01	**0.063**	0.004	9232150			
Total Sulphide	mg/L	0.002	**0.0068**	0.0018	9240493			
Turbidity	NTU	-	16	0.1	9227194			
WAD Cyanide (Free)	ug/L	5	ND	1	9231278			
Alkalinity (Total as CaCO3)	mg/L	-	310	1.0	9229298	310	1.0	9229298
Metals								
Dissolved (0.2u) Aluminum (Al)	ug/L	15	ND	5	9230232			
Chromium (VI)	ug/L	1	ND	0.50	9228792	ND	0.50	9228792

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: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.
N/A = Not Applicable

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID			YKB542			YKB542		
Sampling Date			2024/02/15 12:00			2024/02/15 12:00		
COC Number			C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
Calculated Parameters								
Total Animal/Vegetable Oil and Grease	mg/L	-	ND	0.50	9224498			
Inorganics								
Total Carbonaceous BOD	mg/L	-	ND	2	9226884	ND	2	9226884
Fluoride (F-)	mg/L	-	ND	0.10	9229304	ND	0.10	9229304
Total Kjeldahl Nitrogen (TKN)	mg/L	-	0.27	0.10	9232109			
pH	pH	6.5:8.5	7.56		9227204	7.56		9227204
Phenols-4AAP	mg/L	0.001	ND	0.0010	9229254			
Total Suspended Solids	mg/L	-	56	10	9231040			
Dissolved Sulphate (SO4)	mg/L	-	69	1.0	9227291			
Total Cyanide (CN)	mg/L	-	ND	0.0050	9231275			
Petroleum Hydrocarbons								
Total Oil & Grease	mg/L	-	ND	0.50	9233712			
Total Oil & Grease Mineral/Synthetic	mg/L	0.5	ND	0.50	9233713			
Miscellaneous Parameters								
Nonylphenol Ethoxylate (Total)	mg/L	-	ND	0.025	9227831	ND	0.025	9227831
Nonylphenol (Total)	mg/L	0.00004	**ND (1)**	0.001	9227829			
Metals								
Mercury (Hg)	mg/L	0.0002	ND	0.00010	9234630			
Total Aluminum (Al)	ug/L	-	620	4.9	9233972			
Total Antimony (Sb)	ug/L	20	ND	0.50	9233972			
Total Arsenic (As)	ug/L	100	ND	1.0	9233972			
Total Cadmium (Cd)	ug/L	0.2	ND	0.090	9233972			
Total Chromium (Cr)	ug/L	-	ND	5.0	9233972			
Total Cobalt (Co)	ug/L	0.9	**4.2**	0.50	9233972			
Total Copper (Cu)	ug/L	5	2.3	0.90	9233972			

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: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.
(1) RDL exceeds criteria

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 #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID			YKB542			YKB542		
Sampling Date			2024/02/15 12:00			2024/02/15 12:00		
COC Number			C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
Total Lead (Pb)	ug/L	5	1.3	0.50	9233972			
Total Manganese (Mn)	ug/L	-	360	2.0	9233972			
Total Molybdenum (Mo)	ug/L	40	1.1	0.50	9233972			
Total Nickel (Ni)	ug/L	25	3.7	1.0	9233972			
Total Phosphorus (P)	ug/L	10	**ND (1)**	100	9233972			
Total Selenium (Se)	ug/L	100	ND	2.0	9233972			
Total Silver (Ag)	ug/L	0.1	ND	0.090	9233972			
Total Tin (Sn)	ug/L	-	ND	1.0	9233972			
Total Titanium (Ti)	ug/L	-	23	5.0	9233972			
Total Zinc (Zn)	ug/L	30	8.5	5.0	9233972			
Semivolatile Organics								
Bis(2-ethylhexyl)phthalate	ug/L	0.6	**ND (1)**	2.0	9229972			
Di-N-butyl phthalate	ug/L	4	ND	2.0	9229972			
Volatile Organics								
Benzene	ug/L	100	ND	0.20	9228092			
Chloroform	ug/L	-	ND	0.20	9228092			
1,2-Dichlorobenzene	ug/L	2.5	ND	0.40	9228092			
1,4-Dichlorobenzene	ug/L	4	ND	0.40	9228092			
cis-1,2-Dichloroethylene	ug/L	200	ND	0.50	9228092			
trans-1,3-Dichloropropene	ug/L	7	ND	0.40	9228092			
Ethylbenzene	ug/L	8	ND	0.20	9228092			
Methylene Chloride(Dichloromethane)	ug/L	100	ND	2.0	9228092			
Methyl Ethyl Ketone (2-Butanone)	ug/L	400	ND	10	9228092			
Styrene	ug/L	4	ND	0.40	9228092			
1,1,2,2-Tetrachloroethane	ug/L	70	ND	0.40	9228092			
Tetrachloroethylene	ug/L	50	ND	0.20	9228092			

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: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.
(1) RDL exceeds criteria

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

YORK SANITARY & STORM SEWER (2021-102)

Bureau Veritas ID			YKB542			YKB542		
Sampling Date			2024/02/15 12:00			2024/02/15 12:00		
COC Number			C#976632-01-01			C#976632-01-01		
	UNITS	Criteria	BH8	RDL	QC Batch	BH8 Lab-Dup	RDL	QC Batch
Toluene	ug/L	0.8	ND	0.20	9228092			
Trichloroethylene	ug/L	20	ND	0.20	9228092			
p+m-Xylene	ug/L	2	ND	0.20	9228092			
o-Xylene	ug/L	40	ND	0.20	9228092			
Total Xylenes	ug/L	-	ND	0.20	9228092			
PCBs								
Total PCB	ug/L	0.001	**ND (1)**	0.05	9232258			
Surrogate Recovery (%)								
2,4,6-Tribromophenol	%	-	73		9229972			
2-Fluorobiphenyl	%	-	61		9229972			
2-Fluorophenol	%	-	28		9229972			
D14-Terphenyl	%	-	94		9229972			
D5-Nitrobenzene	%	-	63		9229972			
D5-Phenol	%	-	20		9229972			
Decachlorobiphenyl	%	-	82		9232258			
4-Bromofluorobenzene	%	-	99		9228092			
D4-1,2-Dichloroethane	%	-	109		9228092			
D8-Toluene	%	-	95		9228092			

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: Ontario Provincial Water Quality Objectives
Ref. to MOEE Water Management document dated Feb.1999
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.
(1) RDL exceeds criteria

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Report Date: 2024/02/27

exp Services Inc
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Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

TEST SUMMARY

Bureau Veritas ID: YKB542
Sample ID: BH8
Matrix: Water

Collected: 2024/02/15
Shipped:
Received: 2024/02/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
ABN Compounds in Water by GC/MS	GC/MS	9229972	2024/02/20	2024/02/21	Milijana Avramovic
Dissolved Aluminum (0.2 u, clay free)	ICP/MS	9230232	N/A	2024/02/21	Thuy Linh Nguyen
Alkalinity	AT	9229298	N/A	2024/02/20	Gurparteek KAUR
Carbonaceous BOD	DO	9226884	2024/02/17	2024/02/22	Amrutha Anilkumar
Chromium (VI) in Water	IC	9228792	N/A	2024/02/23	Surleen Kaur Romana
Free (WAD) Cyanide	SKAL/CN	9231278	N/A	2024/02/21	Jency Sara Johnson
Total Cyanide	SKAL/CN	9231275	2024/02/21	2024/02/22	Jency Sara Johnson
Dissolved Oxygen	DO	9226238	2024/02/16	2024/02/16	Nusrat Naz
Fluoride	ISE	9229304	2024/02/17	2024/02/20	Gurparteek KAUR
Hardness (calculated as CaCO3)		9225491	N/A	2024/02/22	Automated Statchk
Mercury in Water by CVAA	CV/AA	9234630	2024/02/22	2024/02/23	Aswathy Neduveli Suresh
Total Metals Analysis by ICPMS	ICP/MS	9233972	2024/02/22	2024/02/22	Azita Fazaeli
Sulphide (as H2S)	CALC	9233437	N/A	2024/02/25	Automated Statchk
Total Sulphide	SPEC	9240493	N/A	2024/02/24	Ly Vu
Total Ammonia-N	LACH/NH4	9230342	N/A	2024/02/21	Prabhjot Kaur
Total Nonylphenol in Liquids by HPLC	LC/FLU	9227829	2024/02/18	2024/02/20	Dennis Boodram
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	9227831	2024/02/18	2024/02/20	Dennis Boodram
Animal and Vegetable Oil and Grease	BAL	9224498	N/A	2024/02/22	Automated Statchk
Total Oil and Grease	BAL	9233712	2024/02/22	2024/02/22	Navneet Singh
Polychlorinated Biphenyl in Water	GC/ECD	9232258	2024/02/21	2024/02/22	Debashis Saha
Phenols (4AAP)	TECH/PHEN	9229254	N/A	2024/02/20	Chloe Pollock
Field Measured pH	PH	ONSITE	N/A	2024/02/23	Patricia Legette
pH	AT	9227204	2024/02/17	2024/02/20	Gurparteek KAUR
Sulphate by Automated Turbidimetry	SKAL	9227291	N/A	2024/02/21	Massarat Jan
Field Measured pH	PH	ONSITE	N/A	2024/02/23	Patricia Legette
Total Kjeldahl Nitrogen in Water	SKAL	9232109	2024/02/21	2024/02/22	Kruti Jitesh Patel
Total Phosphorus (Colourimetric)	SKAL/P	9232150	2024/02/21	2024/02/21	Muskan
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	9233713	2024/02/22	2024/02/22	Navneet Singh
Total Suspended Solids	BAL	9231040	2024/02/21	2024/02/22	Madhav Somani
Turbidity	AT	9227194	N/A	2024/02/17	Vidhi Khatri
Un-ionized Ammonia	CALC/NH3	9225495	2024/02/23	2024/02/23	Automated Statchk
Volatile Organic Compounds in Water	GC/MS	9228092	N/A	2024/02/20	Gabriella Morrone

Bureau Veritas ID: YKB542 Dup
Sample ID: BH8
Matrix: Water

Collected: 2024/02/15
Shipped:
Received: 2024/02/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9229298	N/A	2024/02/20	Gurparteek KAUR
Carbonaceous BOD	DO	9226884	2024/02/17	2024/02/22	Amrutha Anilkumar
Chromium (VI) in Water	IC	9228792	N/A	2024/02/23	Surleen Kaur Romana
Fluoride	ISE	9229304	2024/02/17	2024/02/20	Gurparteek KAUR
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	9227831	2024/02/18	2024/02/21	Dennis Boodram

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

TEST SUMMARY

Bureau Veritas ID: YKB542 Dup
Sample ID: BH8
Matrix: Water

Collected: 2024/02/15
Shipped:
Received: 2024/02/15

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
pH	AT	9227204	2024/02/17	2024/02/20	Gurparteek KAUR

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C

Revised Report (2024/02/27): PWQO criteria policy has been included in this CofA.

Sample YKB542 [BH8] : Sample was analyzed past method specified hold time for Total Sulphide. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Results relate only to the items tested.

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

			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
9228092	4-Bromofluorobenzene	2024/02/20	99	70 - 130	99	70 - 130	101	%				
9228092	D4-1,2-Dichloroethane	2024/02/20	108	70 - 130	101	70 - 130	105	%				
9228092	D8-Toluene	2024/02/20	101	70 - 130	104	70 - 130	96	%				
9229972	2,4,6-Tribromophenol	2024/02/21	96	10 - 130	100	10 - 130	62	%				
9229972	2-Fluorobiphenyl	2024/02/21	56	30 - 130	73	30 - 130	67	%				
9229972	2-Fluorophenol	2024/02/21	31	10 - 130	49	10 - 130	30	%				
9229972	D14-Terphenyl	2024/02/21	95	30 - 130	96	30 - 130	89	%				
9229972	D5-Nitrobenzene	2024/02/21	59	30 - 130	88	30 - 130	72	%				
9229972	D5-Phenol	2024/02/21	21	10 - 130	33	10 - 130	22	%				
9232258	Decachlorobiphenyl	2024/02/22	75	60 - 130	71	60 - 130	79	%				
9226238	Dissolved Oxygen	2024/02/16							5.4	30		
9226884	Total Carbonaceous BOD	2024/02/22					ND,RDL=2	mg/L	NC	30	96	80 - 120
9227194	Turbidity	2024/02/17			101	80 - 120	ND, RDL=0.1	NTU	0.32	20		
9227204	pH	2024/02/20			102	98 - 103			0.082	N/A		
9227291	Dissolved Sulphate (SO4)	2024/02/21	NC	75 - 125	101	80 - 120	ND, RDL=1.0	mg/L	0.94	20		
9227829	Nonylphenol (Total)	2024/02/21	95	50 - 130	92	50 - 130	ND, RDL=0.001	mg/L	NC	40		
9227831	Nonylphenol Ethoxylate (Total)	2024/02/21	99	50 - 130	99	50 - 130	ND, RDL=0.025	mg/L	NC	40		
9228092	1,1,2,2-Tetrachloroethane	2024/02/20	114	70 - 130	105	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	1,2-Dichlorobenzene	2024/02/20	97	70 - 130	94	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	1,4-Dichlorobenzene	2024/02/20	106	70 - 130	105	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	Benzene	2024/02/20	96	70 - 130	92	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	Chloroform	2024/02/20	107	70 - 130	102	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	cis-1,2-Dichloroethylene	2024/02/20	104	70 - 130	98	70 - 130	ND, RDL=0.50	ug/L	NC	30		
9228092	Ethylbenzene	2024/02/20	96	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	Methyl Ethyl Ketone (2-Butanone)	2024/02/20	122	60 - 140	109	60 - 140	ND, RDL=10	ug/L	NC	30		
9228092	Methylene Chloride(Dichloromethane)	2024/02/20	102	70 - 130	95	70 - 130	ND, RDL=2.0	ug/L	NC	30		
9228092	o-Xylene	2024/02/20	87	70 - 130	90	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	p+m-Xylene	2024/02/20	105	70 - 130	105	70 - 130	ND, RDL=0.20	ug/L	NC	30		

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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
9228092	Styrene	2024/02/20	109	70 - 130	110	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	Tetrachloroethylene	2024/02/20	96	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228092	Toluene	2024/02/20	98	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	0.60	30		
9228092	Total Xylenes	2024/02/20					ND, RDL=0.20	ug/L	NC	30		
9228092	trans-1,3-Dichloropropene	2024/02/20	122	70 - 130	114	70 - 130	ND, RDL=0.40	ug/L	NC	30		
9228092	Trichloroethylene	2024/02/20	98	70 - 130	96	70 - 130	ND, RDL=0.20	ug/L	NC	30		
9228792	Chromium (VI)	2024/02/23	103	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9229254	Phenols-4AAP	2024/02/20	104	80 - 120	100	80 - 120	ND, RDL=0.0010	mg/L	4.7	20		
9229298	Alkalinity (Total as CaCO3)	2024/02/20			95	85 - 115	ND, RDL=1.0	mg/L	1.1	20		
9229304	Fluoride (F-)	2024/02/20	91	80 - 120	96	80 - 120	ND, RDL=0.10	mg/L	NC	20		
9229972	Bis(2-ethylhexyl)phthalate	2024/02/21	94	30 - 130	99	30 - 130	ND, RDL=2.0	ug/L	NC	40		
9229972	Di-N-butyl phthalate	2024/02/21	115	30 - 130	119	30 - 130	ND, RDL=2.0	ug/L	NC	40		
9230232	Dissolved (0.2u) Aluminum (Al)	2024/02/21	101	80 - 120	98	80 - 120	ND,RDL=5	ug/L	NC	20		
9230342	Total Ammonia-N	2024/02/21	93	75 - 125	101	80 - 120	ND, RDL=0.050	mg/L	19	20		
9231040	Total Suspended Solids	2024/02/22			97	80 - 120	ND, RDL=10	mg/L	NC	20		
9231275	Total Cyanide (CN)	2024/02/22	87	80 - 120	108	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
9231278	WAD Cyanide (Free)	2024/02/21	107	80 - 120	112	80 - 120	ND,RDL=1	ug/L	NC	20		
9232109	Total Kjeldahl Nitrogen (TKN)	2024/02/22	98	80 - 120	97	80 - 120	ND, RDL=0.10	mg/L	NC	20	92	80 - 120
9232150	Total Phosphorus	2024/02/21	100	80 - 120	100	80 - 120	ND, RDL=0.004	mg/L	NC	20	106	80 - 120
9232258	Total PCB	2024/02/22	63	60 - 130	64	60 - 130	ND, RDL=0.05	ug/L	NC	40		
9233712	Total Oil & Grease	2024/02/22			99	80 - 110	ND, RDL=0.50	mg/L	0.25	25		
9233713	Total Oil & Grease Mineral/Synthetic	2024/02/22			97	65 - 130	ND, RDL=0.50	mg/L	0.52	25		
9233972	Total Aluminum (Al)	2024/02/22	126 (1)	80 - 120	98	80 - 120	ND, RDL=4.9	ug/L	5.1	20		
9233972	Total Antimony (Sb)	2024/02/22	109	80 - 120	106	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9233972	Total Arsenic (As)	2024/02/22	102	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9233972	Total Cadmium (Cd)	2024/02/22	101	80 - 120	101	80 - 120	ND, RDL=0.090	ug/L	NC	20		

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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
9233972	Total Chromium (Cr)	2024/02/22	99	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9233972	Total Cobalt (Co)	2024/02/22	98	80 - 120	97	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9233972	Total Copper (Cu)	2024/02/22	99	80 - 120	98	80 - 120	ND, RDL=0.90	ug/L	6.6	20		
9233972	Total Lead (Pb)	2024/02/22	98	80 - 120	99	80 - 120	ND, RDL=0.50	ug/L	NC	20		
9233972	Total Manganese (Mn)	2024/02/22	98	80 - 120	97	80 - 120	ND, RDL=2.0	ug/L	1.4	20		
9233972	Total Molybdenum (Mo)	2024/02/22	106	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	0.77	20		
9233972	Total Nickel (Ni)	2024/02/22	97	80 - 120	97	80 - 120	ND, RDL=1.0	ug/L	5.7	20		
9233972	Total Phosphorus (P)	2024/02/22	105	80 - 120	99	80 - 120	ND, RDL=100	ug/L				
9233972	Total Selenium (Se)	2024/02/22	103	80 - 120	105	80 - 120	ND, RDL=2.0	ug/L	NC	20		
9233972	Total Silver (Ag)	2024/02/22	98	80 - 120	98	80 - 120	ND, RDL=0.090	ug/L	NC	20		
9233972	Total Tin (Sn)	2024/02/22	104	80 - 120	102	80 - 120	ND, RDL=1.0	ug/L	NC	20		
9233972	Total Titanium (Ti)	2024/02/22	101	80 - 120	100	80 - 120	ND, RDL=5.0	ug/L	NC	20		
9233972	Total Zinc (Zn)	2024/02/22	100	80 - 120	102	80 - 120	ND, RDL=5.0	ug/L	5.7	20		
9234630	Mercury (Hg)	2024/02/23	104	75 - 125	104	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
9240493	Total Sulphide	2024/02/24	80	80 - 120	97	80 - 120	ND, RDL=0.0018	mg/L				

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) Matrix Spike exceeds acceptance limits, probable matrix interference

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Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
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Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
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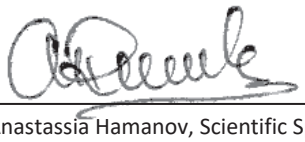
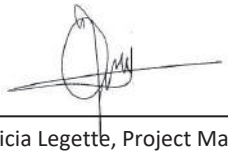
VALIDATION SIGNATURE PAGE

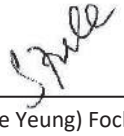
The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Patricia Legette, Project Manager



Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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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

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C NONT-2024-02-1198

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#30554 exp Services Inc	Company Name:	EXP Services Inc	Quotation #:	C31679 Stream
Attention:	Accounts Payable	Attention:	Jeffrey Leon/ Francois Chartier	P.O. #:	PHASE 103 ENV-Rk...
Address:	1595 Clark Blvd Brampton ON L6T 4V1	Address:	ryan.alexander@exp.com	Project:	BRM-23014306-A0
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	Fax:	Project Name:	
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	Jeffrey.leon@exp.com, francois.chartier@exp.com	Site #:	5688 Main St
				Sampled By:	RA

Bottle Order #: 976632 | COC #: C#976632-01-01 | Project Manager: Patricia Legette

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): ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___

Other Regulations: ☐ CCME ☒ Sanitary Sewer Bylaw ☒ Storm Sewer Bylaw ☐ MISA Municipality York ☒ PWQO ☐ Reg 406 Table ☐ Other

Special Instructions:

Include Criteria on Certificate of Analysis (Y/N)? YES

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects
Regular (Standard) TAT: X
(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	ANALYSIS REQUESTED (PLEASE BE SPECIFIC): York Sanitary & Storm Sewer (2021-102)	PWQO Metals and Inorganics	# of Bottles	Comments
1		BHP	24/02/15	12:00	GW	NO	X	X	19	Please include COC in final report
2										
3										
4										
5										
6										
7										
8										
9										
10										

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
RYAN ALEXANDER	24/02/15	18:28	VR VIKRAM	2024/02/15	18:30	

Laboratory Use Only: Time Sensitive | Temperature (°C) on Recei 7/5/6 | Custody Seal Present ☐ Yes ☐ No | 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

ICE: ✓ mailed in

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Job #: C448209
Report Date: 2024/02/27

exp Services Inc
Client Project #: BRM-23014306-A0
Site Location: 5688 MAIN ST
Your P.O. #: ENV-BRM
Sampler Initials: RA

Exceedance Summary Table – Prov. Water Quality Obj.

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH8	YKB542-13	Total Cobalt (Co)	0.9	4.2	0.50	ug/L
BH8	YKB542-14	Total Phosphorus	0.01	0.063	0.004	mg/L
BH8	YKB542-15	Total Sulphide	0.002	0.0068	0.0018	mg/L
BH8	YKB542-15	Sulphide (as H2S)	0.002	0.0072	0.0020	mg/L

Detection Limit Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH8	YKB542-01	Bis(2-ethylhexyl)phthalate	0.6	<2.0	2.0	ug/L
BH8	YKB542-02	Nonylphenol (Total)	0.00004	<0.001	0.001	mg/L
BH8	YKB542-13	Total Phosphorus (P)	10	<100	100	ug/L
BH8	YKB542-04	Total PCB	0.001	<0.05	0.05	ug/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.

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Appendix E – Infiltration Tests

Location:	5688 Main Steet Stoufville
Date:	28-Mar-24
Weather:	Overcast
Analyst:	RA

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)**
INF Test 1	10.548	10.254	0.0	87.9	87.90	0.3	299.0	0.4983	0.104	4.160	0.022	0.017	1.4857	0.00093	0.019882015	0.0	1.3E-08	1.3E-06
INF Test 2	10.548	10.458	0.0	44.2	44.18	0.1	490.8	0.8181	0.105	4.201	0.022	0.018	1.4950	0.00093	0.033132851	0.0	7.8E-09	7.8E-07
INF Test 7	10.575	10.251	0.0	10.2	10.18	0.3	31.4	0.0523	0.104	4.165	0.022	0.017	1.4868	0.00093	0.002092071	0.4	1.2E-07	1.2E-05

5688 Main St
BRM-23014306-A0
Low Impact Design (LID) Calculations for Infiltration Gallery

Test Location	Hydraulic Conductivity (K_{fs}) (m/s)	Hydraulic Conductivity (K_{fs}) (cm/s)	Infiltration Rate (IR) (mm/hr)	Discrete Design Infiltration Rate(DIR) (mm/hr)	Percolation Time (min/cm)
INF Test 1	1.3E-08	1.3E-06	14	6	104
INF Test 2	7.8E-09	7.8E-07	13	5	119
INF Test 7	1.2E-07	1.2E-05	26	11	57

Geology Units	Geometric Mean of K_{fs} (m/s)	Geometric Mean of K_{fs} (cm/s)	Infiltration Rate (I) (mm/hr)*	Ratio of Mean Measured Infiltration Rates	Safety Correction Factor (SCF)
Overlying Geology Unit	2.32E-08	2.32E-06	17	1.0	2.5
Underlying Geology Unit (1.5 m below the bottom of trench)	2.32E-08	2.32E-06	17		

Design Infiltration Rate(DIR) (mm/hr)	Minimum	5	**Percolation Time (min/cm)**	57
	Maximum	11		119
	Geometric Mean	**7**		**89**

Note:
Analytical Solutions (CVC and TRCA 2010)

$$Infiltration\ Rate\ (IR) = \left(\frac{K_{fs}}{6x10^{-11}}\right)^{\frac{1}{3.7363}}$$
$$Design\ Infiltration\ Rate\ (DIR) = \frac{IR}{SCF}$$

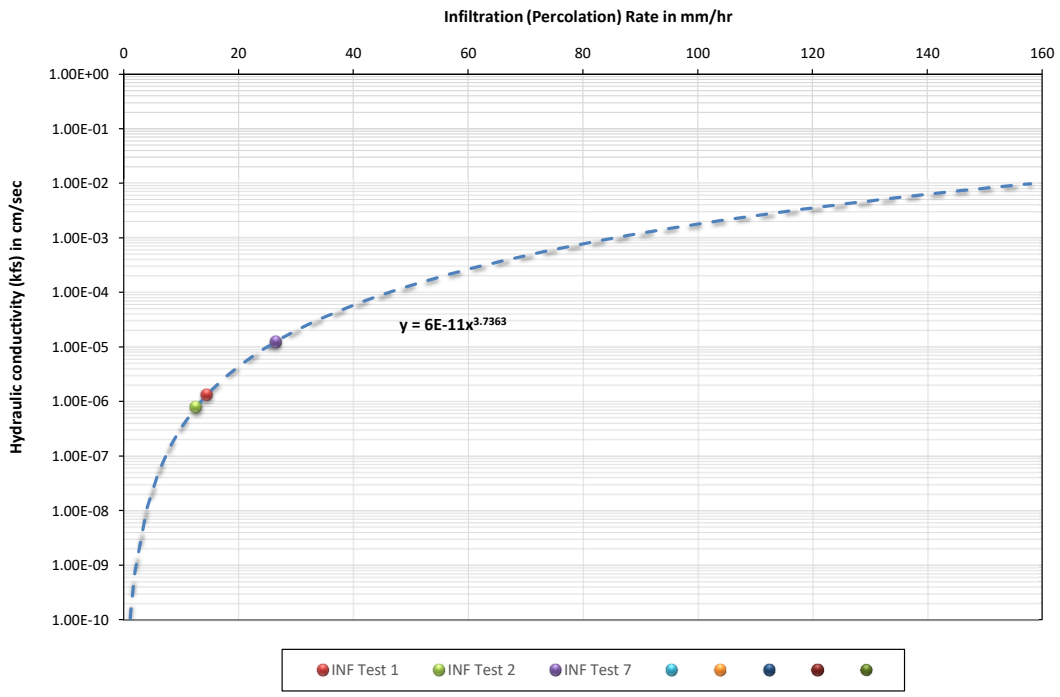
Kfs: hydraulic conductivity (cm/sec)

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)

Figure : Approximate relationship between infiltration rate and hydraulic conductivity (LID SWM planning and Design Guide, Appendix C1)



Appendix F – Water Balance

Appendix F-1: Model Input

5688 Main Street, Stouffville, Ontario
BRM-23014306-A0

Period	Month	Average Temperature (^{0}C)	Average Precipitation (mm)
1977-2006	1	-6.53	64.18
1977-2006	2	-5.37	53.93
1977-2006	3	-0.30	60.72
1977-2006	4	6.80	71.86
1977-2006	5	13.36	80.25
1977-2006	6	18.40	79.44
1977-2006	7	21.33	82.17
1977-2006	8	20.27	89.08
1977-2006	9	15.80	88.57
1977-2006	10	8.95	70.99
1977-2006	11	3.09	85.61
1977-2006	12	-2.90	70.57

Note:

Station Name	RICHMOND HILL	
Station ID	6157012	
Longitude	-79.45	
Latitude	43.88	
Elevation	240.0	masl

Appendix F-2: Model Output

5688 Main Street, Stouffville, Ontario
BRM-23014306-A0

Month	PET	P	P-PET	Soil Moisture	AET	PET-AET	Snow Storage	Surplus
January	8.40	64.18	17.62	195.91	8.34	0.05	64.58	16.73
February	10.27	53.93	27.12	198.02	10.27	0.00	81.15	25.02
March	20.11	60.72	58.55	200.00	20.11	0.00	63.21	56.57
April	38.81	71.86	64.65	200.00	38.81	0.00	31.60	64.65
May	72.80	80.25	23.42	195.49	72.80	0.00	15.64	27.94
June	105.34	79.44	-17.39	170.06	104.68	0.65	7.14	8.70
July	124.90	82.17	-37.05	136.16	117.54	7.34	1.47	4.20
August	99.41	89.08	-8.86	127.97	90.91	8.51	0.00	7.82
September	57.61	88.57	30.96	145.83	56.53	1.08	0.00	14.19
October	29.82	70.99	41.17	169.07	29.59	0.23	0.00	18.16
November	15.41	85.61	69.04	191.17	15.41	0.00	1.16	46.93
December	9.63	70.57	35.69	196.63	9.63	0.00	26.40	30.23
Annual rate (mm/yr)	**592.51**	**897.37**			**574.62**		**292.35**	**322.75**

Note:

Station Name	RICHMOND HILL	
Station ID	6157012	
Longitude	-79.45	
Latitude	43.88	
Elevation	240.0	masl

APPENDIX F-3
Average Infiltration Factors

5688 Main Street, Stouffville, Ontario
BRM-23014306-A0

F-3-1. Average Infiltration Factor – Pre Development Conditions

Un-Mitigated

Category	Weighted Infiltration Factor
Topography/Slope	0.14
Soil Type Glaciolacustrine deposits (Silty to Clayey)	0.20
Cover Landscaped Areas	0.10
Total weighted Infiltration factor	**0.44**

F-3-2. Average Infilteration Factor – Post Development Conditions

Un-Mitigated

Category	Weighted IInfiltration Factor
Topography/Slope	0.140
Soil Type Glaciolacustrine deposits (Silty to Clayey)	0.20
Cover Landscaped areas	0.10
Total weighted Infiltration factor	**0.44**

Notes:
Landscaped area considered equivalent to Cultivated Cover
Assumed existing and proposed slopes are similar

Appendix F-4
Summary of Pre and Post-Development Water Balance

5688 Main Street, Stouffville, Ontario
BRM-23014306-A0

E-4-1. Climate Data

Item	Pre-Development mm/a		Post-Development mm/a
Precipitation	897.37		897.37
Evapotranspiration	574.62		574.62
Water Surplus	322.75		322.75
Infiltration Rate	142.01		142.01
Runoff	180.74		180.74

E-4-2. Pre-Developed Area Statistics

Existing Buildings	700	sq.m.	17.5%
Paved Surfaces	1,200	sq.m.	30.0%
Landscapes	2,100	sq.m.	52.5%
TOTAL	4,000	sq.m.	100%

E-4-3. Post Development Area Statistics
Commercial Development

Building Roofs	2,100	sq.m.	52.5%
ROW (roads, sidewalks, parking) - Paved	1,100	sq.m.	27.5%
Open Areas/Landscaped Areas	800	sq.m.	20.0%
TOTAL	4,000	sq.m.	

E-4-4-1. 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.)
Total Impervious (Buildings and paved surfaces)	1,900	1,705	1,092	0	613
Open Spaces	2,100	1,884	1,207	298	380
TOTAL	4,000	3,589	2,298	298	993
	Pre-development Infiltration Rate		**574.62**	**74.56**	**248.19**
		100	64	8	28

E-4-5-1. Annual Post-Development Water Balance

Land Use	Area (sq.m.)	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Infiltration Rate (cu.m.)	Run-off (cu.m.)
Building Roofs	2,100	1,884	**0**	**0**	1,884
ROW (roads, sidewalks, parking) - Paved	1,100	987	0	0	987
Landscaped Areas	800	718	460	114	145
TOTAL	4,000	3,589	460	114	3,016
	Post-development Infiltration Rate		**114.92**	**28.40**	**754.04**
		100.0	12.8	3.2	84.0

E-4-6-1. Comparison of Pre-Development and Post-Development

Item	Precipitation (cu.m.)	Actual Evapotranspiration (cu.m.)	Run-off (cu.m.)	Infiltration Rate (cu.m.)
Pre-Development	3,589	2,298	993	298
Post Development	3,589	460	3,016	114
			Pre-development Infiltration Rate (mm/a)	**74.6**
			Post-development Infiltration Rate (mm/a)	**28.4**
			Deficit Post Development (cu.m/a)	**185**

APPENDIX F-5

5688 Main Street, Stouffville, Ontario

BRM-23014306-A0

Estimate of Area for Infiltration System

1. Design Infilteration Rate

Item	Value	Unit
Geometric mean of design infiltration rates	7	mm/h
	168.00	mm/day
	0.17	m/day/m^2
	0.34	m/48 hrs/m^2

2. Climate Data

Total precipitation based on weather station records	897.37	mm/yr
Total rain in an eight (8) month precipitation period	598.25	mm/8 months
Based on a 16-week precipitation period	37.39	mm/2 week
Based on a 16-week precipitation period	0.037	m/2 weeks

3. Roof and Resulted Runoff Volume

Total roof area	2,100	m^2
Rooftop runoff volume in an eight (8) month precipitation period	1,256	m^3/year
Total rooftop runoff volume per 2 week	79	m^3/2 week

4. Estimated Deficit Volume

Estimated deficit based on water balance calculations	185	m^3/yr
Deficit over available water (roof runoff) for infiltration	15%	-
Min. Storage to infiltrate to meet deficit	11.54	m^3/2 week
mm Retention	2.9	mm

Area of infiltration system required to mitigate infiltrate deficit (rounded)	**35**	m^2
% of total site area	**1%**	

Note: only roof water to be infiltrated (clean water)

Appendix G – ST and LT Dewatering

APPENDIX G: Dewatering Flow Rates

5688 Main Street Stoufville
BRM-23014306-A0

Table G-1: Construction and Post Construction Dewatering Assessments

Parameters	Symbols	Unit	Construction	Post Construction
Number of Underground Level		-	**2**	**2**
Ground Elevation	-	mASL	**262.22**	**262.22**
Highest Groundwater Elevation	-	mASL	**262.20**	**262.20**
Lowest Top Slab Elevation	-	mASL	**254.55**	**254.55**
Lowest Foundation Invert Elevation	-	mASL	**253.05**	-
Height of Static Water Table Above the Base Aquifer	**H**	m	12.20	12.20
Dewatering Target Elevation	-	mASL	252.05	254.05
Height of Target Water Level Above the Base Aquifer	**h_w**	m	2.05	4.05
Drawdown	**s**	m	10.15	8.15
Dupuit Check (> 45%)		m	17%	33%
Base of Aquifer / Water Bearing Zone	-	mASL	**250.00**	**250.00**
Hydraulic Conductivity	**K**	m/s	**3.4E-05**	**3.4E-05**
Length of Excavation	-	m	**105.00**	**105.00**
Width of Excavation	-	m	**36.00**	**36.00**
Equivalent Radius (equivalent perimeter)	**r_e**	m	44.88	44.88
Method to Calculate Radius of Influence	-	-	**Cooper-Jacob**	**Cooper-Jacob**
Time (days)			**30.00**	**365.00**
Time (seconds)	**t**	s	2592000	31536000
Specific Yield	**Sy**		**0.15**	**0.15**
Cooper-Jacob's Radius of Influence	**Rcj**	m	127.00	443.00
Radius of Influence	**Ro**	m	171.88	487.88
Dewatering Flow Rate (unconfined radial flow)	**Q**	m^3/day	**994.21**	**512.32**
Factor of Safety	**fs**	-	2.00	1.50
Dewatering Flow Rate (multiplied by factor of safety)	**Q.fs**	m^3/day	**1988**	**768**
Precipitation Event	-	mm/day	25	-
Volume from Precipitation (15 mm)	-	m^3/day	95	-
Total Volume (L/day) **with Safety Factor** (with precipitation)	-	m^3/day	**2083**	**-**
Total Volume (L/day) **without Safety Factor** (with precipitation)	-	m^3/day	**1089**	**-**

Precipitation Event 2 year storm (57.8 mm)	-	m^3/day	218.484
Precipitation Event 100 year storm (126.8 mm)	-	m^3/day	479.304

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)

$$r_e = \frac{a+b}{\pi} \qquad R_o = R_{cj} = \sqrt{2.25KDt/S}$$

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)

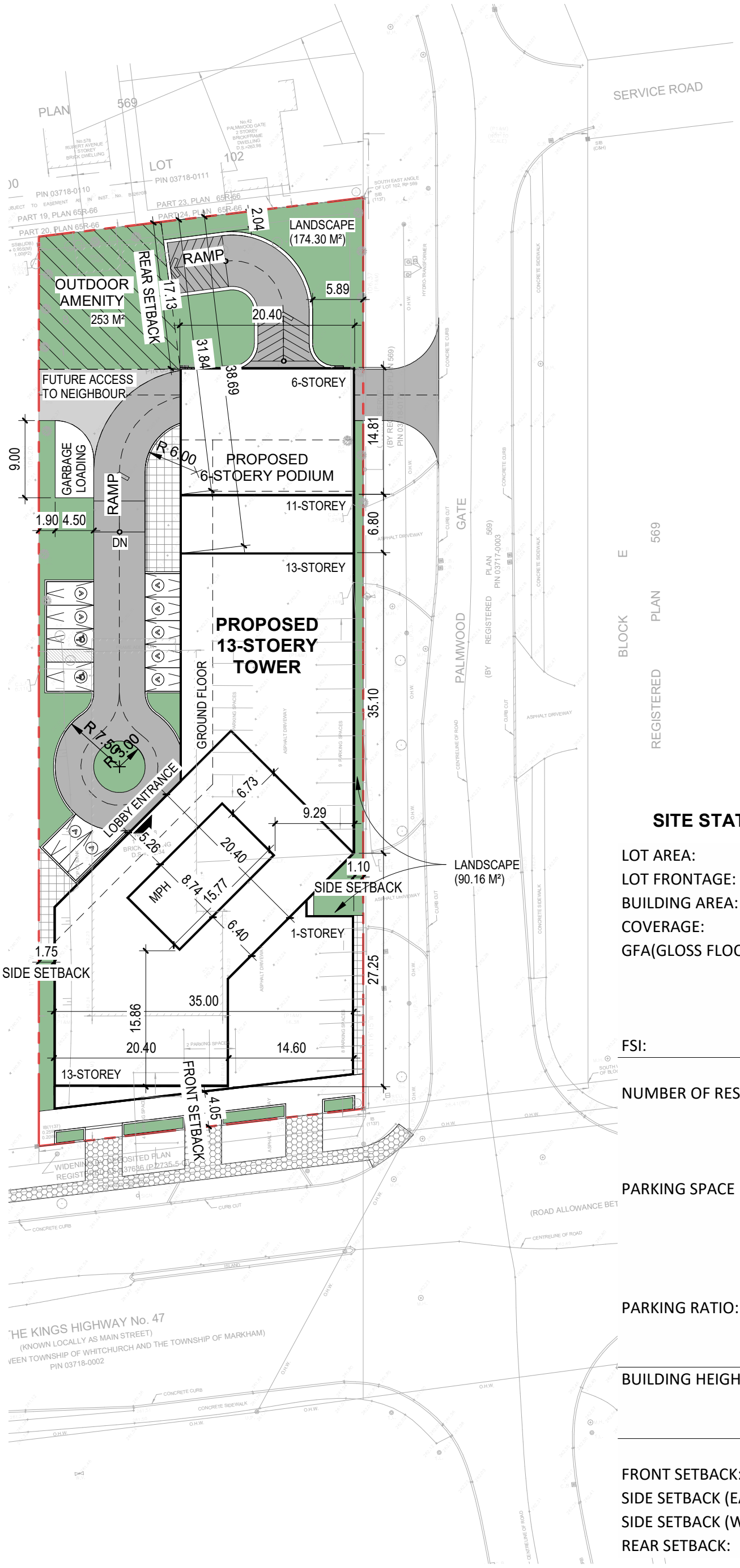
h_w = Height of target water level above the base of water-bearing zone (m)

Rcj=Cooper Jacob Radius of Influence (m)

R_o=Radius of influence (m)

re=Equivalent perimeter (m)

Appendix H – Architectural Drawings



SITE STATISTICS

LOT AREA:	4,021.77 M²	(0.99 Acres)
LOT FRONTAGE:	37.85 M	
BUILDING AREA:	2,098.42 M²	(22,587.94 F²)
COVERAGE:	52.18%	
GFA(GLOSS FLOOR AREA):	20,276.10 M²	(218,257.25 F²)
COMMERCIAL AREA:	610.92 M²	(6,576.10 F²)
RESIDENTIAL AREA:	19,665.18 M²	(211,681.15 F²)
•INDOOR AMENITY:	332.53 M²	(3,579.44 F²)
FSI:	5.04	
NUMBER OF RESIDENTIAL UNITS:	254	
1 BEDROOM UNITS:	68	(26.77%)
2 BEDROOM UNITS:	150	(59.06%)
3 BEDROOM UNITS:	36	(14.17%)
PARKING SPACE NUMBER:	281	
SURFACE:	11	
MEZZANINE:	63	
UNDERGROUND P1:	102	
UNDERGROUND P2:	105	
PARKING RATIO:	1.11	(PARKING/UNIT)
•VISITOR PARKING:	35	
•ACCESSIBLE PARKING:	4	(TYP. A X2 & TYP. B X2)
BUILDING HEIGHT:	45.00 M	(13 STOREYS)
PODIUM:	6	STOREYS
MID-RISE:	7	STOREYS
FRONT SETBACK:	4.05 M	
SIDE SETBACK (EAST):	1.10 M	
SIDE SETBACK (WEST):	1.75 M	
REAR SETBACK:	17.13 M	

Drawing No.

A- 001

SITE PLAN

Date	Issue Date	Checked
Scale	1 : 500	Drawn
Project No.		T2022062

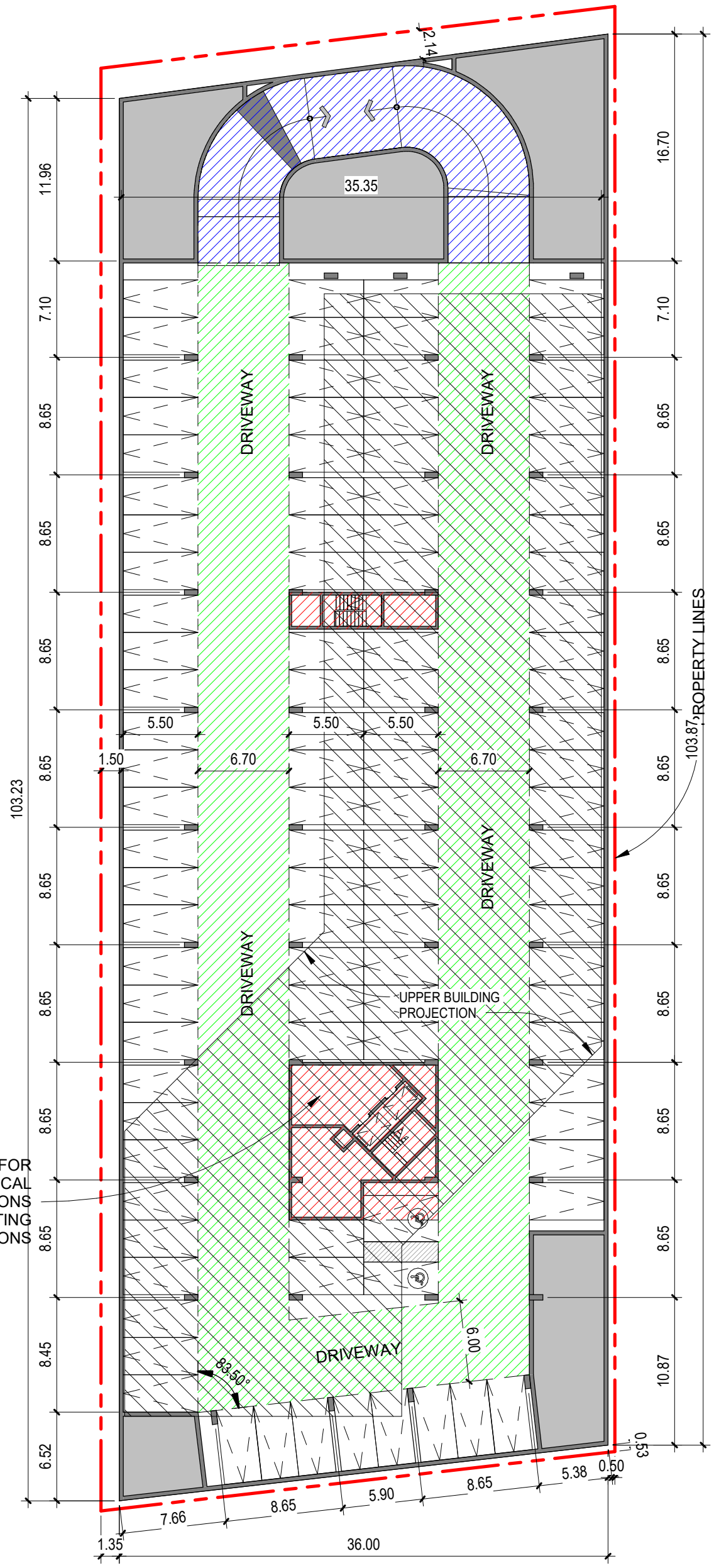
CONDOMINIUM

5688 MAIN STREET

Whitchurch-Stouffville, ON

TAES Architects Inc.
98 SCARSDALE ROAD,
TORONTO, ONTARIO, M3B 2R7
T: 416 800 3284
F:416 800 3485

No.	Issues	Date	By
1	Pre-Consultation	2022-12-15	



P1: 102 PARKING SPACES
P2: 105 PARKING SPACES

*** SUBSEQUENT MEP REQUIREMENTS WILL LOSE SOME PARKING SPACES.**

Drawing No.

A- 101

UNDERGROUND P1

Date	Issue Date	Checked
Scale	1 : 350	Drawn
Project No.		T2022062

CONDOMINIUM

5688 MAIN STREET

Whitchurch-Stouffville, ON

TAES Architects Inc.
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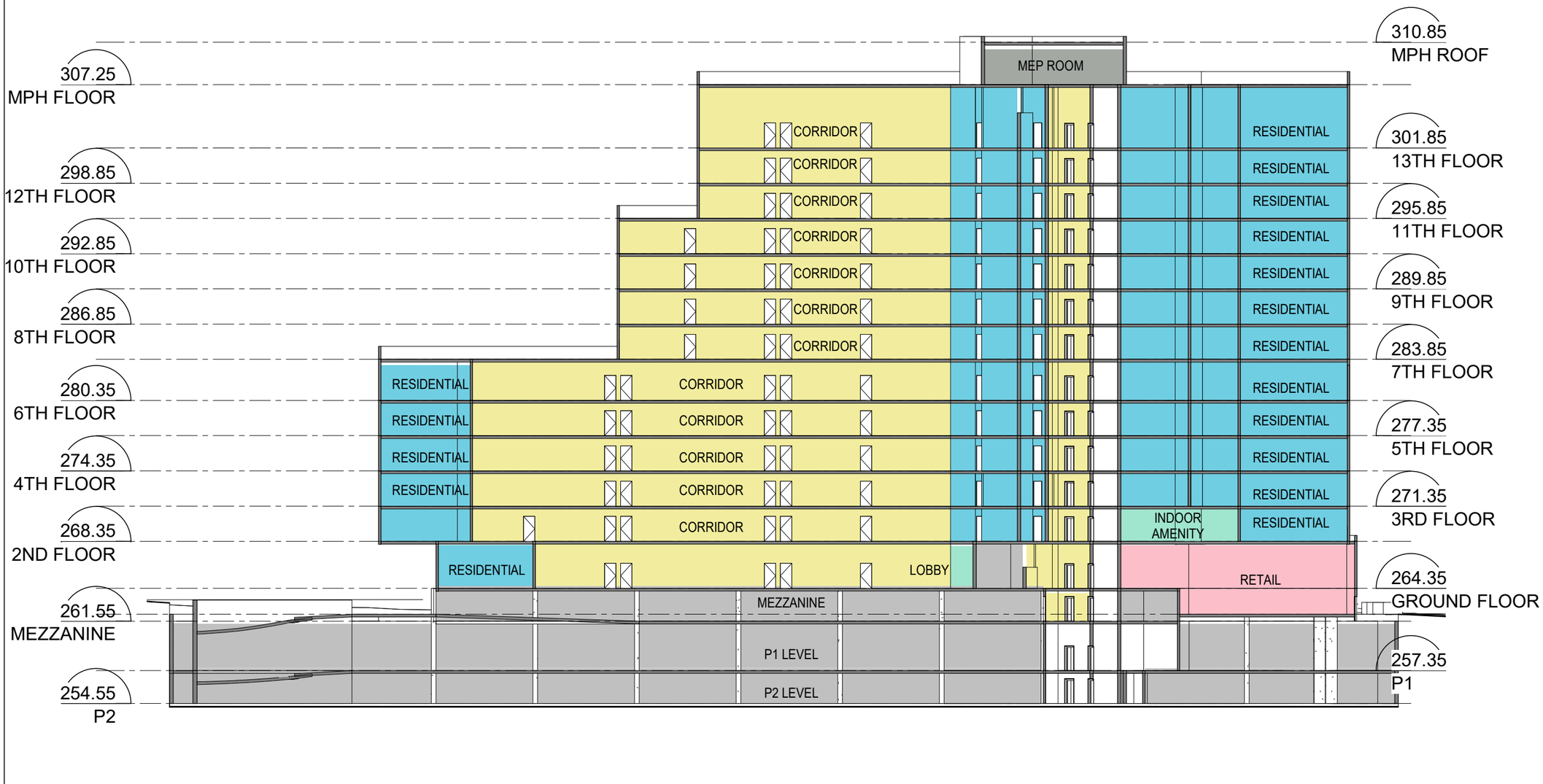
T: 416 800 3284
F:416 800 3485

No.	Issues	Date	By
1	Pre-Consultation	2022-12-15	



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Whitchurch-Stouffville, ON

TAES Architects Inc.
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SECTION 1

Date	Issue Date
Scale	1 : 350
Project No.	T2022062
	Checked
	Drawn

Drawing No.

A- 301