



B.I.G.
CONSULTING
INC.

ADDITIONAL **HYDROGEOLOGICAL** **INVESTIGATION**

166 South Service Road East, Oakville, Ontario

Client

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Project Number

BIGC-ENV-457B

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1 Introduction

1.1 Project Description

B.I.G. Consulting Inc. (BIG) was retained by 166 South Service Inc. (the Client), to update the previous Preliminary Hydrogeological Investigation, conducted by BIG to support the proposed development of the site located at 166 South Service Road East, Oakville, Ontario (Site). A previous report titled, "Preliminary Hydrogeological Investigation, 166 South Service Road East, Oakville, Ontario," was prepared by BIG on June 28, 2021. The earlier field investigations remain valid following design updates.

The Site is located south of South Service Road East in Oakville, Ontario, as show on Figure 1. The Site measures approximately 11,900 m² in size and is currently occupied by a single-storey commercial building (Site building). The areas surrounding the Site building are covered with asphalt and landscaped areas.

It is BIG's understanding that the proposed re-development at the Site will consist of three (3) condominium towers (Tower 1: 51-Storey, Tower 2: 55 Storey & Tower 3: 49 Storey interconnected with 5-Storey Podiums) with seven (7) levels of undergrounding parking structure.

The following investigations previously completed for the subject Site was reviewed by BIG:

- Preliminary Geotechnical Report, 166 South Service Road East, Oakville, Ontario, dated May 2021, prepared by BIG.

This report addresses the hydrogeological aspects of the proposed project. Reports for the Additional Geotechnical Investigation, Phase One and Phase Two Environmental Site Assessments will be issued under separate covers. The field investigation for the geotechnical, environmental and hydrogeological investigations was carried out concurrently.

It should be noted that no design details were provided to BIG during this investigation. Once the design is available, BIG needs to review and re-evaluate the dewatering estimates. If the footing or foundation elevation is deeper than the assumptions in this report, additional investigation will be required. In addition, upon completion of the on-Site building demolition activities we would need to drill additional boreholes for proper Site coverage.

1.2 Project Objectives

The main objectives of the Hydrogeological Investigation were to:

- a) Establish the local hydrogeological settings of the Site
- b) Re-assessment of potential construction dewatering flow rates;
- c) Re-assessment of foundation sub-drain discharge volumes, if applicable;
- d) Prepare an updated Hydrogeological Investigation Report.

1.3 Scope of Work

The previous Preliminary Hydrogeological investigation conducted by BIG in June 2021 consisted of the advancement of ten (10) boreholes (BH1 to BH10) to maximum depth of 23.5 m below ground, and installation of six (6) monitoring wells (BH/MW1, BH/MW2, BH/MW4, BH/MW6, BH/MW8 and BH/MW10) to investigate the subsurface groundwater conditions, performing single well response tests (SWRT) at selected existing monitoring wells to assess the hydraulic characteristics at the Site, collection of one (1) groundwater sample for laboratory testing and compared against the Regional Municipality of Halton and Town of Oakville Storm and Combined/Sanitary Sewer Use By-Law parameters.

To achieve the investigation objectives, BIG proposed and initiated the following scope of work:

- a) Background desktop review of pertinent geological and hydrogeological resources;
- b) Review of the Ministry of Environment, Conservation and Parks (MECP) Water Well Records;
- c) Advancement of six (6) boreholes (BH201 to BH206) to a maximum depth of 31.2 m bgs and installation of monitoring wells (BH/MW201 to BH/MW206);
- d) Perform single well response tests (SWRT) at selected monitoring wells to assess the hydraulic characteristics of the bedrock at the Site;
- e) Complete groundwater level measurements at monitoring wells;
- f) Evaluate the information of groundwater level measurements;
- g) Re-assessment of groundwater discharges during construction phases;
- h) Re-assessment of foundation sub-drain discharge volumes, if applicable; and,
- i) Prepare an updated Hydrogeological Investigation Report.

1.4 Previous Reports

1.4.1 BIG Preliminary Geotechnical Report

BIG completed a Preliminary Geotechnical Investigation at the Site, dated May 2021, that consisted of advancement of ten (10) boreholes (BH1 to BH10) to a maximum depth of 23.5 m bgs and installation of six (6) monitoring wells (BH/MW1, BH/MW2, BH/MW4, BH/MW6, BH/MW8 and BH/MW10).

2 Regional Setting

2.1 Regional Physiography

The Ontario Geological Survey Map P. 2204, indicates the Site lies in the Iroquois Plain physiographic region of Southern Ontario known as the shale plains. Figure 2 shows the physiographic regions of Southern Ontario around the Site.

During the last retreat of the Laurentide Ice Sheet (12,000 years B.P.) lake levels in what was to become Lake Ontario were much higher due to ice blockage in the St. Lawrence waterway. This created the glacial Lake Iroquois which was up to 60 m higher in elevation in the Toronto area than the current Lake Ontario water levels. The Iroquois Shoreline that coincided with this elevated lake, terminated just above St. Clair Avenue West.

2.2 Regional Geology

The surficial geology of the immediate area around the Site is described as Paleozoic bedrock. The surficial geology for the Site and surrounding areas is shown on Figure 3.

Bedrock of the region corresponds to the Georgian Bay Formation, Blue Mountain Formation, Billings Formation, Collingwood Member and Eastview Member consisting of shale, limestone, dolostone and siltstone. The contact between the bedrock and the overlying overburden is expected to be at approximately 3 m bgs.

2.3 Regional Hydrogeology

Groundwater movement through the subsurface is controlled by hydraulic gradients, the physical characteristics of the sediments, and the interconnectedness of lithological formations. Fine grained sediments restrict lateral movement of groundwater and induce vertical infiltration, while coarse grained sediments allow vertical flow with increased transmissivity.

The regional shallow groundwater flow is expected to follow the local topography and discharge to local area creeks and streams. Local deviation from the regional groundwater flow directions may occur in response to changes in topography and/or soil stratigraphy, as well as the presence of surface water features and/or existing subsurface infrastructure.

No local aquifers were identified that could negatively impact the subject Site.

3 Site Setting

3.1 Site Topography and Drainage

The Site is rectangular in shape and has an area of approximately 11,900 m². The Site is currently occupied by a single-storey commercial building (Site building). The areas surrounding the Site building are covered with asphalt and landscaped areas. The topography of the Site generally slopes to the south/southeast and based on the borehole logs, the ground elevation ranges between 105.80 m and 104.63 m above sea level (asl). Precipitation that falls on the Site is inferred to predominantly be directed to the drainage ditch located north of the Site running along South Service Road East and nearby Town of Oakville catch basins.

3.2 Local Surface Water Features

The Site does not feature any surface water bodies on the Site. The closest surface water body to the Site is Sixteen Mile Creek, located approximately 330 m southwest of the Site. The Site is situated within the Lower Morrison Creek watershed and is not part of a Conservation Halton regulated area.

3.3 Ministry of Environment, Conservation and Parks Water Well Review

Well Records from the Ministry of Environment, Conservation and Parks (MECP) Water Well Record Database (WWR) were reviewed to determine the number of water wells and locations present within a 500 m radius of the Site boundaries.

The MECP WWR database indicated 51 well records within 500 m radius of the Site. All identified wells are shown on Figure 4. A summary of the Water Well Records is included in Appendix B, Table B-1. A review of the records indicated that the majority of the wells were classified for observation well, monitoring well and test hole purposes within 500 m radius of the Site. One (1) supply water well was identified at the Queen Elizabeth Way, located approximate 100 m southwest of the Site. The well was installed in 1948, and the well is located in a developed area, the supply well is likely not present. Given the area is serviced by municipal system, no private well water user is expected.

3.4 Permit to Take Water and Environmental Activity and Sector Registry Search

The MECP also maintains a database of all active and expired Permit to Take Water (PTTW) and Environmental Activity and Sector Registry (EASR) items related to construction dewatering and pumping test. There are eight (8) expired PTTW and two (2) active EASR registrations within 1 km of the Site and are summarized in Table B-2, Appendix B. The location for each registration is shown on Figure 5.

4 Field Program

4.1 Borehole and Monitoring Well Details

BIG advanced six (6) boreholes (BH201 to BH206) to a maximum depth of 31.2 m bgs between April 27 and May 10, 2022 and instrumented six (6) boreholes with monitoring wells (BH/MW201 to BH/MW206). The boreholes were advanced by using a truck mounted solid stem continuous flight auger equipment under the direction and supervision of BIG field personnel. Soil samples were retrieved at regular intervals with a 50 mm outside diameter split barrel sampler drive and accordance with the Standard Penetration Test Procedure (ASTM D1586). The samples were logged in the field and returned to the BIG laboratory for detailed visual examination. The borehole records and monitoring well construction detail are included in Appendix A.

The following monitoring wells were previously installed at the Site:

- a) Six (6) monitoring wells (BH/MW1, BH/MW2, BH/MW4, BH/MW6, BH/MW8 and BH/MW10) installed at the Site by BIG in 2021.

Figure 6 is a detailed Borehole/Monitoring Well Location Map of the Site. The borehole logs are attached in Appendix A.

4.2 Site Specific Overburden Geology

The borehole locations are shown on Figure 6 and detailed subsurface conditions are presented on the borehole logs in Appendix A. The following table is provided in addition to the borehole descriptions to provide a general summary of the soil conditions. The soil descriptions are predominately based on BIG's investigation, however, where applicable soil conditions encountered during previous investigation by others are included. The soil boundaries indicated on the borehole logs and discussed herein are inferred from the visual observations and auger resistance and should not be regarded as exact planes of geological change.

The soil conditions encountered at the borehole locations are summarized below. A stratigraphic cross-section across the property as aligned on Figure 6 is included as Figure 7.

Table 4-1: Soil description

Layer	Description
Ground Cover	Three (3) boreholes BH/MW201 to BH/MW203 were advanced through the existing asphalt pavement consisting approximately 60 to 70 mm thick asphalt concrete over 130 to 200 mm thick granular bases. Similarly, remaining three (3) boreholes BH/MW204 to BH/MW206 were advanced through approximately 100 to 150 mm thick topsoil.
Fill	Below the ground surface cover, existing fill generally consisting of clayey silt with trace to some sand and gravel was encountered in all boreholes that extended to depths varying between 0.6 and 1.5 m bgs. Existing fill also contained trace rootlets.
Clayey Silt Till	Below existing fill in all boreholes, a native glacial deposit of clayey silt till was encountered that extended to depths varying between 2.3 and 3.4 m bgs. Clayey silt till deposit also contained trace to some sand and trace gravel. Occasional Shale fragments were also encountered within this deposit.
Shale Bedrock	Below clayey silt till deposit in all borehole locations, a highly weathered reddish brown and/or grey Shale bedrock was encountered that extended to the maximum termination depth at 31.2 m bgs.

4.3 Water Level Monitoring

Water levels at all monitoring well locations were recorded after installation. A summary of all available water level observations is included in Table 4-2. Groundwater was observed in all monitoring wells on May 31, 2022 and depths to the groundwater ranged from 2.59 m to 18.66 m bgs. The shallow wells BH/MW2, BH/MW6 and BH/MW8 were observed with groundwater elevations that ranged from 103.04 m to 101.69 m asl. The deep wells, BH/MW10 and BH/MW201 to BH/MW206 were observed with groundwater elevations that ranged from 87.34 m to 86.67 m asl.

An interpreted shallow groundwater contour map for the water level measurements recorded on May 31, 2022 is included as Figure 8. An interpreted deep groundwater contour map for the water level measurements recorded on May 31, 2022 is included as Figure 9. Based on the water level measurements obtained, the inferred direction of shallow groundwater flow across the Site is interpreted to be to the northeastern direction, and the inferred direction of deep groundwater flow across the Site is interpreted to be to the southwestern direction.

Seasonal variability can produce significant changes to the static water level. It has been observed that groundwater can rise and lower in response to changing weather and climate.

Table 4-2: Monitoring Well Details and Water Levels Elevations

Well ID	Ground Elevation (m asl)	Well Depth (m bgs)	May 4, 2021		May 31, 2022	
			Water Level (m bgs)	Elevation (m asl)	Water Level (m bgs)	Elevation (m asl)
BH/MW1	104.79	12.2	6.25	98.54	6.09	98.70
BH/MW2	104.63	6.1	2.64	101.99	2.94	101.69
BH/MW4	105.59	12.2	3.46	102.13	3.42	102.17
BH/MW6	105.66	6.1	3.39	102.27	3.30	102.36
BH/MW8	105.63	6.1	3.01	102.62	2.59	103.04
BH/MW10	105.44	21.3	18.28	87.16	18.48	86.96
BH/MW201	105.77	24.4	-	-	18.59	87.18
BH/MW202	105.67	24.4	-	-	18.66	87.01
BH/MW203	105.55	20.1	-	-	18.21	87.34
BH/MW204	105.26	24.4	-	-	18.59	86.67
BH/MW205	105.00	27.4	-	-	18.27	86.73
BH/MW206	104.66	22.9	-	-	17.78	86.88

4.4 Hydraulic Conductivity Testing

The hydraulic conductivity test was completed to estimate the saturated hydraulic conductivity (K) of the soil at the well screen depth at selected monitoring well locations.

In advance of performing SWRT, the monitoring well was developed to remove the potential presence of fine sediments. The development process involved purging of the monitoring wells to induce the flow of fresh formation water through the screen. The monitoring well water level was permitted to fully recover prior to performing SWRTs.

During the SWRT, a slug of water was instantaneously removed from the well and the response to the water level is recorded. The Hydraulic Conductivity values for each of the tested wells were calculated from the SWRT data using Aqtesolv Software and the Hvorslev solution for unconfined conditions. The semi-log plots for normalized drawdown versus time are included in Appendix C.

The summary of the hydraulic conductivity (K) values estimated from the SWRTs are provided below in Table 4-3:

Table 4-3: Summary of Hydraulic Conductivity (K) Testing Results

Monitoring Well	Well Depth (m bgs)	Hydraulic Conductivity (m/s)
BH/MW1	12.2	1.06×10^{-7}
BH/MW2	6.1	7.79×10^{-7}
BH/MW4	12.2	8.13×10^{-8}
BH/MW6	6.1	2.13×10^{-6}
BH/MW8	6.1	1.79×10^{-6}
BH/MW10	21.3	6.47×10^{-7}
BH/MW201	24.4	2.18×10^{-7}
BH/MW202	24.4	3.22×10^{-8}
BH/MW203	20.1	1.02×10^{-5}
BH/MW204	24.4	2.29×10^{-6}
BH/MW205	27.4	1.06×10^{-7}
BH/MW206	22.9	3.02×10^{-8}
Geometric mean K value (m/s)		3.79×10^{-7}

The SWRT provides an estimate of K for the geological formation in the immediate media zone surrounding the well screen and may not be representative of bulk formation hydraulic conductivities.

4.5 Groundwater Sampling

To assess the suitability for discharge of pumped groundwater to the Region of Halton Sanitary or Town of Oakville Storm Sewer during dewatering activities, a groundwater sample was collected from BH/MW1 on May 5, 2021.

Prior to collection of the samples, approximately three (3) standing well volumes of groundwater were purged from the well. The sample was collected and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required.

The sample was not field filtered. Dedicated nitrile gloves were used during sample handling. The groundwater sample was submitted to an independent laboratory, Bureau Veritas Laboratories, of Mississauga, Ontario, for analysis.

For the assessment purposes, the analytical results were compared to Table 1 – Limits for Sanitary and Combined Sewer Discharge (By-Law No. 2-03) of the Regional Municipality of Halton; and Table 2 – Limits for Storm Sewer Discharge (By-Law No 2009-031) of the Corporation of the Town of Oakville.

The laboratory Certificate of Analysis (CofAs) and chain of custody are enclosed in Appendix D.

The laboratory CofAs show that there were no exceedances against the Table 1 – Limits for Sanitary and Combined Sewer Discharge.

When compared against the more stringent Table 2 – Limits for Storm Sewer Discharge, the sample indicated exceedance for total suspended solids (TSS) and total manganese (Mn). A summary of the exceedance is provided in Table 4-4.

Table 4-4: Summary of Analytical Results

Parameter	Limits for Sanitary and Combined Sewer Discharge (mg/L) (Table 1)	Limits for Storm Sewer Discharge (mg/L) (Table 2)	Concentration for BH/MW1 (mg/L) (May 5, 2021)
Total Suspended Solids (TSS)	350	15	48
Total Manganese (Mn)	5	0.05	0.20

Notes:

Bold indicates concentration exceeds the Storm Sewer Discharge Limit.

If the groundwater encountered is discharged to the Region of Halton sanitary and combined sewer, no treatment will be required. A treatment is required prior to discharge to the Town of Oakville storm sewer.

Although the water quality meets the limits of Region of Halton sanitary and combined sewer, the Region typically does not allow groundwater discharge to the Regional sewer system. Alternative discharge method or negotiation with the Town of Oakville will be required.

5 Temporary Construction Dewatering

5.1 Construction Dewatering Requirements

It is BIG's understanding that the proposed re-development at the Site will consist of three (3) condominium towers (Tower 1: 51-Storey, Tower 2: 55 Storey & Tower 3: 49 Storey interconnected with 5-Storey Podiums) with seven (7) levels of underground parking structure. Based on Drawing AZ501 Building Sections (North-South), prepared by Sweeny&Co Architects (SCA) dated September 6, 2024, the finished floor elevation (FFE) of seven (7) levels of underground parking structure will be at 82.1 m asl. The footing elevation is assumed approximately 2 m below FFE.

If the footing or foundation elevation is deeper than the assumptions in this report, additional investigation will be required.

The stabilized groundwater level measurements, both in shallow and deep monitoring wells, observed on May 31, 2022 were found to be varying between elevations of 103.04 m and 86.67 m asl. For conservative purposes, the construction dewatering calculation is based on an open cut excavation at the present time. To excavate under dry conditions, the water level is anticipated to be lowered at least to a minimum of approximately 1.0 m below the footing elevation.

Additional dewatering capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. It should be noted that the dewatering estimates provided in this report are based on the conceptual building information available at this time. If design details are changed (including any changes to excavation depth), the dewatering estimates must be revised to include the final layout of the development.

5.2 Construction Dewatering Flow Rate Assumptions

The assumptions used for the calculation of the dewatering rate for the proposed development are presented in Table 5-1.

Table 5-1 Dewatering Estimate Assumptions

Input Parameter	Values	Notes
Tower 1 Established Grade Elevation (m asl)	105.90	Based on Drawing AZ501 prepared by SCA, dated September 6, 2024
P7 FFE (m asl)	82.10	Based on Drawing AZ501 prepared by SCA, dated September 6, 2024
Footing Elevation (m asl)	80.10	Assumed 2.0 m below FFE
Dewatered Elevation Target (m asl)	79.10	Approximate 1.0 m below footing elevation
Groundwater Elevation (m asl)	103.04	Highest groundwater elevation (May 31, 2022)
Estimated Excavation Area	140 m x 60 m	Based on Drawing AZ102 Level P6, prepared by SCA, dated September 6, 2024
Hydraulic Conductivity (m/s)	3.79×10^{-7}	Geometric mean K

5.3 Dewatering Flow Rate Equation

The Dupuit equation for steady flow from a linear source on both sides of a rectangular slot of an excavation through an unconfined aquifer resting on a horizontal impervious surface was used to obtain a flow rate estimate, and is expressed as follows:

$$Q_w = \frac{K(x + a)(H^2 - h^2)}{L_o}$$

Where:

Q_w	= Rate of pumping (m ³ /s)
x	= Length of excavation (m)
a	= Width of excavation (m)
K	= Hydraulic conductivity (m/s)
H	= Head beyond the influence of pumping (static groundwater elevation) (m)
h	= Head above base of aquifer at the excavation (m)
L_o	= Distance to Line Source (m)

It is expected that the initial dewatering rate will be higher in order 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 locally from storage resulting in lower seepage rates into the excavation. Additionally, the use of a continuous caisson shoring system will further reduce groundwater migration into the excavation reducing the ongoing seepage rate.

5.4 Radius of Influence

The Radius of Influence (ROI) for the construction dewatering is based on the empirical Sichardt Equation. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible. This equation is empirical and was developed to provide representative flow rates using the steady state flow dewatering equations, as discussed below.

It is noted that in steady state conditions, the radius of influence of pumping will extend until boundary flow conditions are reached and provide sufficient water inputs to the aquifer, such as recharge and surface water bodies. As a result, the distance of influence calculated using Sichardt equation is used to provide a representative flow rate calculation, but it is not precise in determining the actual radius influenced by pumping.

The ROI of pumping (dewatering) for linear flow is calculated based on the Sichardt equation, which is described as follows:

$$L_o = 1750 (H - h)\sqrt{K}$$

Where:

K	= Hydraulic conductivity (m/s)
H	= Static Saturated Head (m)
h	= Dynamic Saturated Head (m)

Based on the Sichardt equation and the geometric mean K value, the ROI is approximately 25.8 m from the edge of the excavation for linear flow. The ROI calculation is provided in Appendix E.

The ROI calculation is a conservative methodology and is calculated based on the assumption of active pumping during the construction dewatering. It should be noted that most of the water will be pumped during the first stage of the construction period or when a rain event occurs. Although the ROI was conservatively predicted as 25.8 m from the edge of the excavation, over a period of time, the drawdown curve will be very close to the bottom of the excavation and thus resulting in negligible ROI.

The likelihood for impacts to the nearby structures are negligible. Additionally, the use of a shoring system will further reduce radius of influence.

5.5 Results of Construction Dewatering Flow Rate Estimates

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

Table 5-2 Summary of Construction Dewatering Flow Rate Estimate

Location	Construction Dewatering Flow Rate Without Safety Factor (L/day)	Peak Construction Dewatering Flow Rate Including Safety Factor of 2 (L/day)
Excavation area	170,000	340,000

Construction dewatering flow rate estimates are provided in Table E-1, in Appendix E.

The peak construction dewatering flow rate includes a factor of safety of two (2) to account for accumulation of rainfall, seasonal fluctuations in the groundwater table, flow from beddings of existing sewers, and variation in hydrogeological properties beyond those encountered during the course of this study. This total dewatering flow rate also provides additional capacity for the dewatering contractors. Given that the predicted dewatering volume exceeds the 50,000 L/day limit, an EASR for construction dewatering will be required.

It should be noted that if caisson wall shoring system is considered for the subject Site, reduction in groundwater quantities can be anticipated.

Please note that it is the responsibility of the contractor to ensure dry conditions are maintained within the excavation at all times. The dewatering contractor should ensure that silt removal or replacement from subsoil be eliminated and monitored during remediation dewatering at all times.

Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. Additionally, the presence of near-surface fill material could hold significant groundwater.

The maximum flow calculation is intended to provide a conservative estimate to account for unforeseeable conditions that may arise during construction. It should be noted that the dewatering estimate provided in this report are based on the proposed development information available at this time. If changes to the design are implemented (e.g., increase to planned excavation depths, widening of excavations, etc.), the dewatering estimates must be revised to include and reflect future changes.

6 Long Term Discharge Estimate

6.1 Long-Term Dewatering Assumptions

Given that the groundwater level is above foundation depths for the development, a permanent foundation sub-drain is recommended. It is assumed that the below grade structure will feature a perimeter drain and sub-drain system installed at approximately 0.5 m below the basement elevation. Table 6-1 presents the assumptions used to calculate the long-term drainage rate estimates.

Once the design is available, BIG needs to review and re-evaluate the dewatering estimates. If the foundation elevation is deeper than the assumptions in this report, additional investigation will be required.

Table 6-1 Dewatering Estimate Assumptions

Input Parameter	Values	Notes
Tower 1 Established Grade Elevation (m asl)	105.90	Based on Drawing AZ501 prepared by SCA, dated September 6, 2024
P7 FFE (m asl)	82.10	Based on Drawing AZ501 prepared by SCA, dated September 6, 2024
Groundwater Elevation (m asl)	87.34	Highest groundwater elevation in deep aquifer (May 31, 2022)
Sub-drain Elevation Target (m asl)	81.60	Assumed 0.5 m below the P7 basement elevation
Drainage Dimensions	140 m x 60 m	Based on Drawing AZ102 Level P6, prepared by SCA, dated September 6, 2024
Hydraulic Conductivity (m/s)	3.19×10^{-7}	Geometric mean K for deep aquifer

6.2 Radius of Influence

The ROI calculation is a conservative methodology and is calculated based on the assumption of active pumping during long-term dewatering. It should be noted that there will be no active pumping during long-term dewatering. The foundation drains will be constructed below the floor slab and/or near the foundation and the groundwater would passively drain into these sub drains and discharged directly to sumps. Due to the nature of overburden material, the groundwater will flow through the natural gradient that exists on the Site and passively flow into the foundation sub-drains and will not be actively pumped. Although, the ROI which was conservatively predicted was at 21.3 m from the edge of the sub-drain, over a period of time, the drawdown curve will be very close to the foundation walls and thus resulting in negligible ROI.

6.3 Long-Term Perimeter Drain Flow Rate Estimate

Based on the assumptions provided in this report (outlined in Section 6.1), the results of the long-term discharge volume estimate are summarized below:

Table 6-2 Summary of Long-Term Discharge Flow Rate

Location	Long-Term Peak Flow Rate (L/day)	Notes
Flow into sub-drain after initial dewatering stages	48,000	Long term sub-drain flow value rounded based on Dupuit's equation including flow from all sides. Safety factor of 3 was used.

The results for the estimate are available in Appendix F, Table F-1. The maximum flow rate estimates represent short term events and are not indicative of long-term continuous contributions to the drainage system. Intermittent cycling of sump pumps and seasonal fluctuation in groundwater regimes should be considered for pump specifications. Given that the predicted dewatering volume does not exceed the 50,000 L/day limit, a PTTW is not required.

It should be noted that the dewatering estimates provided in this report are based on the proposed building information available at this time.

If the groundwater encountered during long-term dewatering is discharged to the Region of Halton sanitary and combined sewer, no treatment will be required. A treatment is required prior to discharge to the Town of Oakville storm sewer.

In the event that the long-term foundation drainage is not allowed to discharge into the City's sewer system, the proposed building may be designed and supported by "tanked" water-proofed continuous raft foundation without permanent dewatering (i.e., avoiding permanent perimeter and under-floor drainage system).

7 Potential Groundwater Impacts

7.1 Impacts to Nearby Groundwater Users

The Site lies within an urban area of Oakville, based on the MECP WWR database, one (1) supply water well was identified at the Queen Elizabeth Way, located approximate 100 m northwest of the Site. The well was installed in 1948, and the well is located in a developed area, the supply well is likely not present. Given the area is serviced by municipal system, no private well water user is expected. There are no potential impacts to nearby groundwater users due to construction dewatering or long-term dewatering is expected.

7.2 Impacts to Nearby Structures

As discussed in Section 5, given the groundwater table is above the excavation, construction dewatering is required. The ROI calculation is a conservative methodology and is calculated based on the assumption of active pumping during the construction dewatering. It should be noted that most of the water will be pumped during the first stage of the construction period or when a rain event occurs. Although the ROI was conservatively predicted as 25.8 m from the edge of the excavation, over a period of time, the drawdown curve will be very close to the bottom of the excavation and thus resulting in negligible ROI. The likelihood for impacts to the nearby structures are negligible. Additionally, the use of a shoring system will further reduce radius of influence.

As discussed in Section 6, given that the groundwater level is above foundation depths for the development, a permanent foundation sub-drain is recommended. It is assumed that the below grade structure will feature a perimeter drain and sub-drain system installed at approximately 0.5 m below the basement elevation. If the foundation drains operate on a long-term basis, the radius of influence was conservatively estimated at 21.3 m from the edge of the excavation. However, unlike the construction dewatering activities where active dewatering takes places, the long-term dewatering operates passively where water would flow through fractured bedrock primarily via vertical drains. Therefore, the actual radius of influence will be less than the predicted distance and no impacts to the surrounding feature is expected.

8 Water Taking and Discharge Permits

8.1 EASR

During the active construction dewatering phase, the volume of water expected to be pumped exceeds the daily limit on groundwater taking under the Ontario Water Resources Act (50,000 L/day) if the excavation is to be undertaken all at once. Therefore, it is necessary to register the construction dewatering under the EASR guidelines, as cumulative discharge rate for construction is 340,000 L/day. The limit for water taking under an EASR is 400,000 L/day. If combined storm and groundwater were to exceed this limit, the dewatering rate would need to be capped to 400,000 L/day of pumped water. If it is necessary to exceed 400,000 L/day of water taking, a Permit to Take Water as per O.Reg.387/04 would be required.

9 Conclusions

Based on the findings of the Hydrogeological Investigation, the following summary of conclusions are provided:

- a) It is BIG's understanding that the proposed re-development at the Site will consist of three (3) condominium towers (Tower 1: 51-Storey, Tower 2: 55-Storey & Tower 3: 49-Storey interconnected with 5-Storey Podiums) with seven (7) levels of underground parking structure;
- b) The Site is located within a physiographic region within the Iroquois Plain known as the shale plains;
- c) The surficial geology of the immediate area around the Site is described as Paleozoic bedrock;
- d) The MECP WWR database indicate that there are 51 well records registered with the database within 500 m of the Site. One (1) supply water well was identified at the Queen Elizabeth Way, located approximate 100 m southwest of the Site. The well was installed in 1948 and the well is located in a developed area, the supply well is likely not present. Given the area is serviced by municipal system, no private well water user is expected;
- e) Groundwater was observed in all monitoring wells on May 31, 2022 and depths to the groundwater ranged from 2.59 m to 18.66 m bgs. The shallow wells BH/MW2, BH/MW6 and BH/MW8 were observed with groundwater elevations that ranged from 103.04 m to 101.69 m asl. The deep wells, BH/MW10 and BH/MW201 to BH/MW206 were observed with groundwater elevations that ranged from 87.34 m to 86.67 m asl;
- f) Based on the water level measurements obtained, the inferred direction of shallow groundwater flow across the Site is interpreted to be to the northeastern direction, and the inferred direction of deep groundwater flow across the Site is interpreted to be to the southwestern direction;
- g) The estimated hydraulic conductivity of the soil ranges from 1.02×10^{-5} m/s to 3.02×10^{-8} m/s with a geometric mean of 3.79×10^{-7} m/s;
- h) Based on the assumptions outlined in this report, the estimated peak construction dewatering flow rate including rainfall for the proposed construction activity is 340,000 L/day;
- i) Based on the assumptions outlined in this report, the cumulative contribution to the foundation drains is 48,000 L/day;
- j) Given that the predicted dewatering volumes does exceed the 50,000 L/day limit, an EASR for construction dewatering is required;
- k) The laboratory CofA shows that no exceedance under Table 1 – Limits for Sanitary and Combined Sewer Discharge;
- l) When compared against the more stringent Table 2 – Limits for Storm Sewer Discharge, the sample indicated exceedances for total suspended solids (TSS) and total manganese (Mn);
- m) If the groundwater encountered is discharged to the Region of Halton sanitary and combined sewer, no treatment will be required. A treatment is required prior to discharge to the Town of Oakville storm sewer; and,
- n) Although the water quality meets the limits of Region of Halton sanitary and combined sewer, the Region typically does not allow groundwater discharge to the Regional sewer system. Alternative discharge method or negotiation with the Town of Oakville will be required.

It should be noted that the comments and recommendations in this report are based on the assumption that the present design concept described throughout the report will proceed to construction. Any changes to the design concept may result in a modification to the recommendations provided in this report. It is noted that these conclusions and recommendations should be read in conjunction with the entirety of the report.

10 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 conclusion and recommendations presented within this report reflect Site conditions existing at the time of the assessment. BIG must be contacted immediately if any unforeseen Site conditions are experienced during the dewatering activities. This will allow BIG to review the new findings and provide appropriate recommendations to allow the construction to proceed in a timely and cost-effective manner.

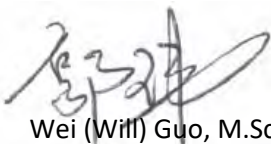
Our undertaking at BIG, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the geoscience profession. No other warranty or presentation, either expressed or implied, is included or intended in this report.

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

Yours truly,

B.I.G. Consulting Inc.


Travis Van Holst, M.Env.Sc., GIT
Environmental Scientist

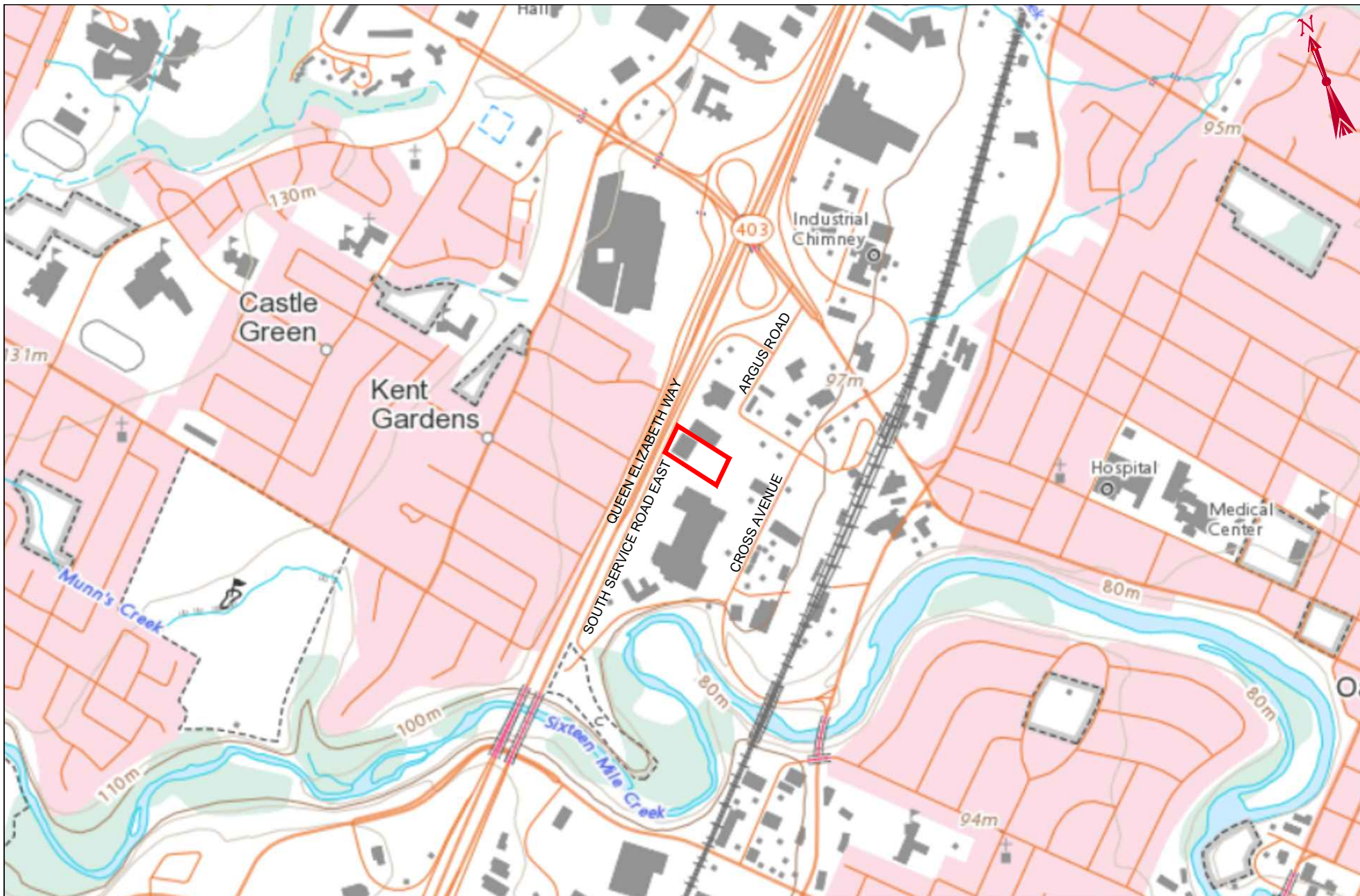

Wei (Will) Guo, M.Sc., P.Geo.
Senior Hydrogeologist



11 References

- B.I.G. Consulting Inc. (2021). Preliminary Geotechnical Report, 166 South Service Road East, Oakville, Ontario, dated May 2021.
- Cashman, P. M. (2013). *Groundwater Lowering in Construction: A Practical Guide to Dewatering (Second Ed.)*.
- Chapman, L., & Putnam, D. (2007). Physiography of Southern Ontario. *Miscellaneous Release, Data 228 ISBN 978-1-4249-5158-1*. Ontario Geological Survey.
- Ministry of Environment, Conservation and Parks. (2017). Ontario Water Resources Act.
- Ontario Water Resources Act, Ontario Regulation 387/04, as amended. (2016). *Water Taking and Transfer*.
- Ontario Ministry of Environment, Conservation and Parks, Map: Well Records, 2018. Accessed online at <https://www.ontario.ca/environment-and-energy/map-well-records>
- Singer, S.N., Cheng, C.K., and Scafe, M.G. (2003). The Hydrogeology of Southern Ontario, 2nd Edition. Environmental Monitoring and Reporting Branch, Ontario Ministry of Environment.
- The Corporation of the Town of Oakville (2009). *By-Law Number 2009-031 – A By-law to Regulate the Use of Municipal Storm Sewers and to repeal and replace By-law 2008-041*.
- The Regional Municipality of Halton (2001). By-Law No.2-03


FIGURES

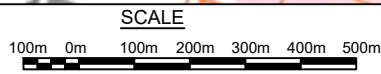


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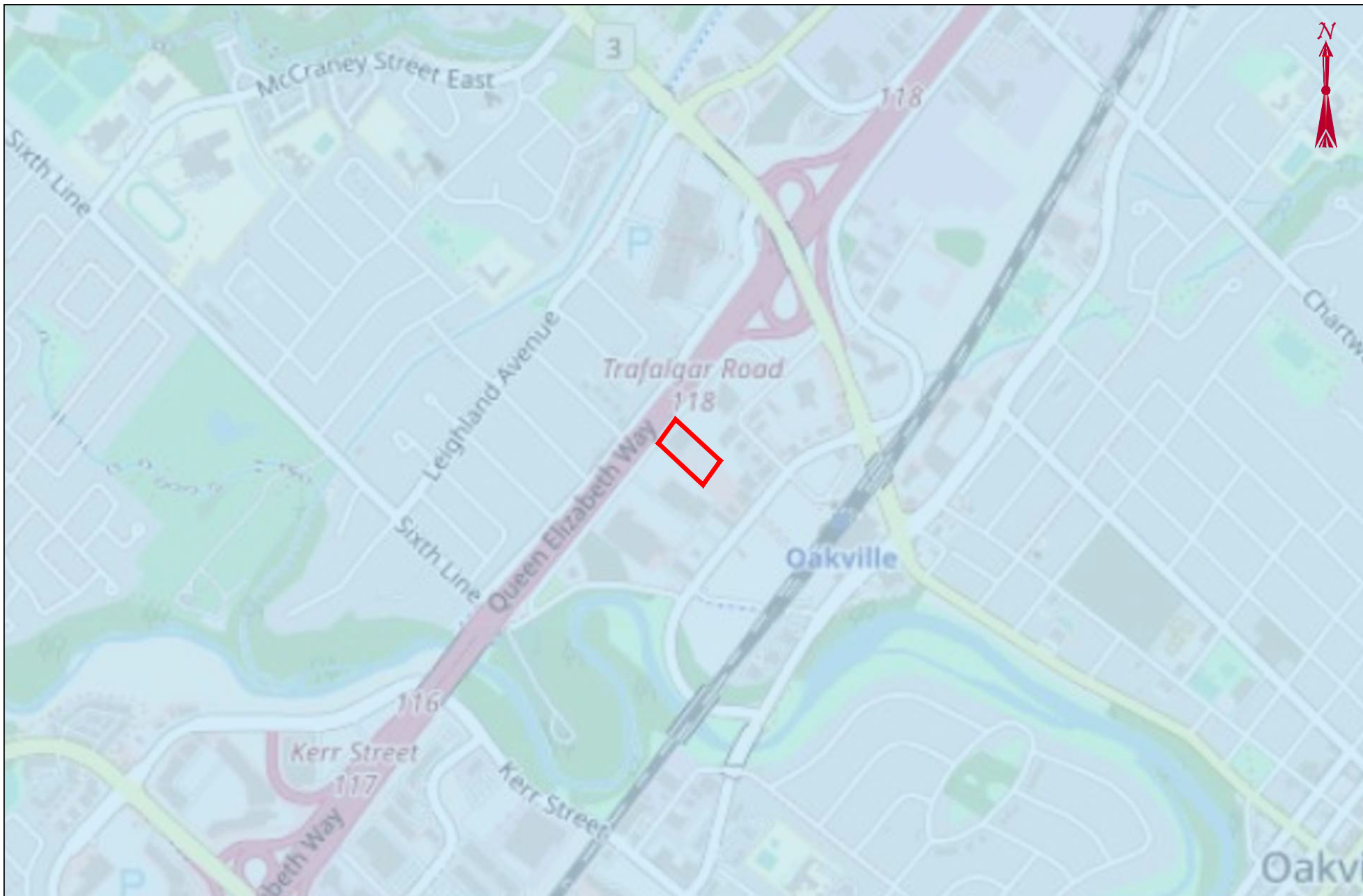
LEGEND
 SITE BOUNDARY



TITLE AND LOCATION

SITE LOCATION PLAN
HYDROGEOLOGICAL
INVESTIGATION
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO

PROJECT NO. BIGC-ENV-457B	DWN. T.S.
SCALE AS NOTED	CK. T.V.H.
DATE AUGUST 2022	FIG NO. 1



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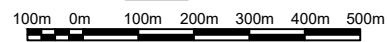
LEGEND

- SITE BOUNDARY
- IROQUOIS PLAIN

NOTES:

1. PHYSIOGRAPHIC REGIONS PRODUCED BY MINISTRY OF ENERGY, NORTHERN DEVELOPMENT AND MINES, 2012
2. IMAGERY OBTAINED FROM OPENSTREETMAP, 2016

SCALE



TITLE AND LOCATION

**PHYSIOGRAPHIC REGIONS
 OF SOUTHERN ONTARIO
 HYDROGEOLOGICAL
 INVESTIGATION
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO**

PROJECT NO.

BIGC-ENV-457B

SCALE

AS NOTED

DATE

AUGUST 2022

DWN.

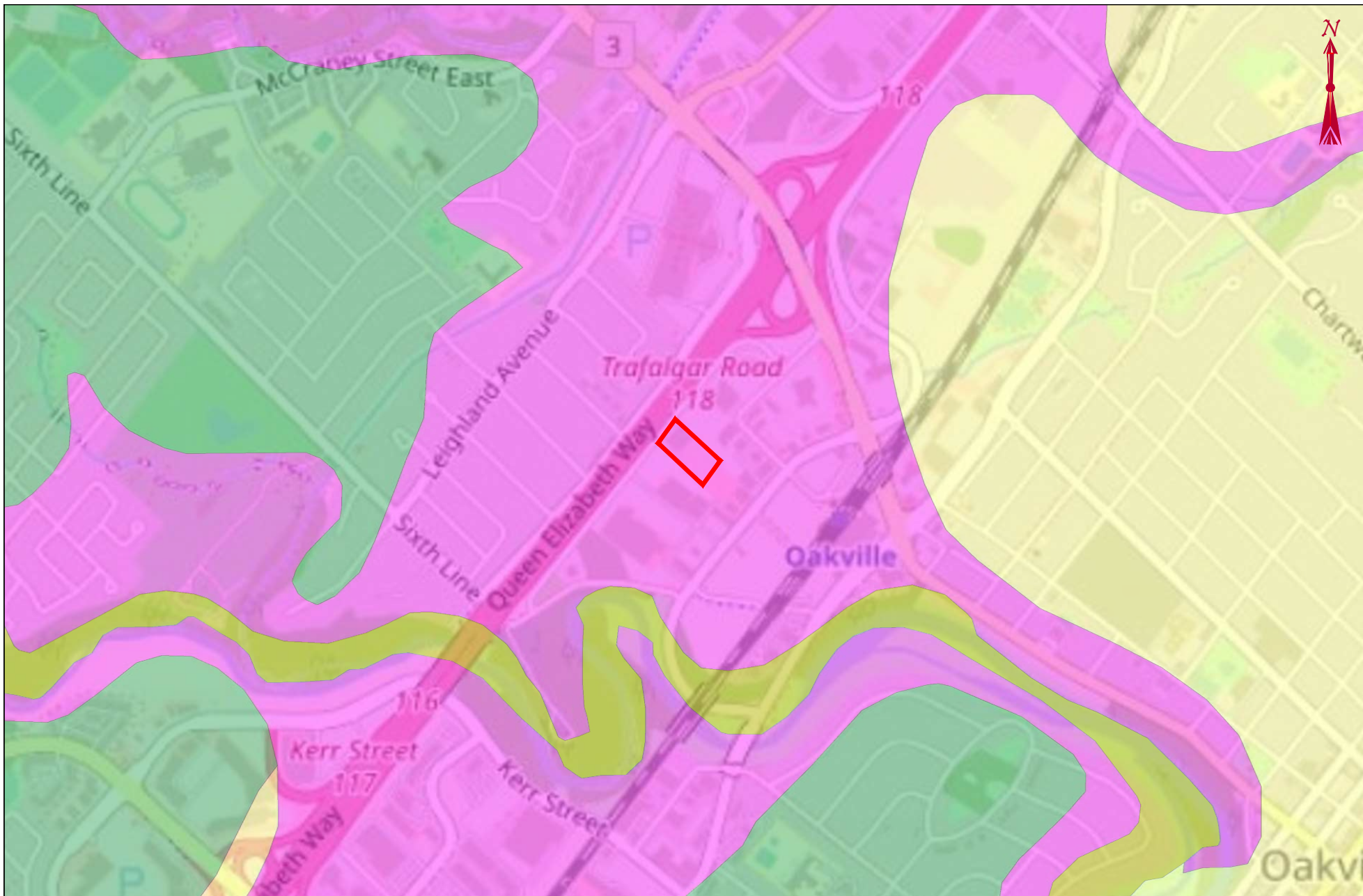
T.S.

CK.

T.V.H.

FIG NO.

2



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LEGEND

- SITE BOUNDARY
- COARSE-TEXTURED GLACIOLACUSTRINE DEPOSITS
- TILL
- MODERN ALLUVIAL DEPOSITS
- PALEOZOIC BEDROCK

SCALE



TITLE AND LOCATION

**SURFICIAL GEOLOGY
 OF SOUTHERN ONTARIO
 HYDROGEOLOGICAL
 INVESTIGATION
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO**

NOTES:

1. SURFICIAL GEOLOGY PRODUCED BY MINISTRY OF ENERGY, NORTHERN DEVELOPMENT AND MINES, 2012
2. IMAGERY OBTAINED FROM OPENSTREETMAP, 2016

PROJECT NO.

BIGC-ENV-457B

DWN.

T.S.

SCALE

AS NOTED

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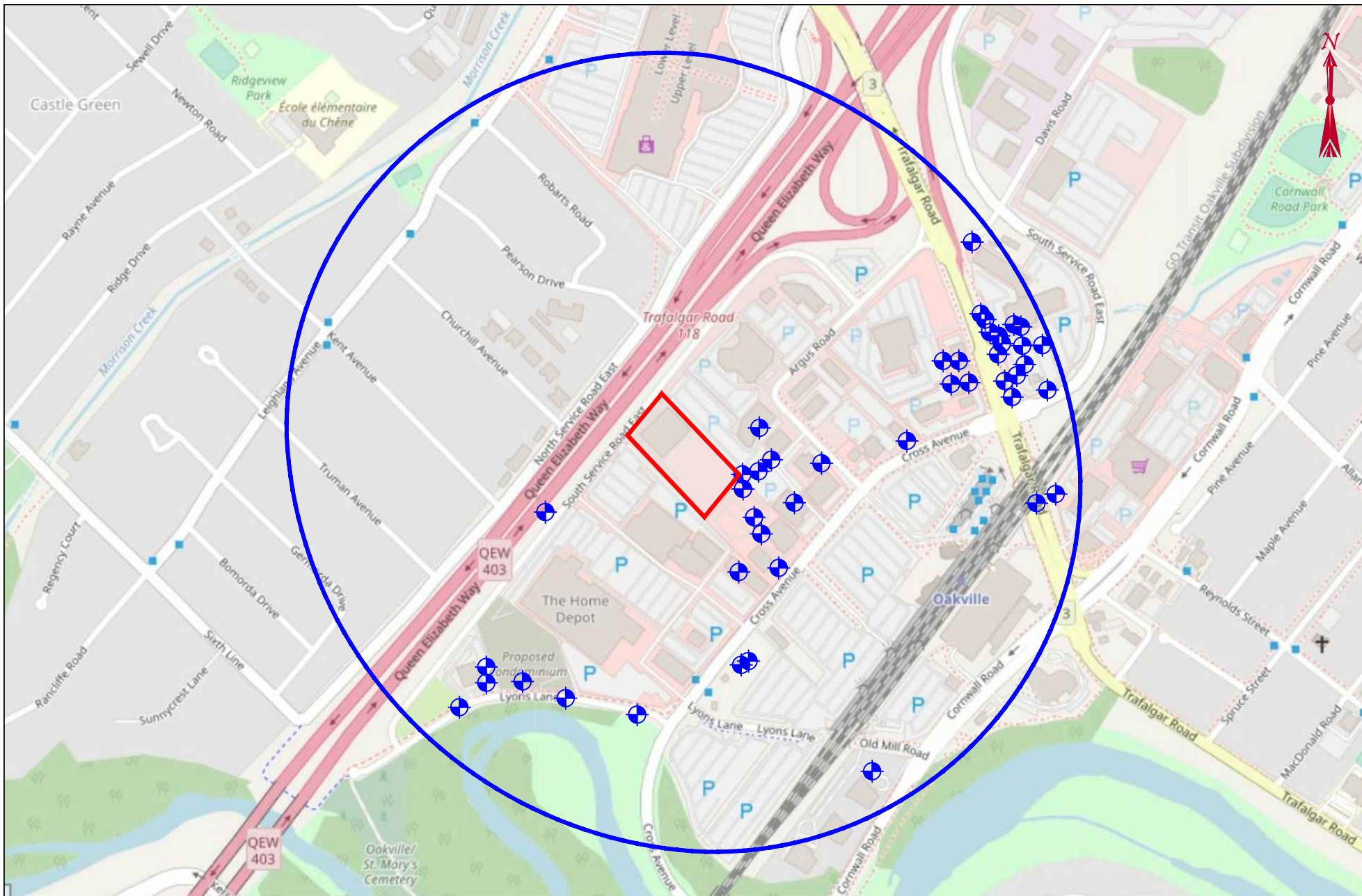
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FIG NO.

3



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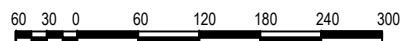


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LEGEND

- SITE BOUNDARY
- WELL RECORD STUDY AREA BOUNDARY
- ⊕ WELL RECORD LOCATION (2021)

SCALE



TITLE AND LOCATION

**MECP WATER WELL
 RECORD LOCATIONS
 HYDROGEOLOGICAL
 INVESTIGATION**
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO

PROJECT NO.

BIGC-ENV-457B

SCALE

AS NOTED

DATE

AUGUST 2022

DWN.

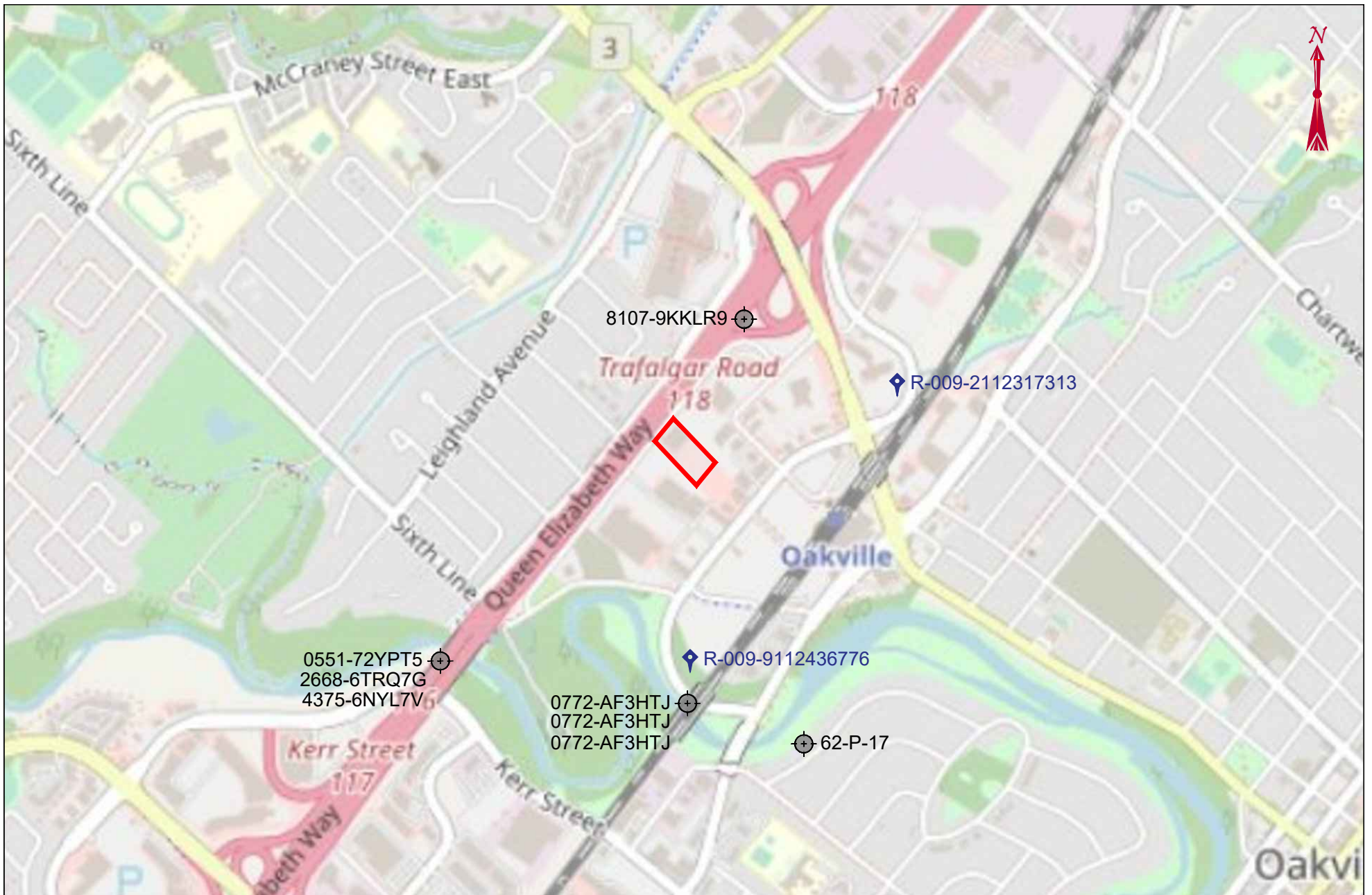
T.S.

CK.

T.V.H.

FIG. NO.

4



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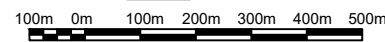


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LEGEND

- ▬ SITE BOUNDARY
- LOCATION OF PTTW RECORD
- LOCATION OF EASR RECORD

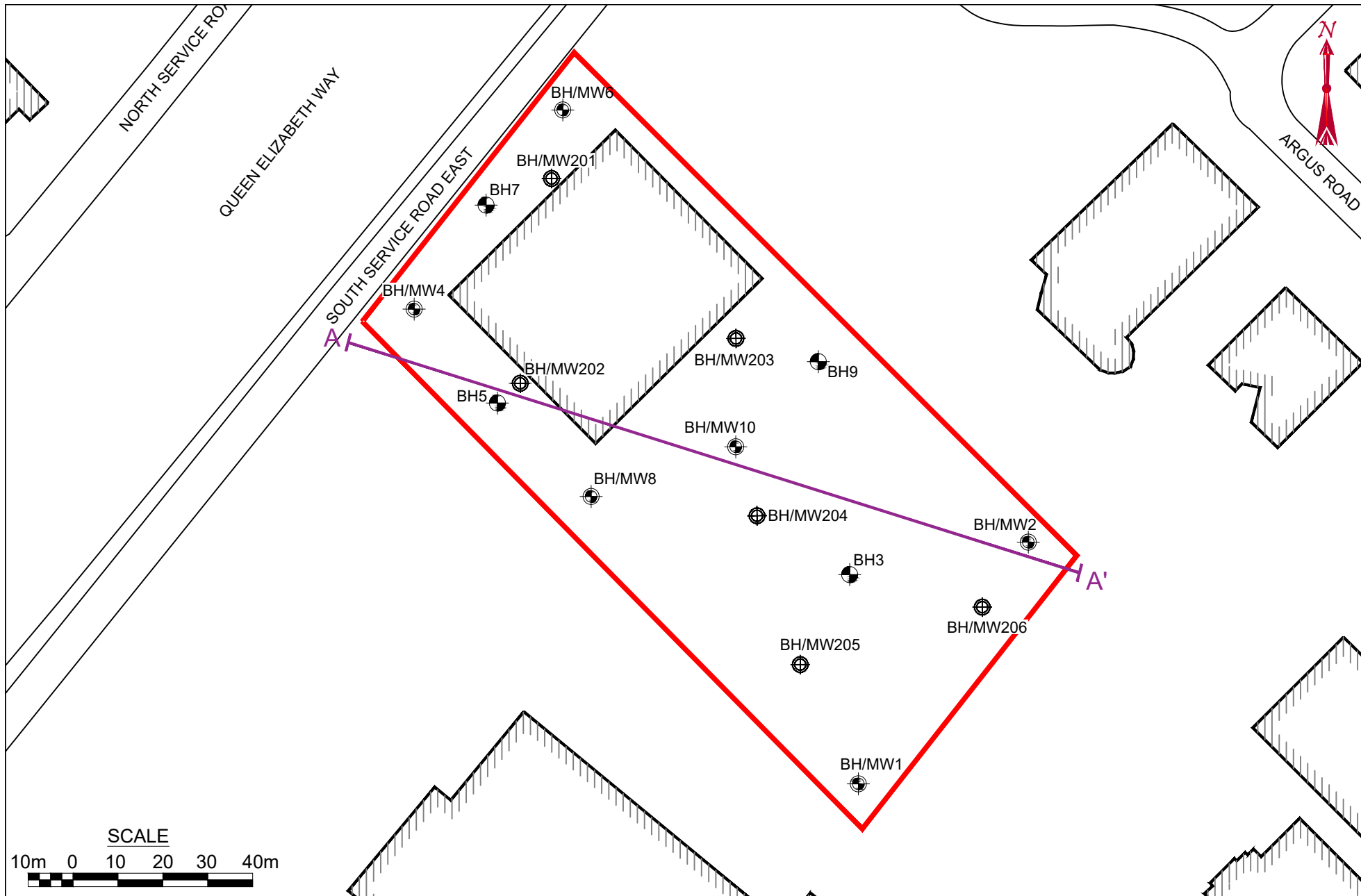
SCALE



TITLE AND LOCATION

**PTTW AND EASR
 RECORD LOCATIONS
 HYDROGEOLOGICAL
 INVESTIGATION
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO**

PROJECT NO. BIGC-ENV-457B	DWN. T.S.
SCALE AS NOTED	CK. T.V.H.
DATE AUGUST 2022	FIG NO. 5



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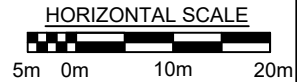
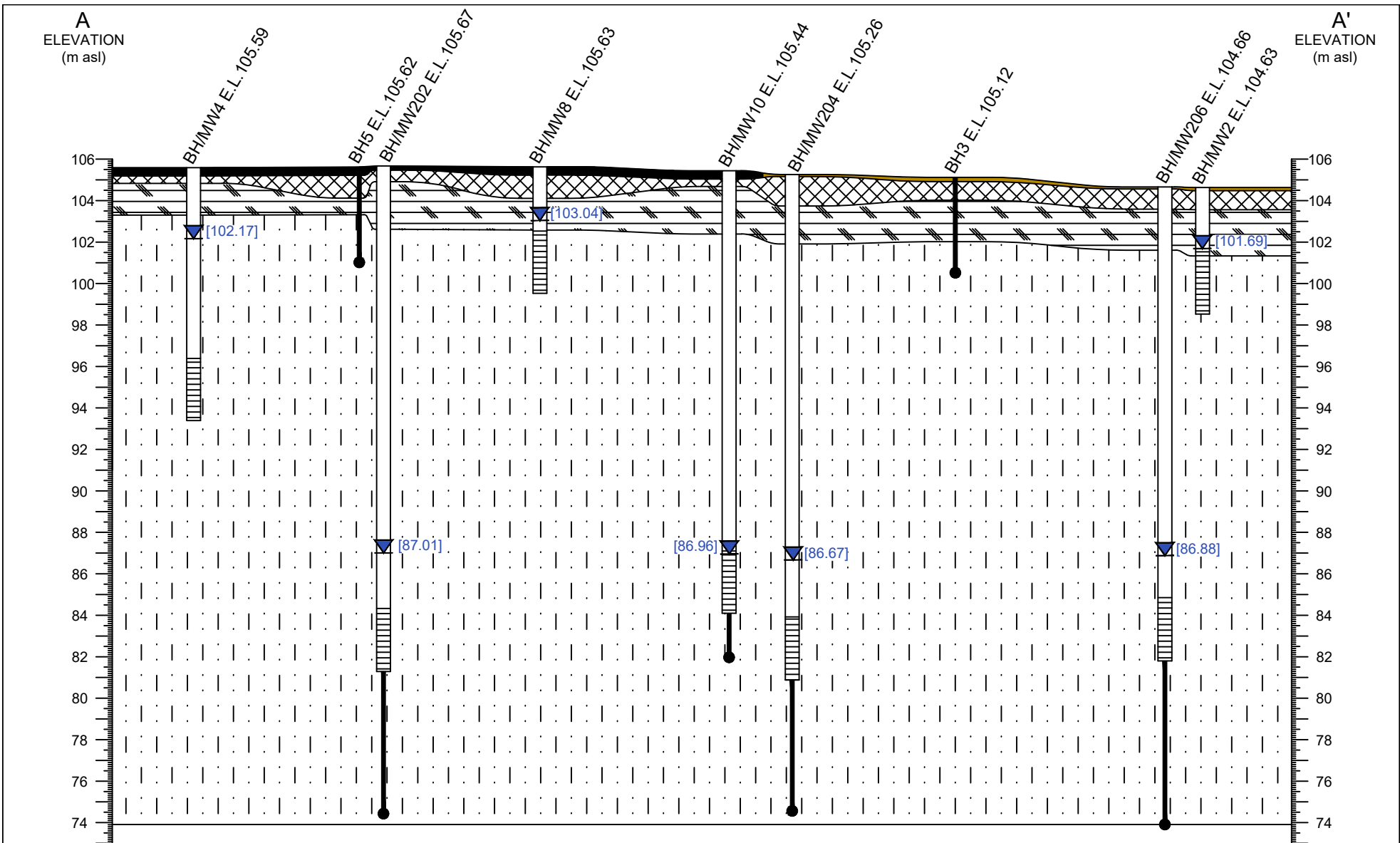


LEGEND	
	SITE BOUNDARY
	BUILDING FOOTPRINT
	LOCATION OF BOREHOLE/MONITORING WELL (B.I.G 2022)
	LOCATION OF BOREHOLE/MONITORING WELL (B.I.G 2021)
	LOCATION OF BOREHOLE (B.I.G 2021)
	GEOLOGICAL CROSS SECTION (SEE FIGURE 7)

TITLE AND LOCATION

**BOREHOLE/MONITORING
 WELL LOCATION PLAN
 HYDROGEOLOGICAL
 INVESTIGATION**
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO



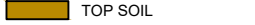




PROJECT NO.	DWN.
BIGC-ENV-457B	T.S.
SCALE	CK.
AS NOTED	T.V.H.
DATE	FIG NO.
AUGUST 2022	6



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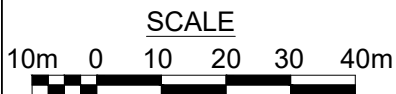
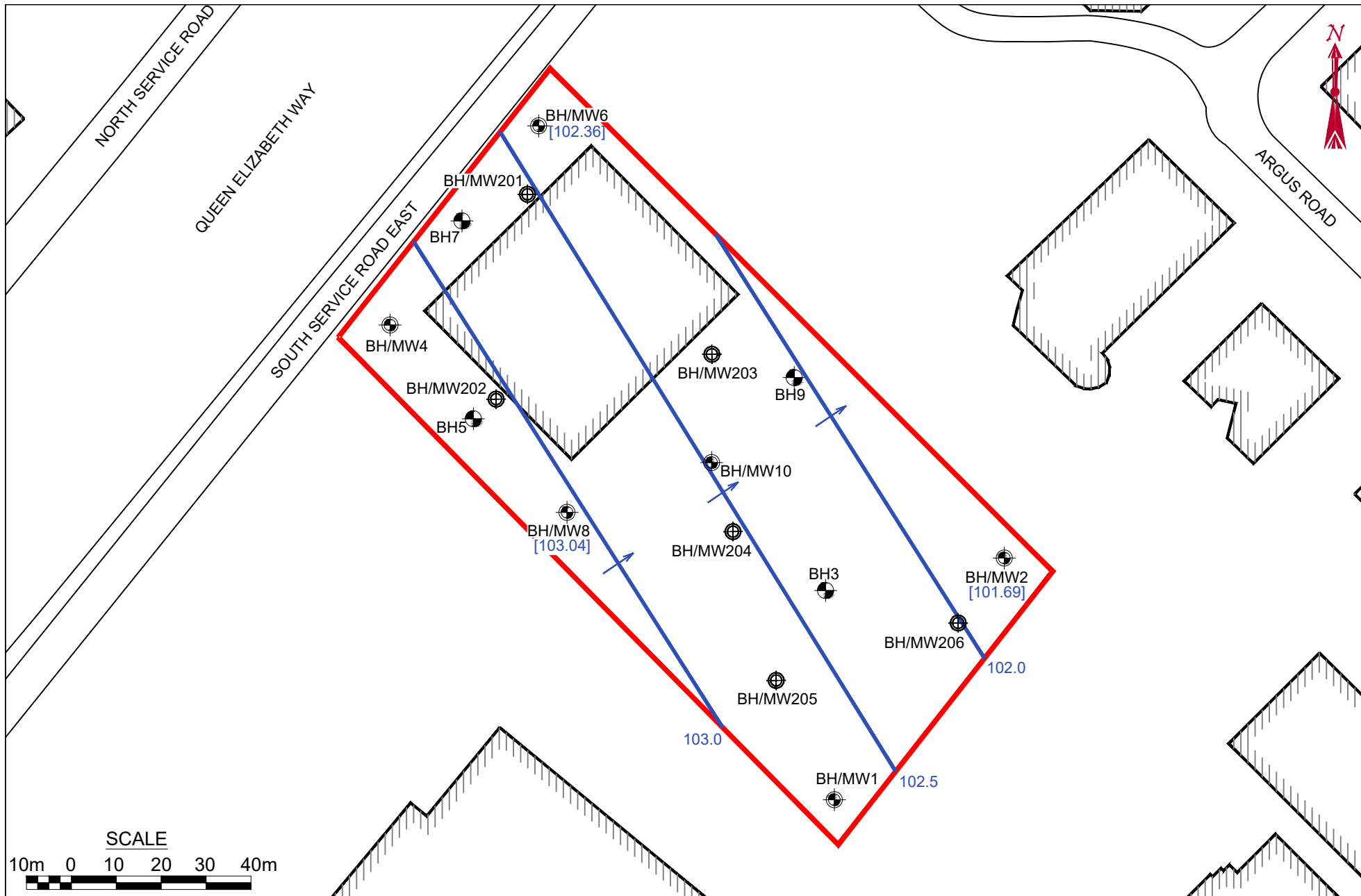
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LEGEND		WATER LEVEL	
	ASPHALT / GRANULAR		WATER LEVEL
	TOP SOIL		WATER LEVEL MEASUREMENT
	FILL		(MAY 31, 2022)
	CLAYEY SILT TILL		
	SHALE BEDROCK		

TITLE AND LOCATION

GEOLOGICAL CROSS SECTION A-A'
HYDROGEOLOGICAL INVESTIGATION
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO









PROJECT NO.	DWN.
BIGC-ENV-457B	T.S.
SCALE	CK.
AS NOTED	T.V.H.
DATE	FIG. NO.
AUGUST 2022	7



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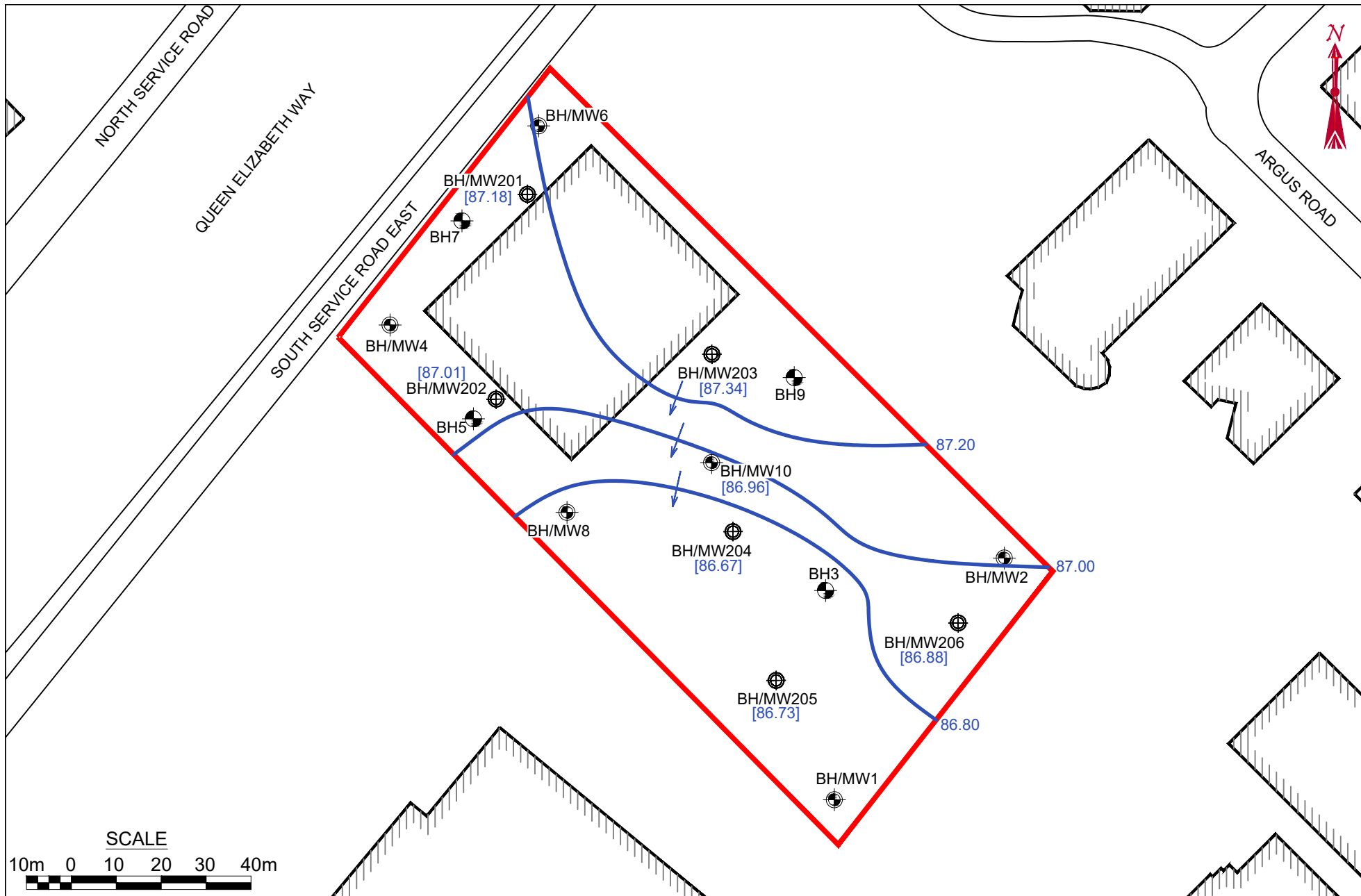


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LEGEND	
	SITE BOUNDARY
	BUILDING FOOTPRINT
	LOCATION OF BOREHOLE/MONITORING WELL (B.I.G 2022)
	LOCATION OF BOREHOLE/MONITORING WELL (B.I.G 2021)
	LOCATION OF BOREHOLE (B.I.G 2021)
	WATER LEVEL MEASUREMENT (MAY 31, 2022)
	GROUNDWATER CONTOUR
	INTERPRETED DIRECTION OF GROUNDWATER FLOW

TITLE AND LOCATION
SHALLOW GROUNDWATER CONTOUR MAP
HYDROGEOLOGICAL INVESTIGATION
166 SOUTH SERVICE ROAD EAST,
OAKVILLE, ONTARIO

PROJECT NO. BIGC-ENV-457B	DWN. T.S.
SCALE AS NOTED	CK. T.V.H.
DATE AUGUST 2022	FIG NO. 8



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LEGEND	
	SITE BOUNDARY
	BUILDING FOOTPRINT
	LOCATION OF BOREHOLE/MONITORING WELL (B.I.G 2022)
	LOCATION OF BOREHOLE/MONITORING WELL (B.I.G 2021)
	LOCATION OF BOREHOLE (B.I.G 2021)
	WATER LEVEL MEASUREMENT (MAY 31, 2022)
	GROUNDWATER CONTOUR
	INTERPRETED DIRECTION OF GROUNDWATER FLOW

TITLE AND LOCATION

**DEEP GROUNDWATER
 CONTOUR MAP
 HYDROGEOLOGICAL
 INVESTIGATION**
 166 SOUTH SERVICE ROAD EAST,
 OAKVILLE, ONTARIO

PROJECT NO. BIGC-ENV-457B	DWN. T.S.
SCALE AS NOTED	CK. T.V.H.
DATE AUGUST 2022	FIG NO. 9

APPENDIX A: BOREHOLE LOGS

RECORD OF BOREHOLE No. BH/MW201



Project Number: **BIGC-ENV-457B** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **District Capital** Drilling Method: **150 mm Hollow Stem Augering + Rock Coring** Compiled by: **KK**
 Project Name: **Additional Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **SS**
 Project Location: **166 South Service Road East, Oakville, Ontario** Date Started: **22 May 3** Date Completed: **22 May 4** Revision No.: **0, 22-7-5**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing	Soil Vapour Reading (ppm)	Lower Explosive Limit (LEL)	Plastic		
	Geodetic Ground Surface Elevation: 105.77 m ASPHALT PAVEMENT: 70 mm asphalt over 130 mm granular base FILL: clayey silt, trace sand, trace gravel, greyish brown, moist, firm CLAYEY SILT TILL: trace to some sand, trace gravel, shale fragments, reddish brown to grey, moist, hard - grey BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown, moist, hard							Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 Lower Explosive Limit (LEL) W _p W L _i Plastic Liquid 20 40 60 80				
		SS	1	54	7		105.57	○	10				
		SS	2	100	33	1	105.01	○	11				
		SS	3	100	92/28cm	2	104.48	○	92/28cm	○	7		
		SS	4	80	50/10cm	3	103.8	○	50/10cm				
		SS	5	80	50/5cm	3	103.48	○	50/5cm				
		SS	6	100	50/13cm	5	101.48	○	50/13cm				
		SS	7	80	50/10	6	100.48	○	50/10				
						7	99.48						
						8	98.48						
						9	97.48						
						10	96.48						
						11	95.48						
						12	94.48						
		RC	1	100	17		93.48	○					
		RC	2	100	53		92.48	○					
		RC	3	100	63		91.48	○					
						15	90.48						
						16	89.48						

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 F: 416-551-2633

No freestanding groundwater measured in open borehole on completion of drilling. Cave in depth recorded on completion of drilling: Open m.
 Groundwater depth observed on 2022-05-31 at a depth of: 18.59 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

Scale: 1 : 84
 Page: 1 of 2

RECORD OF BOREHOLE No. BH/MW201



Project Number: **BIGC-ENV-457B**

Drilling Location: **See Borehole Location Plan**

Logged by: **KK**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)		ELEVATION (m)		FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%					Penetration Testing ○ SPT ● DCPT	★ Rinse pH Values 2 4 6 8 10 12	Soil Vapour Reading parts per million (ppm) 100 200 300 400	Lower Explosive Limit (LEL) W _p W L		
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown, moist, hard														
	- Good Quality	RC	4	100	80	17	89			○					
	- Good Quality	RC	5	100	86	18	88								
	- Good Quality	RC	6	100	80	19	87								
	- Very Poor Quality	RC	7	100	18	20	86			○					
	- Excellent Quality	RC	8	100	98	21	85								
	- Good Quality	RC	9	100	84	22	84								
	- Good Quality	RC	10	100	84	23	83								
	- Good Quality	RC	11	100	84	24	82								
	- Good Quality	RC	12	100	83	25	81								
	- Good Quality	RC	13	100	98	26	80								
	- Excellent Quality	RC	13	100	98	27	79								
	- Excellent Quality	RC	13	100	98	28	78								
	- Excellent Quality	RC	13	100	98	29	77								
	- Excellent Quality	RC	13	100	98	30	76								
	End of Borehole						75.17								
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading not measured due to core water upon completion of drilling. 3. Groundwater level reading at 18.59 m bgs on May 31, 2022.						30.6								

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW202



Project Number: **BIGC-ENV-457B** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **Distrikt Capital** Drilling Method: **150 mm Hollow Stem Augering + Rock Coring** Compiled by: **KK**
 Project Name: **Additional Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **SS**
 Project Location: **166 South Service Road East, Oakville, Ontario** Date Started: **22 May 2** Date Completed: **22 May 3** Revision No.: **0, 22-7-5**

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)							SPT 'N' Value/RQD%
Geodetic Ground Surface Elevation: 105.67 m											
<p>ASPHALT PAVEMENT: 70 mm asphalt over 130 mm granular base FILL: silty sand, some gravel, brown to grey, moist, loose CLAYEY SILT TILL: trace sand, trace gravel, reddish brown, moist, hard</p>	SS	1	84	13	105.47	○	○10				
	SS	2	62	37	104.91	○	○10				
	SS	3	50	72/20cm	104.6	○	○9	72 20cm			
	SS	4	90	50/5cm	103.8	○	○8	50 5cm			
	SS	5	100	50/5cm	102.62	○	○8	50 5cm			
<p>BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, moist</p> <p>ROCK CORE BEGINS</p> <p>- Fair Quality</p> <p>- Fair Quality</p> <p>- Fair Quality</p>	RC	1	100	52	102.1	○					
	RC	2	100	69	101.8	○					
	RC	3	100	69	101.5	○					
						101.2					
						100.9					
						100.6					
						100.3					
						100.0					
						99.7					
						99.4					

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No freestanding groundwater measured in open borehole on completion of drilling.
 Cave in depth recorded on completion of drilling: Open m.
 Groundwater depth observed on 2022-05-31 at a depth of: 18.66 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

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RECORD OF BOREHOLE No. BH/MW202



Project Number: **BIGC-ENV-457B**

Drilling Location: **See Borehole Location Plan**

Logged by: **KK**

Lithology Plot	LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing ○ SPT ● DCPT	Soil Vapour Reading parts per million (ppm) 100 200 300 400	Soil Vapour Reading parts per million (ppm) 100 200 300 400	Lower Explosive Limit (LEL) W _p W L _l		
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, moist					89							
	- Good Quality	RC	4	100	76	17			○				
	- Good Quality	RC	5	100	78	18			○				
	- Good Quality	RC	6	100	80	19			○				
	- Good Quality	RC	7	86	84	20			○				
	- Good Quality	RC	8	100	87	21			○				
	- Excellent Quality	RC	9	100	92	22			○				
	- Fair Quality	RC	10	98	69	23			○				
	- Excellent Quality	RC	11	100	95	24			○				
	- Excellent Quality	RC	12	100	91	25			○				
	- Excellent Quality	RC	13	100	96	26			○				
	End of Borehole					74.43							
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading not measured due to core water upon completion of drilling. 3. Groundwater level reading at 18.66 m bgs on May 31, 2022.					31.2							

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW203



Project Number: **BIGC-ENV-457B** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **Distrikt Capital** Drilling Method: **150 mm Hollow Stem Augering + Rock Coring** Compiled by: **KK**
 Project Name: **Additional Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **SS**
 Project Location: **166 South Service Road East, Oakville, Ontario** Date Started: **22 Apr 27** Date Completed: **22 May 2** Revision No.: **0, 22-7-5**

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RQD%	Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80		
Geodetic Ground Surface Elevation: 105.55 m										
	ASPHALT PAVEMENT: 60 mm asphalt over, 200 mm granular bases	SS	1	13	11	105.25	○	○ 13		
	FILL: silty clay, trace sand, trace gravel, trace rootlets, grey, moist, stiff	SS	2	79	8	104.03	○	○ 12		
	CLAYEY SILT TILL: trace sand, trace gravel, occasional shale fragments, reddish brown, moist, hard	SS	3	79	36	103.26	○	○ 9		
	BEDROCK: Shale, highly weathered to fair quality, occasional limestone layers, reddish brown to grey, moist	SS	4	100	50/15cm	103	○	○ 50 15cm		
		SS	5	38	50/13cm	102	○	○ 50 13cm		
		SS	6	38	50/8cm	101	○	○ 50 8cm		
		SS	7	100	50/8cm	100	○	○ 50 8cm		
		SS	8	100	50/5cm	99	○	○ 50 5cm		
	RC	1	75	0	93	○				
	RC	2	100	47	92	○				
	RC	3	98	55	91	○				

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No freestanding groundwater measured in open borehole on completion of drilling.
 Cave in depth recorded on completion of drilling: Open m.
 Groundwater depth observed on 2022-05-31 at a depth of: 18.21 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW203



Project Number: **BIGC-ENV-457B**

Drilling Location: **See Borehole Location Plan**

Logged by: **KK**

Lithology Plot	LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%						
	BEDROCK: Shale, highly weathered to fair quality, occasional limestone layers, reddish brown to grey, moist - Fair Quality	RC	4	100	55	89					
	- Fair Quality	RC	5	92	47	17 88					
	- Fair Quality	RC	6	84	50	18 87					
	85.45 20.1					19 86					
	End of Borehole Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading not measured due to core water upon completion of drilling. 3. Groundwater level reading at 18.21 m bgs on May 31, 2022.					20					

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW204



Project Number: **BIGC-ENV-457B** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **Distrikt Capital** Drilling Method: **150 mm Hollow Stem Augering + Rock Coring** Compiled by: **KK**
 Project Name: **Additional Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **SS**
 Project Location: **166 South Service Road East, Oakville, Ontario** Date Started: **22 May 9** Date Completed: **22 May 10** Revision No.: **0, 22-7-5**

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
	Description	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RCD%	Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80		
Geodetic Ground Surface Elevation: 105.26 m										
TOPSOIL: 100 mm FILL: clayey silt, trace to some sand, trace gravel, trace rootlets, dark brown, moist, stiff CLAYEY SILT TILL: trace sand, trace gravel, grey, moist, very stiff to hard BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist	SS	1	79	14	105	105.0	○	○12		
	SS	2	95	16	104	104.8	○	○11		
	SS	3	100	25	103	103.4	○	○9		
	SS	4	67	39	102	101.91	○	○8		
	SS	5	100	50/13cm	101	101.91	○	○50 13cm		
	SS	6	38	50/8cm	100	101.91	○	○50 8cm		
	RC	1	93	76	93	93.0	○			
	RC	2	100	57	92	92.0	○			
	RC	3	100	81	91	91.0	○			

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No freestanding groundwater measured in open borehole on completion of drilling. Cave in depth recorded on completion of drilling: Open m.
 Groundwater depth observed on 2022-05-31 at a depth of: 18.59 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying Notes to Record of Boreholes.

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RECORD OF BOREHOLE No. BH/MW204



Project Number: **BIGC-ENV-457B**

Drilling Location: **See Borehole Location Plan**

Logged by: **KK**

Lithology Plot	LITHOLOGY PROFILE DESCRIPTION	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing ○ SPT ● DCPT	MTO Vane* △ Intact ▲ Remould	Nilcon Vane* ◇ Intact ◆ Remould	★ Rinse pH Values 2 4 6 8 10 12		
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist - 2 inch clay seam - Fair Quality	RC	4	100	72	89		○					
	- Good Quality - highly weathered	RC	5	100	78	17 88		○					
	- Fair Quality	RC	6	98	56	19 87		○					
	- Fair Quality	RC	7	100	64	20 85		○					
	- Very Poor Quality - highly weathered with clay interbedded from 22.1 m to 23.3 m bgs	RC	8	100	14	21 84		○					
	- Fair Quality	RC	9	98	58	22 83		○					
	- Fair Quality	RC	10	79	45	23 82		○					
	- Excellent Quality	RC	11	100	93	24 81		○					
	- Good Quality	RC	12	100	83	25 80		○					
	- Good Quality	RC	13	100	84	26 79		○					
						27 78		○					
						28 77		○					
						29 76		○					
					30 75		○						
	End of Borehole 74.56 30.7												
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading not measured due to core water upon completion of drilling. 3. Groundwater level reading at 18.59 m bgs on May 31, 2022.												

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW205



Project Number: BIGC-ENV-457B Drilling Location: See Borehole Location Plan Logged by: KK
 Project Client: Distrikt Capital Drilling Method: 150 mm Hollow Stem Augering + Rock Compiled by: KK
 Project Name: Additional Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 22 May 5 Date Completed: 22 May 5 Revision No.: 0, 22-7-5

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	Description	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RCD%	Penetration Testing	Soil Vapour Reading	Rinse pH Values		
Geodetic Ground Surface Elevation: 105.00 m												
TOPSOIL: 150 mm FILL: clayey silt, trace to some sand, trace gravel, trace rootlets, dark brown, moist to very moist, very stiff CLAYEY SILT TILL: trace sand, trace gravel, grey, moist, very stiff to hard BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist	SS	1	87	18			○	○11				
	SS	2	100	20	1	104	○	○14				
	SS	3	100	41	2	103	○	○10				
	SS	4	100	28			○	○8				
	SS	5	90	50/5cm	3	102	○	○50				
	SS	6	56	50/3cm	5	100	○	○50				
ROCK CORE BEGINS												
- Poor Quality	RC	1	87	44			○					
- Poor Quality	RC	2	100	36			○					
- Poor Quality	RC	3	100	46			○					

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No freestanding groundwater measured in open borehole on completion of drilling.
 Cave in depth recorded on completion of drilling: Open m.
 Groundwater depth observed on 2022-05-31 at a depth of: 18.27 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW205



Project Number: **BIGC-ENV-457B**

Drilling Location: **See Borehole Location Plan**

Logged by: **KK**

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80		★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _p W W _L Plastic Liquid 20 40 60 80					
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist - Fair Quality	RC	4	100	67	17	88		○						
	- Fair Quality	RC	5	100	57	18	87		○						
	- Fair Quality	RC	6	100	64	19	86		○						
	- Fair Quality	RC	7	100	88	21	84		○						
	- Good Quality	RC	8	100	61	22	83		○						
	Fair Quality	RC	9	100	86	23	82		○						
	- Good Quality	RC	10	92	65	24	81		○						
	- Fair Quality	RC	11	100	68	25	80		○						
	- Fair Quality	RC	12	100	86	26	79		○						
	- Good Quality	RC	13	100	93	27	78		○						
	- Good Quality	RC				28	77		○						
	- Good Quality	RC				29	76		○						
	- Good Quality	RC				30	75		○						
End of Borehole 74.48 30.5 Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading not measured due to core water upon completion of drilling. 3. Groundwater level reading at 18.27 m bgs on May 31, 2022.															

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW206



Project Number: **BIGC-ENV-457B** Drilling Location: **See Borehole Location Plan** Logged by: **KK**
 Project Client: **District Capital** Drilling Method: **150 mm Hollow Stem Augering + Rock** Compiled by: **KK**
 Project Name: **Additional Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **SS**
 Project Location: **166 South Service Road East, Oakville, Ontario** Date Started: **22 May 6** Date Completed: **22 May 6** Revision No.: **0, 22-7-5**

Lithology Profile	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)							SPT 'N' Value/RCD%
Geodetic Ground Surface Elevation: 104.66 m											
	TOPSOIL: 100 mm FILL: clayey silt, trace to some sand, trace gravel, trace rootlets, dark brown, moist, very stiff	SS	1	75	18			Rinse pH Values: 2, 4, 6, 8, 10, 12 Soil Vapour Reading parts per million (ppm): 100, 200, 300, 400 Lower Explosive Limit (LEL): W _p , W, W _L Plastic: 20, 40, 60, 80 Liquid: 20, 40, 60, 80			
	CLAYEY SILT TILL: trace sand, trace gravel, grey, moist, very stiff to hard	SS	2	87	13	1					
		SS	3	100	36	2					
		SS	4	92	34						
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist	SS	5	100	89/8cm	3		89 8cm			
		SS	6	100	50/10cm	5		50 10cm			
ROCK CORE BEGINS											
- Very Poor Quality	RC	1	59	18							
- Poor Quality	RC	2	100	32							
- Poor Quality	RC	3	100	34							

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No freestanding groundwater measured in open borehole on completion of drilling.
 Cave in depth recorded on completion of drilling: Open m.
 Groundwater depth observed on 2022-05-31 at a depth of: 17.78 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW206



Project Number: **BIGC-ENV-457B**

Drilling Location: **See Borehole Location Plan**

Logged by: **KK**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
		DESCRIPTION	Sample Type	Sample Number	Recovery (%)			SPT 'N' Value/RQD%	Penetration Testing	Soil Vapour Reading parts per million (ppm)	Lower Explosive Limit (LEL)		
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist												
	- Fair Quality	RC	4	100	51	88		○					
	- Poor Quality	RC	5	100	32	87		○					
	- Fair Quality	RC	6	100	71	85		○					
	- Fair Quality	RC	7	100	58	83		○					
	Good Quality	RC	8	100	88	82		○					
	- Good Quality	RC	9	100	84	80		○					
	- Excellent Quality	RC	10	100	93	79		○					
	- Excellent Quality	RC	11	100	92	77		○					
	- Good Quality	RC	12	100	89	76		○					
	- Excellent Quality	RC	13	100	100	75		○					
	End of Borehole					74							
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading not measured due to core water upon completion of drilling. 3. Groundwater level reading at 17.78 m bgs on May 31, 2022.												

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW1



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: District Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 27 Apr 21 Date Completed: 27 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	DEPTH (m)	ELEVATION (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	Penetration Testing	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading		
	Geodetic Ground Surface Elevation: <u>104.79 m</u>													
	TOPSOIL: 150 mm	104.64												
	FILL: clayey silt, trace sand, trace gravel, top soil inclusions, fragments of Shale, dark brown, damp, stiff	104.2		SS	1	95	8							
			1											
				SS	2	84	9							
			2											
	CLAYEY SILT TILL: trace to some sand, trace 1.5 gravel, fragments of Shale, reddish brown, moist, very stiff to hard	103.27		SS	3	92	29							
	- grey													
				SS	4	70	41							
			3											
				SS	5	57	50/8							
	BEDROCK: Shale, highly weathered, fragments of Limestone, reddish brown, moist, hard	101.74												
		3.1												
			4											
				SS	6	40	50/5							
			5											
				SS	7	80	50/10							
			6											
				SS	8	100	50/5							
			7											
				SS	9	100	50/8							
			8											
				SS	10	100	50/3							
			9											
				SS	11	100	50/3							
			10											
				SS	12	100	50/3							
			11											
				SS	14	100	50/3							
			12											
	End of Borehole	92.57												
		12.2												

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∇ Groundwater depth on completion of drilling: 3.66 m. ■ Cave in depth recorded on completion of drilling: Open m.
 ▼ Groundwater depth observed on 04/05/2021 at a depth of: 6.25 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW2



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: District Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 27 Apr 21 Date Completed: 27 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	ELEVATION (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	DEPTH (m)	ELEVATION (m)	Penetration Testing	Soil Vapour Reading	Lower Explosive Limit (LEL)	Plastic			Liquid
	Geodetic Ground Surface Elevation: <u>104.63 m</u>														
	TOPSOIL: 150 mm FILL: clayey silt, trace gravel, top soil inclusions, fragments of Shale, dark brown, moist, very soft to stiff	104.48 0.2	SS	1	51	2									
	CLAYEY SILT TILL: trace sand, trace gravel, 1.1 fragments of Shale, light brown, moist, stiff to hard	103.56	SS	2	84	15	1								
	- sandy - possible cobble/boulder		SS	3	90	50/15			50 15						
			SS	4	0	50/15			50 15						
	BEDROCK: Shale, highly weathered, fragments of Limestone, reddish brown, moist, hard	101.33 3.3	SS	5	32	50/10	3		50 10						
	grey		SS	6	63	50/8			50 8						
	End of Borehole	98.48 6.2	SS	7	100	50/5	6		50 5						
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 3.66 m bgs upon completion of drilling. 3. Groundwater level reading at 2.64 m bgs on May 4, 2021.														

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∇ Groundwater depth on completion of drilling: 3.66 m. ■ Cave in depth recorded on completion of drilling: Open m.
 ▽ Groundwater depth observed on 04/05/2021 at a depth of: 2.64 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH3



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: District Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 27 Apr 21 Date Completed: 27 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Geodetic Ground Surface Elevation: 105.12 m	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%			Penetration Testing	Soil Vapour Reading	Lower Explosive Limit (LEL)	Plastic		
	TOPSOIL: 150 mm 104.97 0.2						105				18			
	FILL: clayey silt, trace gravel, top soil inclusions, fragments of Shale, dark brown, damp, hard - sand and gravel, brown, moist, dense - silty sand, trace gravel, topsoil inclusion brown moist, compact 104.65 1.7	SS	1	70	32		104				14			
	CLAYEY SILT TILL: trace to some sand, trace gravel, fragments of Shale, brown, moist, stiff to hard - sandy silt/silty sand till, trace gravel, fragments of Shale, light brown, , moist, compact 103	SS	2	95	10		103				13			
		SS	3	95	28		102				13			
		SS	4	54	45		101							
	BEDROCK: Shale, highly weathered, fragments of Limestone, grey, moist to damp, hard 102.07 3.1	SS	5	53	50/15		102							
							101							
	End of Borehole 100.50 4.6	SS	6	100	50/5		100							
	Notes: 1. Borehole open upon completion of drilling. 2. Borehole dry upon completion of drilling.													

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∇ Groundwater depth on completion of drilling: Dry m. ☐ Cave in depth recorded on completion of drilling: Open m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW4



Project Number: **BIGC-ENV-457A** Drilling Location: **See Borehole Location Plan** Logged by: **AB**
 Project Client: **District Capital** Drilling Method: **150 mm Hollow Stem Augering** Compiled by: **AB**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **SS**
 Project Location: **166 South Service Road East, Oakville, Ontario** Date Started: **27 Apr 21** Date Completed: **27 Apr 21** Revision No.: **0, 28/5/21**

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	DEPTH (m)	ELEVATION (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	Penetration Testing	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading		
	Geodetic Ground Surface Elevation: 105.59 m													
	ASPHALT PAVEMENT: 200 mm asphalt over 200 mm granular bases	105.19		SS	1	59	4							
	FILL: clayey silt, trace sand, trace gravel, grey, very moist, soft	104.83		SS	2	59	38							
	CLAYEY SILT TILL: trace sand, trace gravel, fragments of Shale, reddish brown, moist, hard	103.30		SS	3	33	53							
	BEDROCK: Shale, highly weathered, fragments of Limestone, reddish brown, moist to damp, hard	2.3		SS	4	29	50/13							
				SS	5	33	50/15							
				SS	6	100	50/13							
				SS	7	63	50/8							
				SS	8	60	50/5							
				SS	9	100	50/3							
				SS	10	100	50/3							
				SS	11	100	50/3							
				SS	12	100	50/3							
	End of Borehole	93.37		SS	14	100	50/3							
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 4.57 m bgs upon completion of drilling. 3. Groundwater level reading at 3.46 m bgs on May 4, 2021.	12.2												

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∇ Groundwater depth on completion of drilling: 4.57 m. ■ Cave in depth recorded on completion of drilling: Open m.
 ▼ Groundwater depth observed on 04/05/2021 at a depth of: 3.46 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH5



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: District Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 27 Apr 21 Date Completed: 27 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT MTO Vane* Nilcon Vane* △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) W _p W W _L Plastic Liquid 20 40 60 80					
	Geodetic Ground Surface Elevation: <u>105.62 m</u>														
	ASPHALT PAVEMENT: 200 mm asphalt over 200 mm granular bases	105.22	SS	1	67	9									
	FILL: clayey silt, trace sand, trace gravel, grey, very moist, form	0.4													
		104.10													
	CLAYEY SILT TILL: trace sand, trace gravel, fragments of Shale, reddish brown, moist, hard	1.5	SS	2	75	6									
		103.33													
	BEDROCK: Shale, highly weathered, fragments of Limestone, reddish brown, moist to damp	2.3	SS	3	95	35									
		103.33													
	grey		SS	4	38	50/13									
			SS	5	20	50/5									
			SS	6	60	50/3									
	End of Borehole	101.00 4.6													
	Notes: 1. Borehole open upon completion of drilling. 2. Borehole dry upon completion of drilling.														

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∇ Groundwater depth on completion of drilling: Dry m. ■ Cave in depth recorded on completion of drilling: Open m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW6



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: District Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 27 Apr 21 Date Completed: 27 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS	
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	DEPTH (m)	ELEVATION (m)	Penetration Testing ○ SPT ● DCPT △ Intact ◇ Intact ▲ Remould ◆ Remould * Undrained Shear Strength (kPa) 20 40 60 80	MTO Vane* ○ Intact ● Remould	Nilcon Vane* ◇ Intact ◆ Remould	★ Rinse pH Values 2 4 6 8 10 12	Soil Vapour Reading parts per million (ppm) 100 200 300 400			Lower Explosive Limit (LEL) W _p W _L
	Geodetic Ground Surface Elevation: 105.66 m														
	ASPHALT PAVEMENT: 200 mm asphalt over 200 mm granular bases	SS	1	62	2		105.26				25				
	FILL: silty sand, some gravel, brown, moist, very loose	SS	2	67	36	1	104.90	○ 50 ○ 15			19				
	CLAYEY SILT TILL: trace sand, trace gravel, fragments of Shale, reddish brown, moist, hard	SS	3	81	50/15	2	104.14	○ 50 ○ 15			6				
	BEDROCK: Shale, highly weathered, occasional Limestone layers, reddish brown, moist, hard	SS	4	60	50/5	3	103.14	○ 50 ○ 15			11				
		SS	5	53	50/15	4	102.14	○ 50 ○ 15			5				
		SS	6	100	50/3	5	101.14	○ 50 ○ 15			3				
		SS	7	100	50/3	6	99.53	○ 50 ○ 15			3				
	End of Borehole						6.1								
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 4.27 m bgs upon completion of drilling. 3. Groundwater level reading at 3.39 m bgs on May 4, 2021.														

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▽ Groundwater depth on completion of drilling: 4.27 m. ■ Cave in depth recorded on completion of drilling: Open m.
 ▽ Groundwater depth observed on 04/05/2021 at a depth of: 3.39 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH7



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: District Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 28 Apr 21 Date Completed: 28 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	DEPTH (m)	ELEVATION (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	Penetration Testing	Soil Vapour Reading	Lower Explosive Limit (LEL)	Plastic	Liquid		
	Geodetic Ground Surface Elevation: <u>105.80 m</u>													
	ASPHALT PAVEMENT: 200 mm asphalt over 200 mm granular bases	105.40		SS	1	25	4							
	FILL: clayey silt, trace sand, some sand, trace gravel, dark brown, moist, soft	105.04												
	CLAYEY SILT TILL: trace sand, trace gravel, 0.8 fragments of Shale, reddish brown, moist, hard		1	SS	2	75	44							
			2	SS	3	71	50/13							
			3	SS	4	42	50/15							
		102.75	3	SS	5	63	50/8							
	BEDROCK: Shale, highly weathered, occasional Limestone layers, reddish brown, damp, hard	3.1												
			4											
		101.20												
	End of Borehole	4.6		SS	6	100	50/3							
	Notes: 1. Borehole open upon completion of drilling. 2. Borehole dry upon completion of drilling.													

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Groundwater depth on completion of drilling: Dry m. Cave in depth recorded on completion of drilling: Open m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW8



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: District Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 28 Apr 21 Date Completed: 28 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	DEPTH (m)	ELEVATION (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	Penetration Testing	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading		
	Geodetic Ground Surface Elevation: 105.63 m													
	ASPHALT PAVEMENT: 200 mm asphalt over 200 mm granular bases	105.23		SS	1	13	7							
	FILL: sand and gravel, dark brown, moist, loose	0.4		SS	2	75	6							
	- clayey silt, some sand, trace gravel, dark brown, moist, soft	104.11		SS	3	84	26							
	CLAYEY SILT TILL: trace sand, trace gravel, fragments of Shale, reddish brown, moist, very stiff to hard	1.5		SS	4	79	40							
	BEDROCK: Shale, highly weathered, occasional Limestone layers, reddish brown, moist to damp, hard	3.1		SS	5	70	49							
		99.50		SS	6	60	50/5							
	End of Borehole	6.1		SS	7	100	50/3							
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading at 4.88 m bgs upon completion of drilling. 3. Groundwater level reading at 3.01 m bgs on May 4, 2021.													

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∇ Groundwater depth on completion of drilling: 4.88 m. ■ Cave in depth recorded on completion of drilling: Open m.
 ▼ Groundwater depth observed on 04/05/2021 at a depth of: 3.01 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH9



Project Number: BIGC-ENV-457A Drilling Location: See Borehole Location Plan Logged by: AB
 Project Client: Distrikt Capital Drilling Method: 150 mm Hollow Stem Augering Compiled by: AB
 Project Name: Preliminary Geotechnical Investigation Drilling Machine: Truck Mounted Drill Reviewed by: SS
 Project Location: 166 South Service Road East, Oakville, Ontario Date Started: 28 Apr 21 Date Completed: 28 Apr 21 Revision No.: 0, 28/5/21

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
		DESCRIPTION	Sample Type	Sample Number	Recovery (%)						
	Geodetic Ground Surface Elevation: <u>105.46 m</u>										
	ASPHALT PAVEMENT: 200 mm asphalt over 200 mm granular bases 105.06	SS	1	67	6						
	FILL: silty sand, trace gravel, brown, moist, loose 0.4 - clayey silt, some sand, trace gravel, dark brown, moist, soft 103.94	SS	2	75	4	1					
	SILTY CLAY/CLAYEY SILT TILL: trace sand, trace gravel, fragments of Shale, reddish brown, moist to damp, firm to hard 102.41	SS	3	207	8	2					
	BEDROCK: Shale, highly weathered, fragments of Limestone, reddish brown, damp, hard 3.1 102.41	SS	5	80	50/10	3					
	End of Borehole 100.84 4.6	SS	6	60	50/5	4					
	Notes: 1. Borehole open upon completion of drilling. 2. Borehole dry upon completion of drilling.										

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∇ Groundwater depth on completion of drilling: Dry m. ☐ Cave in depth recorded on completion of drilling: Open m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH/MW10



Project Number: **BIGC-ENV-457A** Drilling Location: **See Borehole Location Plan** Logged by: **AB**
 Project Client: **District Capital** Drilling Method: **150 mm Hollow Stem Augering + Rock Coring** Compiled by: **AB**
 Project Name: **Preliminary Geotechnical Investigation** Drilling Machine: **Truck Mounted Drill** Reviewed by: **SS**
 Project Location: **166 South Service Road East, Oakville, Ontario** Date Started: **28 Apr 21** Date Completed: **28 Apr 21** Revision No.: **0, 28/5/21**

Lithology Plot	LITHOLOGY PROFILE		SOIL SAMPLING				FIELD TESTING		LAB TESTING				INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	DEPTH (m)	ELEVATION (m)	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/ROD%	Penetration Testing	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading	Soil Vapour Reading		
	Geodetic Ground Surface Elevation: 105.44 m													
	ASPHALT PAVEMENT: 200 mm asphalt over 200 mm granular bases	105.04		SS	1	62	9							
	FILL: silty sand, some gravel, brown to grey, moist, loose	104.68		SS	2	95	6							
	CLAYEY SILT TILL: trace sand, trace gravel, reddish brown, moist, firm		1	SS	3	62	21							
	- very stiff		2	SS	4	67	50/15							
	- occasional fragments of Shale, hard		3	SS	5	77	50/13							
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist	102.39		SS	6	63	50/8							
		3.1		SS	7	60	50/5							
			5	SS	8	60	50/3							
			6	SS	9	100	50/3							
			8	SS	10	60	50/5							
	ROCK CORE BEGINS		11	RC	1	57	0							
	- Very Poor Quality		12	RC	2	96	86							
	grey		13	RC	3	100	87							
	- Good Quality		14											

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Groundwater depth on completion of drilling: Core water m. Cave in depth recorded on completion of drilling: Open m.
 Groundwater depth observed on 04/05/2021 at a depth of: 18.28 m.

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

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RECORD OF BOREHOLE No. BH/MW10



Project Number: **BIGC-ENV-457A**

Drilling Location: **See Borehole Location Plan**

Logged by: **AB**

Lithology Plot	LITHOLOGY PROFILE	SOIL SAMPLING				DEPTH (m)	ELEVATION (m)	FIELD TESTING		LAB TESTING		INSTRUMENTATION INSTALLATION	COMMENTS
	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value/RQD%			Penetration Testing	Soil Vapour Reading parts per million (ppm)	Lower Explosive Limit (LEL)	W _p		
	BEDROCK: Shale, highly weathered to excellent quality, occasional limestone layers, reddish brown to grey, damp to moist					91							
	- Good Quality	RC	4	100	81	15							
	- Good Quality	RC	5	100	85	16							
	- Excellent Quality	RC	6	100	95	17							
	- Good Quality	RC	7	100	84	18							
	----- clay seam, trace gravel, shale inclusion, grey, very moist ----- - Fair Quality	RC	8	79	54	19							
	- Excellent Quality	RC	9	100	91	20							
	81.97					21							
	End of Borehole 23.5					22							
	Notes: 1. Borehole open upon completion of drilling. 2. Ground water level reading not measured due to core water upon completion of drilling. 3. Groundwater level reading at 18.28 m bgs on May 4, 2021.					23							
						82							

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commissioned and the accompanying 'Notes to Record of Boreholes'.

APPENDIX B: MECP WWR, PTTW AND EASR SUMMARY TABLES

Table B-1: MECP WWR Summary Table

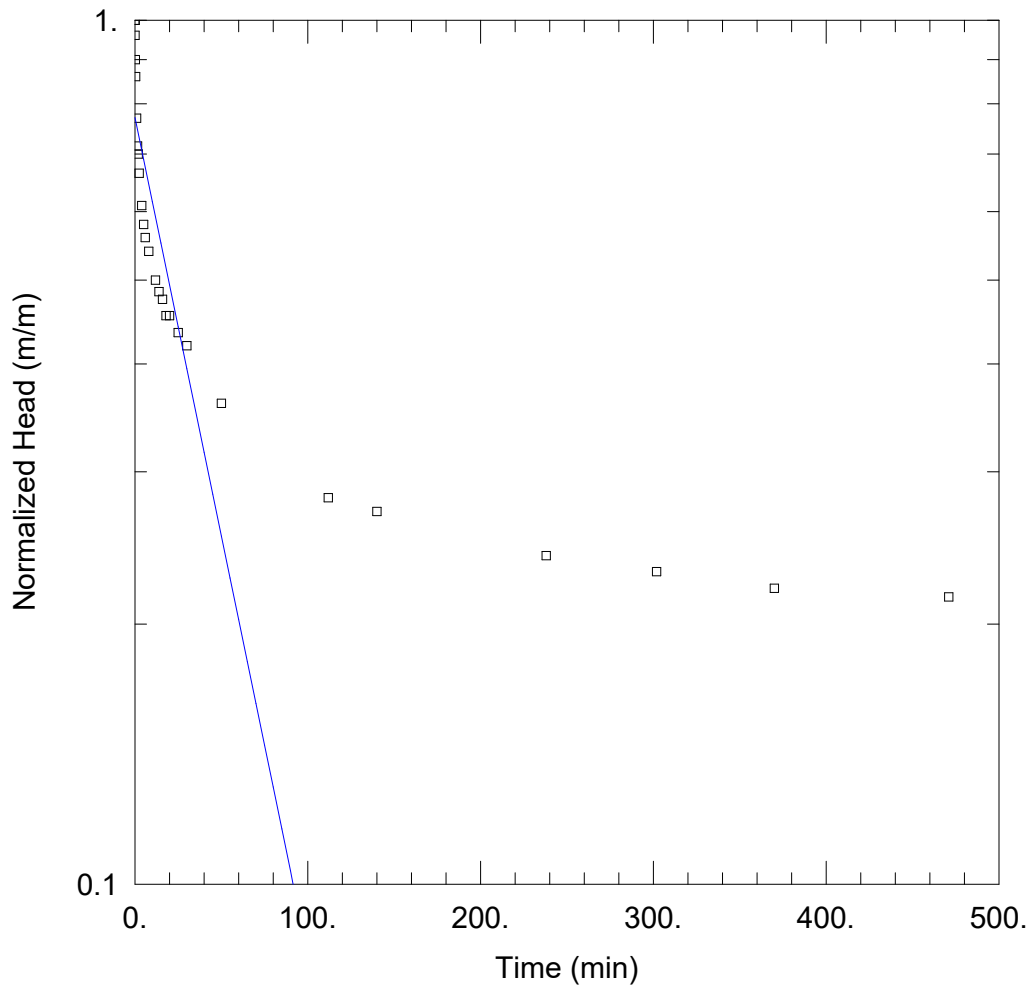
Count	Well ID	Date Completed	Depth (m)	Reported Water Level (m)	Status of Well
1.	2802422	07/21/1948	12.2	4.9	Water supply
2.	2810039	04/06/2004	5.1	N/A	Observation well
3.	2810392	09/20/2005	4.5	N/A	Observation well
4.	7041205	01/12/2007	2.4	N/A	Observation well
5.	7100453	09/26/2007	4.7	N/A	Observation well
6.	7100453	09/26/2007	N/A	N/A	Observation well
7.	7101141	09/27/2007	N/A	N/A	Monitoring and test hole
8.	7101141	09/27/2007	N/A	N/A	Monitoring and test hole
9.	7134031	09/16/2009	6.1	N/A	Observation well
10.	7152039	09/03/2010	4.0	N/A	Monitoring and test hole
11.	7152039	09/03/2010	N/A	N/A	Monitoring and test hole
12.	7152039	09/03/2010	N/A	N/A	Monitoring and test hole
13.	7152039	09/03/2010	N/A	N/A	Monitoring and test hole
14.	7152039	09/03/2010	N/A	N/A	Monitoring and test hole
15.	7152039	09/07/2010	N/A	N/A	Monitoring and test hole
16.	7152039	09/07/2010	N/A	N/A	Monitoring and test hole
17.	7152039	09/07/2010	N/A	N/A	Monitoring and test hole
18.	7152039	09/07/2010	N/A	N/A	Monitoring and test hole
19.	7152039	09/07/2010	N/A	N/A	Monitoring and test hole
20.	7152039	09/07/2010	N/A	N/A	Monitoring and test hole
21.	7152039	09/08/2010	N/A	N/A	Monitoring and test hole
22.	7152039	09/08/2010	N/A	N/A	Monitoring and test hole
23.	7152039	09/08/2010	N/A	N/A	Monitoring and test hole
24.	7152039	09/09/2010	N/A	N/A	Monitoring and test hole
25.	7152039	09/09/2010	N/A	N/A	Monitoring and test hole
26.	7161332	03/29/2011	3.4	N/A	Monitoring and test hole
27.	7161333	03/29/2011	3.4	N/A	Monitoring and test hole
28.	7161334	03/29/2011	3.4	N/A	Monitoring and test hole
29.	7188619	04/13/2012	N/A	N/A	N/A
30.	7192191	05/18/2012	N/A	N/A	N/A
31.	7253999	11/20/2015	6.1	N/A	Monitoring and test hole
32.	7254000	11/20/2015	6.1	N/A	Monitoring and test hole
33.	7259855	09/09/2015	N/A	N/A	N/A
34.	7263647	04/23/2016	6.1	N/A	Monitoring and test hole
35.	7263648	04/23/2016	6.1	N/A	Monitoring and test hole
36.	7263649	04/23/2016	6.1	N/A	Monitoring and Test Hole
37.	7263650	04/23/2016	6.1	N/A	Monitoring and Test Hole
38.	7286766	N/A	N/A	N/A	N/A
39.	7322522	05/17/2018	6.1	N/A	Monitoring and Test Hole
40.	7322523	05/17/2018	5.0	N/A	Monitoring and test hole
41.	7322524	05/17/2018	6.4	N/A	Monitoring and test hole
42.	7325283	09/11/2018	N/A	N/A	N/A

Count	Well ID	Date Completed	Depth (m)	Reported Water Level (m)	Status of Well
43.	7327366	08/29/2018	N/A	N/A	N/A
44.	7329556	01/04/2019	16.8	N/A	Monitoring
45.	7343775	09/05/2019	N/A	N/A	N/A
46.	7374253	10/29/2020	N/A	N/A	N/A
47.	7376602	08/13/2020	N/A	N/A	N/A
48.	7384388	01/26/2021	6.1	N/A	Observation well
49.	7384399	01/26/2021	7.6	N/A	Observation well
50.	7384400	01/26/2021	6.1	N/A	Observation well
51.	7384402	01/26/2021	6.1	N/A	Observation well

Table B-2: MECP EASR Summary Table

Permit Number	Purpose	Address	Municipality	Water Source	Max L/Day	Active
8107-9KKLR9	Unknown	Queen Elizabeth Way (Hwy 403)	Oakville	Surface water	449,280,000	No
0551-72YPT5	Dewatering construction	Northeast of Queen Elizabeth Way (Hwy 403) and Kerr Street	Oakville	Groundwater	1,962,744	No
2668-6TRQ7G	Dewatering construction	Northeast of Queen Elizabeth Way (Hwy 403) and Kerr Street	Oakville	Groundwater	1,962,744	No
4375-6NYL7V	Dewatering construction	Northeast of Queen Elizabeth Way (Hwy 403) and Kerr Street	Oakville	Groundwater	1,962,744	No
0772-AF3HTJ	Tunnel	Canadian National Railway and Cross Avenue	Oakville	Groundwater	20,000	No
0772-AF3HTJ	Mine – shaft or other	Canadian National Railway and Cross Avenue	Oakville	Groundwater	428,000	No
0772-AF3HTJ	Unknown	Canadian National Railway and Cross Avenue	Oakville	Groundwater	400,000	No
62-P-17	Lake	419 River Side Drive	Oakville	Surface water	1,083,940	No
R-009-2112317313	Construction dewatering	547 Trafalgar Road	Oakville	Groundwater	50,000 to 400,000	Yes
R-009-9112436776	Construction dewatering	Trans-Northern Pipelines Inc.	Oakville	Groundwater	50,000 to 400,000	Yes

APPENDIX C: SWRT RESULTS



WELL TEST ANALYSIS

Data Set: C:\...\BHMW201 - 457B.aqt
 Date: 07/29/22

Time: 12:08:16

PROJECT INFORMATION

Company: B.I.G. Consulting
 Client: 166 South Service Inc.
 Project: BIGC-ENV-457B
 Location: 166 South Service Road
 Test Well: BH/MW201
 Test Date: May 27, 2022

AQUIFER DATA

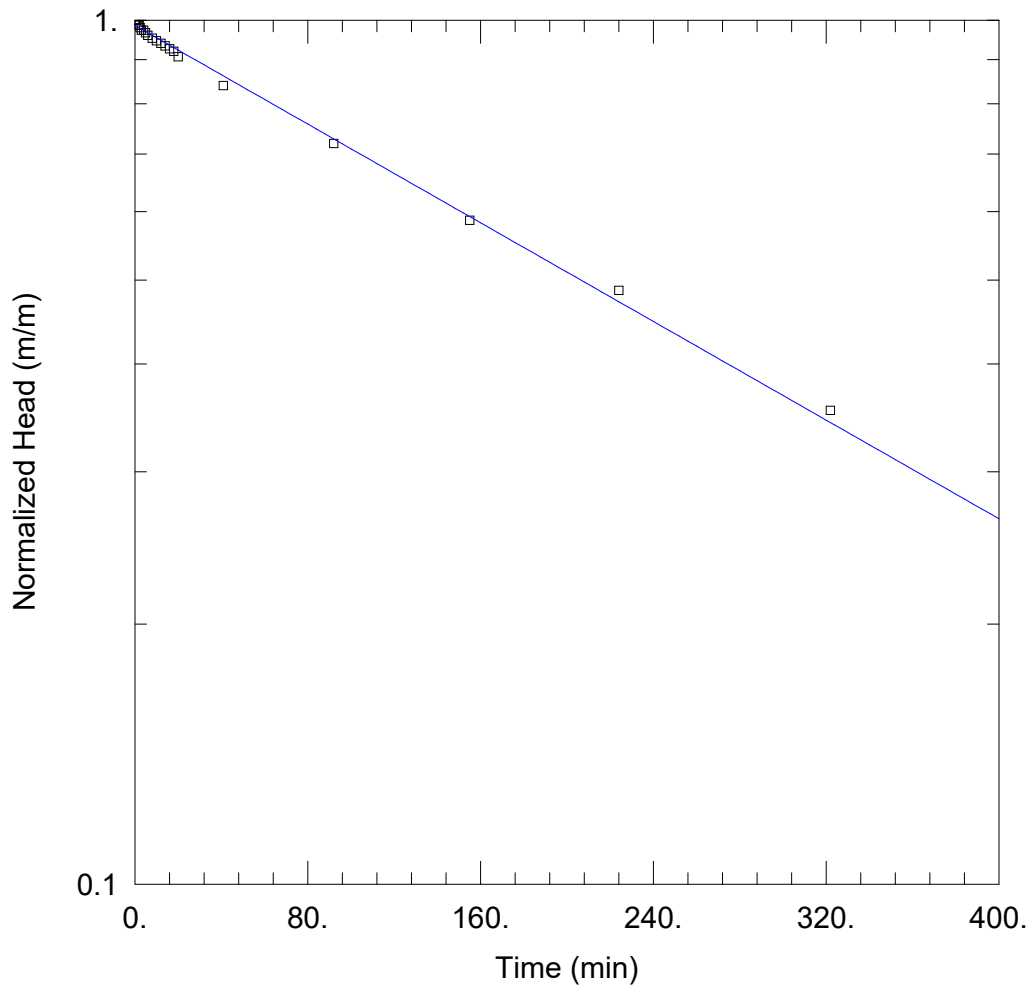
Saturated Thickness: 8.19 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW201)

Initial Displacement: 1. m Static Water Column Height: 8.19 m
 Total Well Penetration Depth: 8.19 m Screen Length: 3. m
 Casing Radius: 0.0254 m Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 2.184E-7 m/sec y0 = 0.7712 m



WELL TEST ANALYSIS

Data Set: C:\...\BHMW202 - 457B.aqt
 Date: 07/29/22

Time: 15:58:33

PROJECT INFORMATION

Company: B.I.G. Consulting
 Client: 166 South Service Inc.
 Project: BIGC-ENV-457B
 Location: 166 South Service Road
 Test Well: BH/MW202
 Test Date: May 27, 2022

AQUIFER DATA

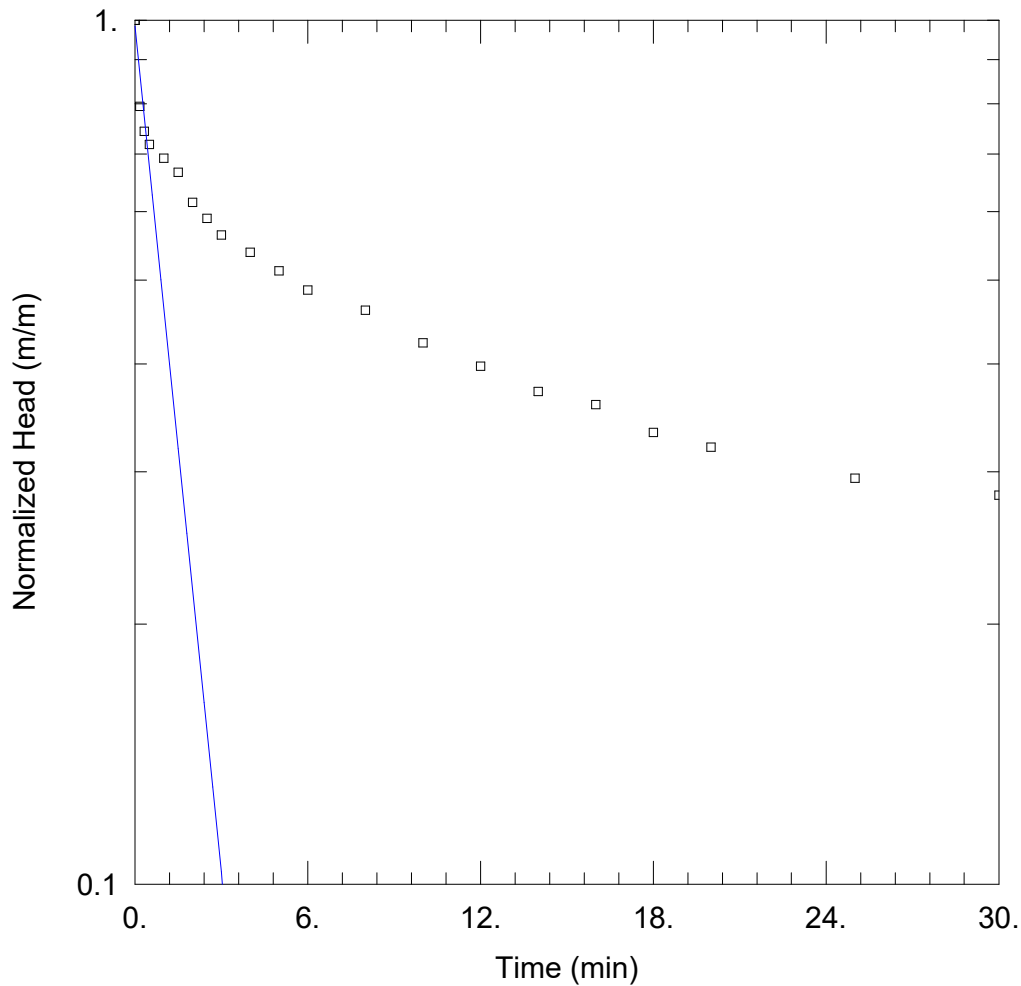
Saturated Thickness: 5.18 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW202)

Initial Displacement: 0.75 m Static Water Column Height: 5.18 m
 Total Well Penetration Depth: 5.18 m Screen Length: 3. m
 Casing Radius: 0.0254 m Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev
 K = 3.219E-8 m/sec y0 = 0.7394 m



WELL TEST ANALYSIS

Data Set: C:\...\BHMW203.aqt

Date: 07/29/22

Time: 16:13:18

PROJECT INFORMATION

Company: B.I.G. Consulting

Client: 166 South Service Inc.

Project: BIGC-ENV-457B

Location: 166 South Service Road

Test Well: BH/MW203

Test Date: May 27, 2022

AQUIFER DATA

Saturated Thickness: 2.09 m

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW203)

Initial Displacement: 0.39 m

Static Water Column Height: 2.09 m

Total Well Penetration Depth: 2.09 m

Screen Length: 2.09 m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m

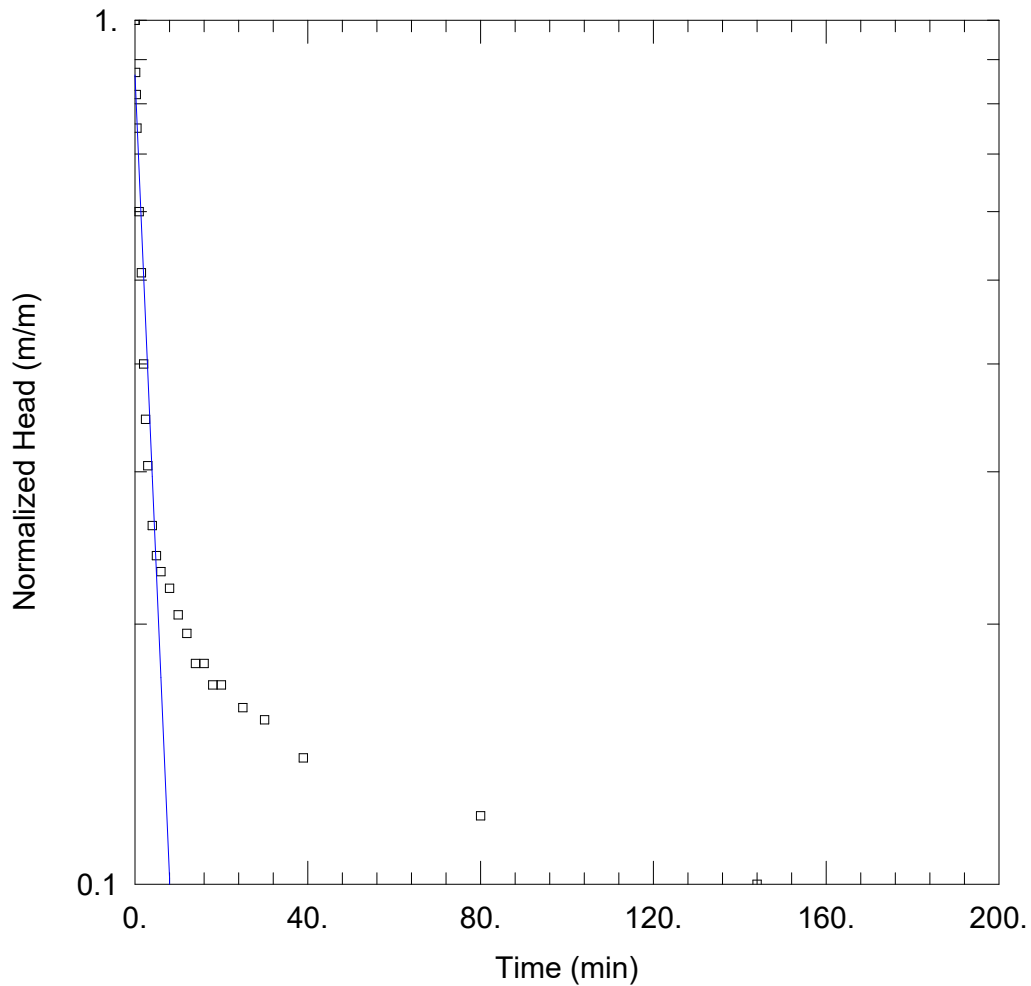
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

K = 1.024E-5 m/sec

y0 = 0.384 m



WELL TEST ANALYSIS

Data Set: C:\...\BHMW204 - 457B.aqt
 Date: 07/29/22

Time: 16:15:35

PROJECT INFORMATION

Company: B.I.G. Consulting
 Client: 166 South Service Inc.
 Project: BIGC-ENV-457B
 Location: 166 South Service Road
 Test Well: BH/MW204
 Test Date: May 19, 2022

AQUIFER DATA

Saturated Thickness: 6.36 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW204)

Initial Displacement: 1. m
 Total Well Penetration Depth: 6.36 m
 Casing Radius: 0.0254 m

Static Water Column Height: 6.36 m
 Screen Length: 3. m
 Well Radius: 0.0254 m

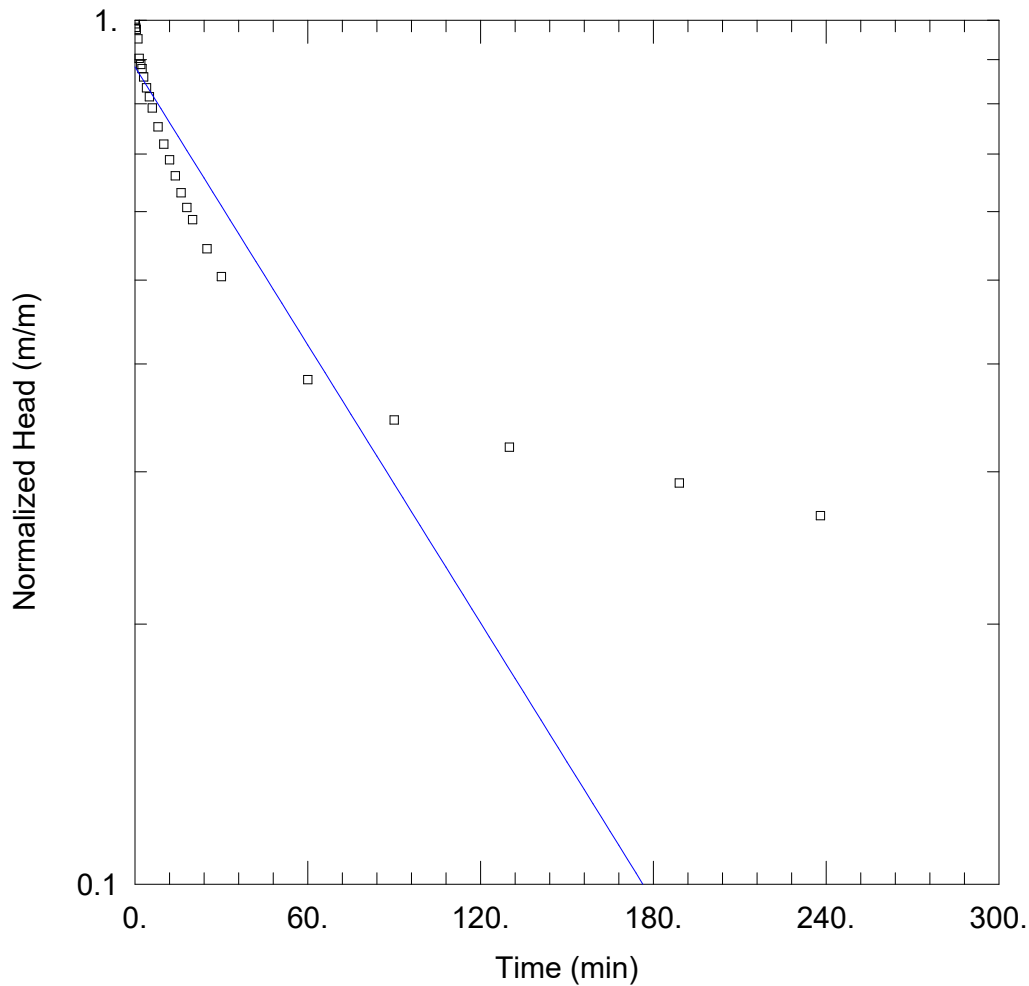
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 2.288E-6$ m/sec

$y_0 = 0.8638$ m



WELL TEST ANALYSIS

Data Set: C:\...\BHMW205 - 457B.aqt

Date: 07/29/22

Time: 16:16:37

PROJECT INFORMATION

Company: B.I.G. Consulting

Client: 166 South Service Inc.

Project: BIGC-ENV-457B

Location: 166 South Service Road

Test Well: BH/MW205

Test Date: May 19, 2022

AQUIFER DATA

Saturated Thickness: 9.81 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW205)

Initial Displacement: 1.03 m

Static Water Column Height: 9.81 m

Total Well Penetration Depth: 9.81 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m

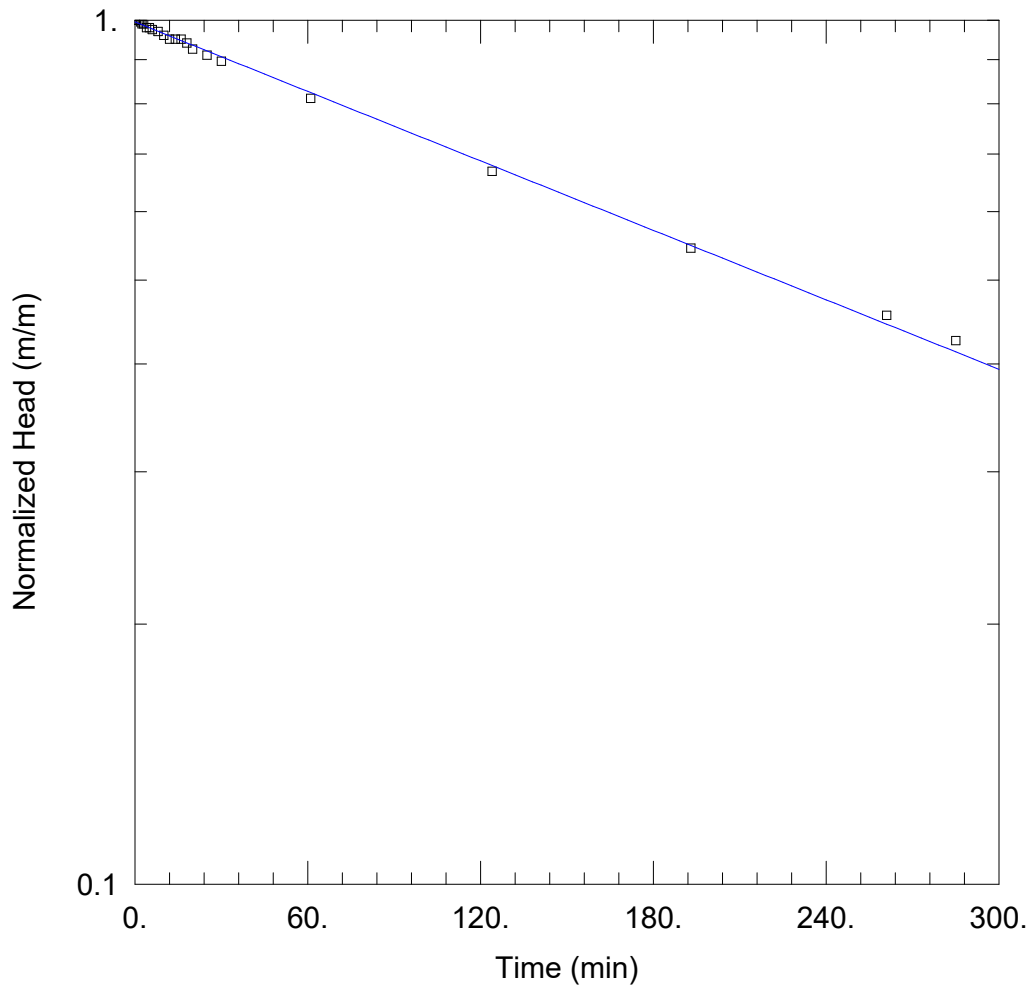
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 1.056E-7$ m/sec

$y_0 = 0.9091$ m



WELL TEST ANALYSIS

Data Set: C:\...\BHMW206.aqt
 Date: 07/29/22

Time: 16:17:56

PROJECT INFORMATION

Company: B.I.G. Consulting
 Client: 166 South Service Inc.
 Project: BIGC-ENV-457B
 Location: 166 South Service Road
 Test Well: BH/MW206
 Test Date: May 27, 2022

AQUIFER DATA

Saturated Thickness: 5.45 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW206)

Initial Displacement: 1.01 m
 Total Well Penetration Depth: 5.45 m
 Casing Radius: 0.0254 m

Static Water Column Height: 5.45 m
 Screen Length: 3. m
 Well Radius: 0.0254 m

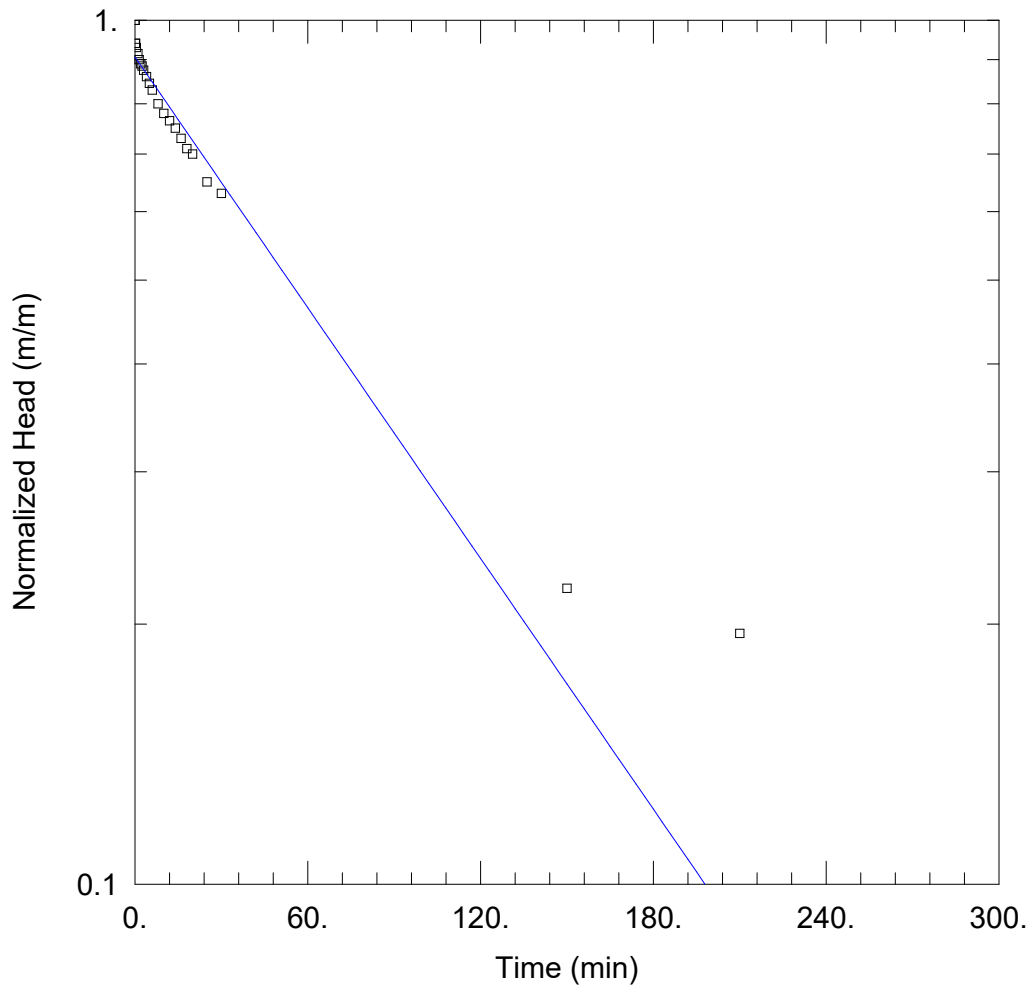
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 3.021E-8$ m/sec

$y_0 = 1.005$ m



WELL TEST ANALYSIS

Data Set: C:\...\MW1.aqt

Date: 05/13/21

Time: 13:31:31

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: Distrikt Capital

Project: BIGC-ENV-457A

Location: 166 South Service Rd E, ON

Test Well: BH/MW1

Test Date: May 4, 2021

AQUIFER DATA

Saturated Thickness: 5.45 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW1)

Initial Displacement: 1. m

Total Well Penetration Depth: 5.45 m

Casing Radius: 0.025 m

Static Water Column Height: 5.45 m

Screen Length: 3. m

Well Radius: 0.025 m

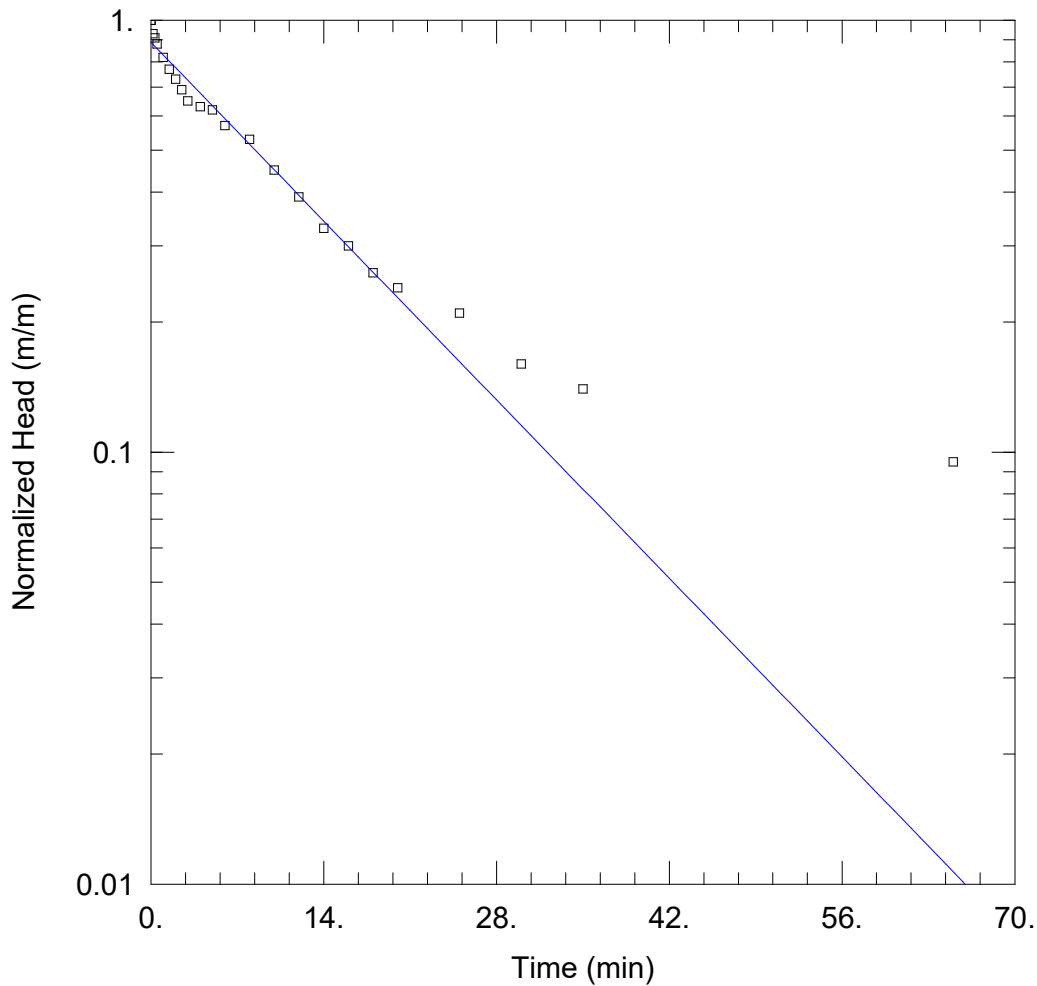
SOLUTION

Aquifer Model: Unconfined

$K = 1.06E-7$ m/sec

Solution Method: Hvorslev

$y_0 = 0.9064$ m



WELL TEST ANALYSIS

Data Set: C:\...\MW10.aqt

Date: 05/13/21

Time: 13:32:47

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: Distrikt Capital

Project: BIGC-ENV-457A

Location: 166 South Service Rd E, ON

Test Well: BH/MW10

Test Date: May 4, 2021

AQUIFER DATA

Saturated Thickness: 3.45 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW10)

Initial Displacement: 1. m

Static Water Column Height: 3.45 m

Total Well Penetration Depth: 3.45 m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

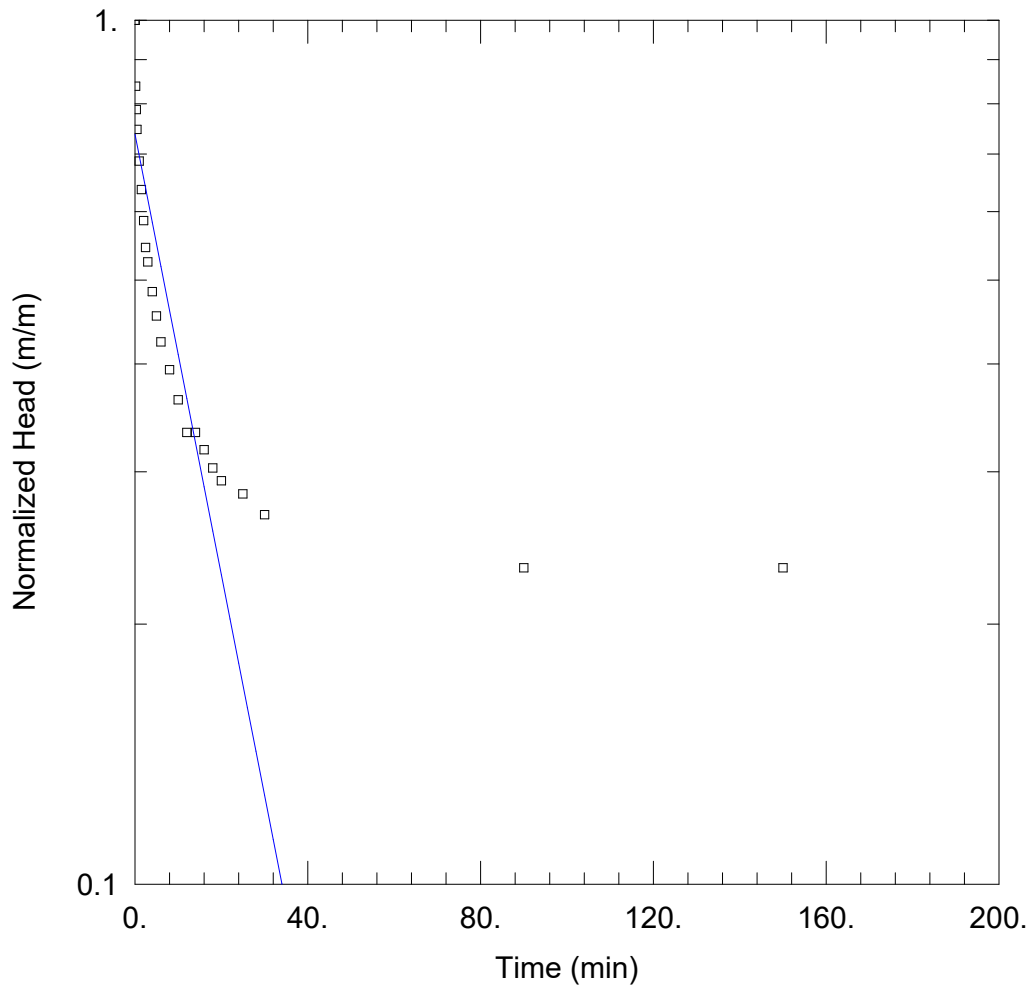
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 6.472E-7$ m/sec

$y_0 = 0.8887$ m



WELL TEST ANALYSIS

Data Set: C:\...\MW2.aqt

Date: 05/13/21

Time: 13:31:44

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: Distrikt Capital

Project: BIGC-ENV-457A

Location: 166 South Service Rd E, ON

Test Well: BH/MW2

Test Date: May 4, 2021

AQUIFER DATA

Saturated Thickness: 2.08 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW2)

Initial Displacement: 0.99 m

Static Water Column Height: 2.08 m

Total Well Penetration Depth: 2.08 m

Screen Length: 2.08 m

Casing Radius: 0.025 m

Well Radius: 0.025 m

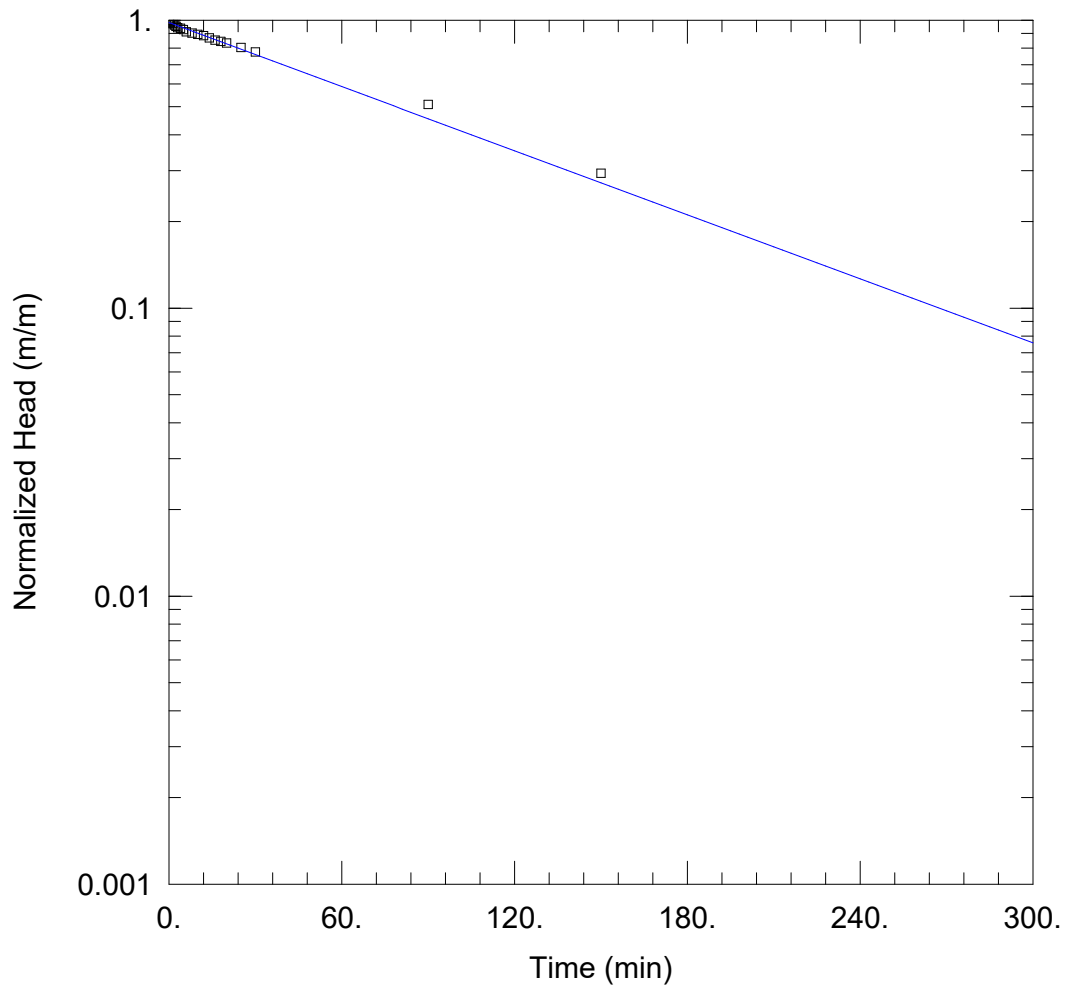
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 7.794E-7$ m/sec

$y_0 = 0.7307$ m



WELL TEST ANALYSIS

Data Set: C:\...\MW4.aqt

Date: 05/13/21

Time: 13:31:58

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: Distrikt Capital

Project: BIGC-ENV-457A

Location: 166 South Service Rd E, ON

Test Well: BH/MW4

Test Date: May 4, 2021

AQUIFER DATA

Saturated Thickness: 8.28 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW4)

Initial Displacement: 1.02 m

Static Water Column Height: 8.28 m

Total Well Penetration Depth: 8.28 m

Screen Length: 3. m

Casing Radius: 0.025 m

Well Radius: 0.025 m

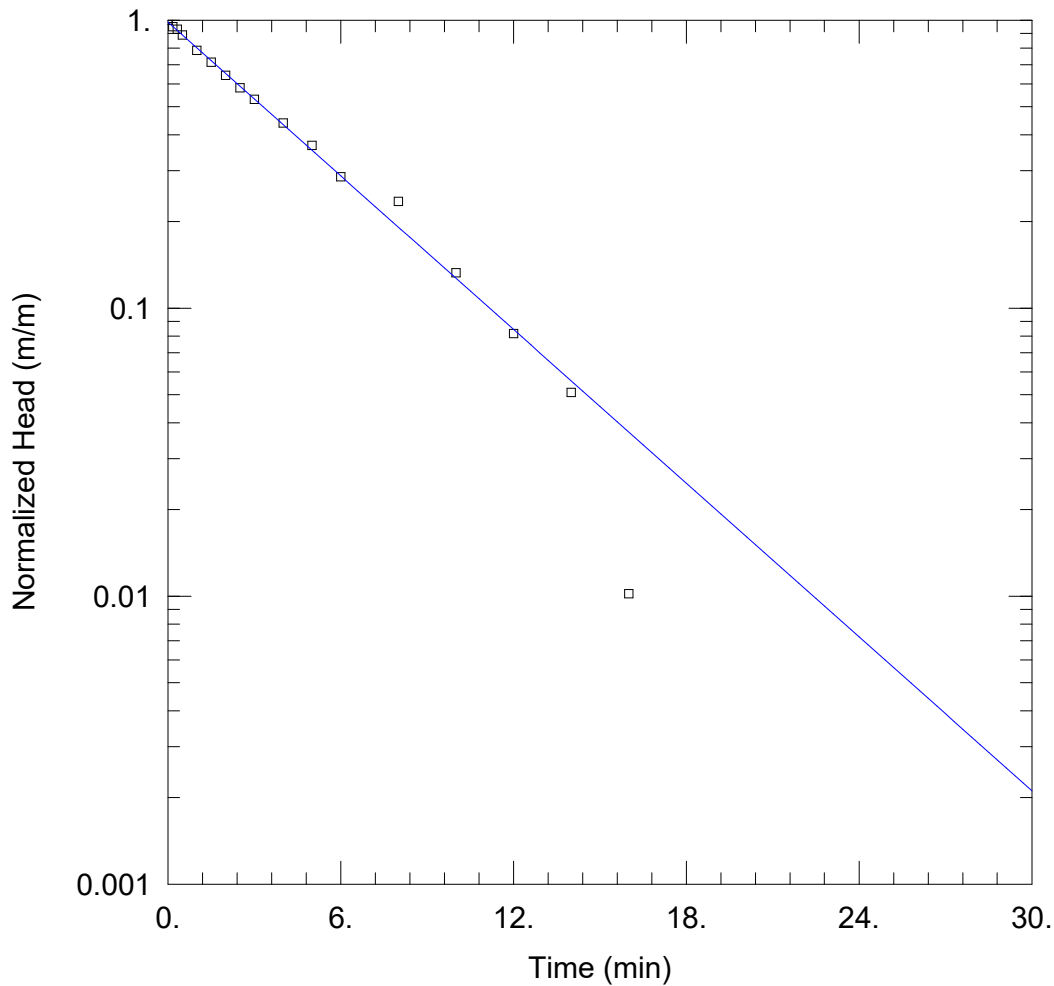
SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 8.125E-8$ m/sec

$y_0 = 1.$ m



WELL TEST ANALYSIS

Data Set: C:\...\MW6.aqt

Date: 05/13/21

Time: 13:32:11

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: Distrikt Capital

Project: BIGC-ENV-457A

Location: 166 South Service Rd E, ON

Test Well: BH/MW6

Test Date: May 4, 2021

AQUIFER DATA

Saturated Thickness: 2.66 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW6)

Initial Displacement: 0.98 m

Total Well Penetration Depth: 2.66 m

Casing Radius: 0.025 m

Static Water Column Height: 2.66 m

Screen Length: 2.66 m

Well Radius: 0.025 m

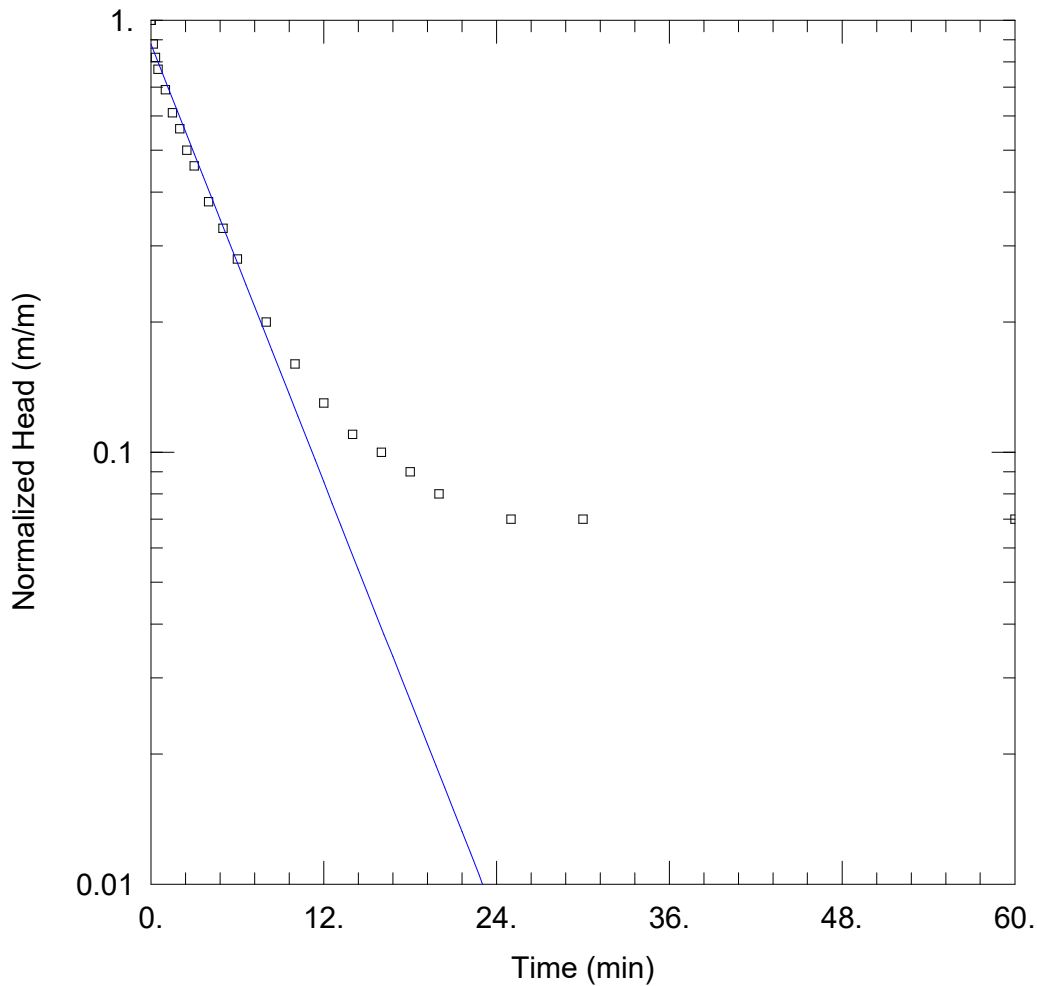
SOLUTION

Aquifer Model: Unconfined

$K = 2.125E-6$ m/sec

Solution Method: Hvorslev

$y_0 = 0.9648$ m



WELL TEST ANALYSIS

Data Set: C:\...\MW8.aqt

Date: 05/13/21

Time: 13:32:28

PROJECT INFORMATION

Company: B.I.G. Consulting Inc.

Client: Distrikt Capital

Project: BIGC-ENV-457A

Location: 166 South Service Rd E, ON

Test Well: BH/MW8

Test Date: May 4, 2021

AQUIFER DATA

Saturated Thickness: 2.99 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH/MW8)

Initial Displacement: 1 m

Static Water Column Height: 2.99 m

Total Well Penetration Depth: 2.99 m

Screen Length: 2.99 m

Casing Radius: 0.025 m

Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 1.793E-6$ m/sec

$y_0 = 0.8794$ m

**APPENDIX D: WATER QUALITY LABORATORY CERTIFICATE OF
ANALYSIS AND CHAIN OF CUSTODY**



Your Project #: BIGC-ENV-457A
 Site Location: 166 South Service Road, Oakville.
 Your C.O.C. #: 825290-01-01

Attention: Eileen Liu

B.I.G Consulting Inc.
 12-5500 Tomken Road
 Mississauga, ON
 CANADA L4W 2Z4

Report Date: 2021/05/14
 Report #: R6633816
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1C0586

Received: 2021/05/05, 15:16

Sample Matrix: Water
 # Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Sewer Use By-Law Semivolatile Organics	1	2021/05/07	2021/05/10	CAM SOP 00301	EPA 8270 m
Biochemical Oxygen Demand (BOD)	1	2021/05/06	2021/05/11	CAM SOP-00427	SM 23 5210B m
Carbonaceous BOD	1	2021/05/06	2021/05/11	CAM SOP-00427	SM 23 5210B m
Chromium (VI) in Water	1	N/A	2021/05/11	CAM SOP-00436	EPA 7199 m
Total Cyanide	1	2021/05/07	2021/05/10	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2021/05/06	2021/05/06	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2021/05/07	2021/05/07	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	N/A	2021/05/11	CAM SOP-00447	EPA 6020B m
E.coli, (CFU/100mL)	1	N/A	2021/05/05	CAM SOP-00552	MOE LSB E3371
Total Nonylphenol in Liquids by HPLC	1	2021/05/11	2021/05/12	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2021/05/11	2021/05/12	CAM SOP-00313	In-house Method
Animal and Vegetable Oil and Grease	1	N/A	2021/05/10	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2021/05/10	2021/05/10	CAM SOP-00326	EPA1664B m,SM5520B m
OC Pesticides (Selected) & PCB (1)	1	2021/05/10	2021/05/11	CAM SOP-00307	EPA 8081A/8082B m
OC Pesticides Summed Parameters	1	N/A	2021/05/06	CAM SOP-00307	EPA 8081A/8082B m
pH	1	2021/05/06	2021/05/06	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2021/05/07	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Colourimetry	1	N/A	2021/05/07	CAM SOP-00464	EPA 375.4 m
Total Kjeldahl Nitrogen in Water	1	2021/05/06	2021/05/10	CAM SOP-00938	OMOE E3516 m
Total PAHs (2)	1	N/A	2021/05/10	CAM SOP - 00301	
Mineral/Synthetic O & G (TPH Heavy Oil) (3)	1	2021/05/10	2021/05/10	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2021/05/10	2021/05/11	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2021/05/09	CAM SOP-00228	EPA 8260C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement



Your Project #: BIGC-ENV-457A
Site Location: 166 South Service Road, Oakville.
Your C.O.C. #: 825290-01-01

Attention: Eileen Liu

B.I.G Consulting Inc.
12-5500 Tomken Road
Mississauga, ON
CANADA L4W 2Z4

Report Date: 2021/05/14
Report #: R6633816
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1C0586

Received: 2021/05/05, 15:16

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. This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane
- (2) Total PAHs include only those PAHs specified in the sewer use by-by-law.
- (3) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

=====
BV Labs 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 Signature Page.



BV Labs Job #: C1C0586
 Report Date: 2021/05/14

B.I.G Consulting Inc.
 Client Project #: BIGC-ENV-457A
 Site Location: 166 South Service Road, Oakville.
 Sampler Initials: AB

OIL & GREASE - A/V/M/T (WATER)

BV Labs ID			PML524		
Sampling Date			2021/05/05 13:15		
COC Number			825290-01-01		
	UNITS	Criteria	MW1	RDL	QC Batch
Calculated Parameters					
Total Animal/Vegetable Oil and Grease	mg/L	150	ND	0.50	7334848
Petroleum Hydrocarbons					
Total Oil & Grease	mg/L	-	ND	0.50	7342497
Total Oil & Grease Mineral/Synthetic	mg/L	-	ND	0.50	7342500
No Fill	No Exceedance				
Grey	Exceeds 1 criteria policy/level				
Black	Exceeds both criteria/levels				
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Criteria: Halton Sanitary & Combined Sewer Bylaw (2-03)					
ND = Not detected					



OAKVILLE STORM SEWER BYLAW (2009-031)

BV Labs ID				PML524		
Sampling Date				2021/05/05 13:15		
COC Number				825290-01-01		
	UNITS	Criteria	Criteria-2	MW1	RDL	QC Batch
Inorganics						
Total BOD	mg/L	15	-	4	2	7336983
pH	pH	6.5:8.5	6.0:10.0	7.87		7338052
Phenols-4AAP	mg/L	0.008	1	ND	0.0010	7339307
Total Suspended Solids	mg/L	15	350	48	10	7339673
Total Cyanide (CN)	mg/L	0.02	2	ND	0.0050	7340100
Miscellaneous Parameters						
Nonylphenol Ethoxylate (Total)	mg/L	0.01	-	ND	0.005	7345655
Nonylphenol (Total)	mg/L	0.001	-	ND	0.001	7345651
Metals						
Chromium (VI)	ug/L	40	-	ND	0.50	7340175
Mercury (Hg)	mg/L	0.0004	0.05	ND	0.00010	7339567
Total Arsenic (As)	ug/L	20	1000	2.1	1.0	7344667
Total Cadmium (Cd)	ug/L	8	1000	ND	0.090	7344667
Total Chromium (Cr)	ug/L	80	3000	ND	5.0	7344667
Total Copper (Cu)	ug/L	40	3000	2.8	0.90	7344667
Total Lead (Pb)	ug/L	120	3000	ND	0.50	7344667
Total Manganese (Mn)	ug/L	50	5000	200	2.0	7344667
Total Nickel (Ni)	ug/L	80	3000	5.9	1.0	7344667
Total Phosphorus (P)	ug/L	400	10000	ND	100	7344667
Total Selenium (Se)	ug/L	20	5000	ND	2.0	7344667
Total Silver (Ag)	ug/L	120	5000	ND	0.090	7344667
Total Zinc (Zn)	ug/L	40	3000	ND	5.0	7344667
Semivolatile Organics						
Di-N-butyl phthalate	ug/L	15	-	ND	2	7339336
Bis(2-ethylhexyl)phthalate	ug/L	8.8	-	ND	2	7339336
3,3'-Dichlorobenzidine	ug/L	0.8	-	ND	0.8	7339336
Pentachlorophenol	ug/L	2	-	ND	1	7339336
Phenanthrene	ug/L	-	-	ND	0.2	7339336
No Fill	No Exceedance					
Grey	Exceeds 1 criteria policy/level					
Black	Exceeds both criteria/levels					
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						
Criteria: The Town of Oakville Storm Sewer Discharge By Law 2009-031						
Criteria-2: Halton Sanitary & Combined Sewer Bylaw (2-03)						
ND = Not detected						



OAKVILLE STORM SEWER BYLAW (2009-031)

BV Labs ID				PML524		
Sampling Date				2021/05/05 13:15		
COC Number				825290-01-01		
	UNITS	Criteria	Criteria-2	MW1	RDL	QC Batch
Anthracene	ug/L	-	-	ND	0.2	7339336
Fluoranthene	ug/L	-	-	ND	0.2	7339336
Pyrene	ug/L	-	-	ND	0.2	7339336
Benzo(a)anthracene	ug/L	-	-	ND	0.2	7339336
Chrysene	ug/L	-	-	ND	0.2	7339336
Benzo(b/j)fluoranthene	ug/L	-	-	ND	0.2	7339336
Benzo(k)fluoranthene	ug/L	-	-	ND	0.2	7339336
Benzo(a)pyrene	ug/L	-	-	ND	0.2	7339336
Indeno(1,2,3-cd)pyrene	ug/L	-	-	ND	0.2	7339336
Dibenzo(a,h)anthracene	ug/L	-	-	ND	0.2	7339336
Benzo(g,h,i)perylene	ug/L	-	-	ND	0.2	7339336
Dibenzo(a,i)pyrene	ug/L	-	-	ND	0.2	7339336
Benzo(e)pyrene	ug/L	-	-	ND	0.2	7339336
Perylene	ug/L	-	-	ND	0.2	7339336
Dibenzo(a,j) acridine	ug/L	-	-	ND	0.4	7339336
7H-Dibenzo(c,g) Carbazole	ug/L	-	-	ND	0.4	7339336
1,6-Dinitropyrene	ug/L	-	-	ND	0.4	7339336
1,3-Dinitropyrene	ug/L	-	-	ND	0.4	7339336
1,8-Dinitropyrene	ug/L	-	-	ND	0.4	7339336
Calculated Parameters						
Total PAHs (18 PAHs)	ug/L	2	-	ND	1	7335644
Volatile Organics						
Benzene	ug/L	2	10	1.4	0.40	7337368
Chloroform	ug/L	2	40	ND	0.40	7337368
1,2-Dichlorobenzene	ug/L	5.6	-	ND	0.80	7337368
1,4-Dichlorobenzene	ug/L	6.8	80	ND	0.80	7337368
cis-1,2-Dichloroethylene	ug/L	5.6	-	ND	1.0	7337368
trans-1,3-Dichloropropene	ug/L	5.6	-	ND	0.80	7337368
Ethylbenzene	ug/L	2	160	ND	0.40	7337368
No Fill	No Exceedance					
Grey	Exceeds 1 criteria policy/level					
Black	Exceeds both criteria/levels					
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						
Criteria: The Town of Oakville Storm Sewer Discharge By Law 2009-031						
Criteria-2: Halton Sanitary & Combined Sewer Bylaw (2-03)						
ND = Not detected						



OAKVILLE STORM SEWER BYLAW (2009-031)

BV Labs ID				PML524		
Sampling Date				2021/05/05 13:15		
COC Number				825290-01-01		
	UNITS	Criteria	Criteria-2	MW1	RDL	QC Batch
Methylene Chloride(Dichloromethane)	ug/L	5.2	2000	ND	4.0	7337368
1,1,2,2-Tetrachloroethane	ug/L	17	-	ND	0.80	7337368
Tetrachloroethylene	ug/L	4.4	1000	ND	0.40	7337368
Toluene	ug/L	2	16	ND	0.40	7337368
Trichloroethylene	ug/L	7.6	400	ND	0.40	7337368
Total Xylenes	ug/L	4.4	-	ND	0.40	7337368
Pesticides & Herbicides						
Aldrin	ug/L	-	-	ND	0.005	7342702
Dieldrin	ug/L	-	-	ND	0.005	7342702
a-Chlordane	ug/L	-	-	ND	0.005	7342702
g-Chlordane	ug/L	-	-	ND	0.005	7342702
o,p-DDT	ug/L	0.04	-	ND	0.005	7342702
p,p-DDT	ug/L	0.04	-	ND	0.005	7342702
Lindane	ug/L	40	-	ND	0.003	7342702
Hexachlorobenzene	ug/L	0.04	-	ND	0.005	7342702
Mirex	ug/L	40	-	ND	0.005	7342702
Microbiological						
Escherichia coli	CFU/100mL	200	-	<10	10	7336394
Surrogate Recovery (%)						
2,4,6-Tribromophenol	%	-	-	91		7339336
2-Fluorobiphenyl	%	-	-	68		7339336
D14-Terphenyl (FS)	%	-	-	100		7339336
D5-Nitrobenzene	%	-	-	90		7339336
D8-Acenaphthylene	%	-	-	84		7339336
2,4,5,6-Tetrachloro-m-xylene	%	-	-	89		7342702
Decachlorobiphenyl	%	-	-	100		7342702
4-Bromofluorobenzene	%	-	-	82		7337368
D4-1,2-Dichloroethane	%	-	-	121		7337368
D8-Toluene	%	-	-	90		7337368
No Fill	No Exceedance					
Grey	Exceeds 1 criteria policy/level					
Black	Exceeds both criteria/levels					
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						
Criteria: The Town of Oakville Storm Sewer Discharge By Law 2009-031						
Criteria-2: Halton Sanitary & Combined Sewer Bylaw (2-03)						
ND = Not detected						



BV Labs Job #: C1C0586
 Report Date: 2021/05/14

B.I.G Consulting Inc.
 Client Project #: BIGC-ENV-457A
 Site Location: 166 South Service Road, Oakville.
 Sampler Initials: AB

RESULTS OF ANALYSES OF WATER

BV Labs ID			PML524		
Sampling Date			2021/05/05 13:15		
COC Number			825290-01-01		
	UNITS	Criteria	MW1	RDL	QC Batch
Inorganics					
Total Carbonaceous BOD	mg/L	300	ND	2	7336987
Fluoride (F-)	mg/L	10	0.48	0.10	7337986
Total Kjeldahl Nitrogen (TKN)	mg/L	100	4.7	0.10	7338795
Dissolved Sulphate (SO4)	mg/L	1500	180	1.0	7338498
No Fill	No Exceedance				
Grey	Exceeds 1 criteria policy/level				
Black	Exceeds both criteria/levels				
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Criteria: Halton Sanitary & Combined Sewer Bylaw (2-03)					
ND = Not detected					



ORGANOCHLORINATED PESTICIDES BY GC-ECD (WATER)

BV Labs ID			PML524		
Sampling Date			2021/05/05 13:15		
COC Number			825290-01-01		
	UNITS	Criteria	MW1	RDL	QC Batch
Calculated Parameters					
Aldrin + Dieldrin	ug/L	0.08	ND	0.005	7334589
Chlordane (Total)	ug/L	40	ND	0.005	7334589
DDT+ Metabolites	ug/L	-	ND	0.005	7334589
Heptachlor + Heptachlor epoxide	ug/L	-	ND	0.005	7334589
o,p-DDD + p,p-DDD	ug/L	-	ND	0.005	7334589
o,p-DDE + p,p-DDE	ug/L	-	ND	0.005	7334589
o,p-DDT + p,p-DDT	ug/L	-	ND	0.005	7334589
Total Endosulfan	ug/L	-	ND	0.005	7334589
Total PCB	ug/L	0.4	ND	0.05	7334589
No Fill	No Exceedance				
Grey	Exceeds 1 criteria policy/level				
Black	Exceeds both criteria/levels				
RDL = Reportable Detection Limit					
QC Batch = Quality Control Batch					
Criteria: The Town of Oakville Storm Sewer Discharge By Law 2009-031					
ND = Not detected					



BV Labs Job #: C1C0586
Report Date: 2021/05/14

B.I.G Consulting Inc.
Client Project #: BIGC-ENV-457A
Site Location: 166 South Service Road, Oakville.
Sampler Initials: AB

GENERAL COMMENTS

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

Package 1	13.3°C
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Sample PML524 [MW1] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.



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VERITAS

BV Labs Job #: C1C0586

Report Date: 2021/05/14

QUALITY ASSURANCE REPORT

B.I.G Consulting Inc.

Client Project #: BIGC-ENV-457A

Site Location: 166 South Service Road, Oakville.

Sampler Initials: AB

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7337368	4-Bromofluorobenzene	2021/05/09	93	70 - 130	94	70 - 130	86	%				
7337368	D4-1,2-Dichloroethane	2021/05/09	110	70 - 130	108	70 - 130	117	%				
7337368	D8-Toluene	2021/05/09	110	70 - 130	110	70 - 130	91	%				
7339336	2,4,6-Tribromophenol	2021/05/07	57	10 - 130	52	10 - 130	84	%				
7339336	2-Fluorobiphenyl	2021/05/07	43	30 - 130	35	30 - 130	83	%				
7339336	D14-Terphenyl (FS)	2021/05/07	45	30 - 130	49	30 - 130	97	%				
7339336	D5-Nitrobenzene	2021/05/07	49	30 - 130	40	30 - 130	94	%				
7339336	D8-Acenaphthylene	2021/05/07	48	30 - 130	41	30 - 130	89	%				
7342702	2,4,5,6-Tetrachloro-m-xylene	2021/05/11	89	50 - 130	82	50 - 130	67	%				
7342702	Decachlorobiphenyl	2021/05/11	112	50 - 130	107	50 - 130	97	%				
7336983	Total BOD	2021/05/11					ND,RDL=2	mg/L	NC	30	97	80 - 120
7336987	Total Carbonaceous BOD	2021/05/11					ND,RDL=2	mg/L	13	30	97	85 - 115
7337368	1,1,2,2-Tetrachloroethane	2021/05/09	109	70 - 130	109	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7337368	1,2-Dichlorobenzene	2021/05/09	98	70 - 130	101	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7337368	1,4-Dichlorobenzene	2021/05/09	113	70 - 130	118	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7337368	Benzene	2021/05/09	96	70 - 130	98	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7337368	Chloroform	2021/05/09	102	70 - 130	103	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7337368	cis-1,2-Dichloroethylene	2021/05/09	101	70 - 130	103	70 - 130	ND, RDL=0.50	ug/L	NC	30		
7337368	Ethylbenzene	2021/05/09	88	70 - 130	93	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7337368	Methylene Chloride(Dichloromethane)	2021/05/09	121	70 - 130	121	70 - 130	ND, RDL=2.0	ug/L	NC	30		
7337368	Tetrachloroethylene	2021/05/09	86	70 - 130	89	70 - 130	ND, RDL=0.20	ug/L	1.9	30		
7337368	Toluene	2021/05/09	100	70 - 130	103	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7337368	Total Xylenes	2021/05/09					ND, RDL=0.20	ug/L	NC	30		
7337368	trans-1,3-Dichloropropene	2021/05/09	113	70 - 130	113	70 - 130	ND, RDL=0.40	ug/L	NC	30		
7337368	Trichloroethylene	2021/05/09	96	70 - 130	99	70 - 130	ND, RDL=0.20	ug/L	NC	30		
7337986	Fluoride (F-)	2021/05/06	95	80 - 120	101	80 - 120	ND, RDL=0.10	mg/L	NC	20		
7338052	pH	2021/05/06			102	98 - 103			0.24	N/A		
7338498	Dissolved Sulphate (SO4)	2021/05/07	117	75 - 125	100	80 - 120	ND, RDL=1.0	mg/L	1.9	20		
7338795	Total Kjeldahl Nitrogen (TKN)	2021/05/10	NC	80 - 120	99	80 - 120	ND, RDL=0.10	mg/L	8.2	20	96	80 - 120
7339307	Phenols-4AAP	2021/05/07	102	80 - 120	99	80 - 120	ND, RDL=0.0010	mg/L	18	20		



BUREAU
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BV Labs Job #: C1C0586
Report Date: 2021/05/14

QUALITY ASSURANCE REPORT(CONT'D)

B.I.G Consulting Inc.
Client Project #: BIGC-ENV-457A
Site Location: 166 South Service Road, Oakville.
Sampler Initials: AB

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7339336	1,3-Dinitropyrene	2021/05/07	59	30 - 130	77	30 - 130	ND, RDL=0.4	ug/L	NC	40		
7339336	1,6-Dinitropyrene	2021/05/07	60	30 - 130	68	30 - 130	ND, RDL=0.4	ug/L	NC	40		
7339336	1,8-Dinitropyrene	2021/05/07	53	30 - 130	63	30 - 130	ND, RDL=0.4	ug/L	NC	40		
7339336	3,3'-Dichlorobenzidine	2021/05/07	37	30 - 130	96	30 - 130	ND, RDL=0.8	ug/L	NC	40		
7339336	7H-Dibenzo(c,g) Carbazole	2021/05/07	113	30 - 130	104	30 - 130	ND, RDL=0.4	ug/L	NC	40		
7339336	Anthracene	2021/05/07	93	30 - 130	89	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Benzo(a)anthracene	2021/05/07	90	30 - 130	97	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Benzo(a)pyrene	2021/05/07	96	30 - 130	97	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Benzo(b/j)fluoranthene	2021/05/07	113	30 - 130	113	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Benzo(e)pyrene	2021/05/07	113	30 - 130	113	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Benzo(g,h,i)perylene	2021/05/07	126	30 - 130	118	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Benzo(k)fluoranthene	2021/05/07	96	30 - 130	103	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Bis(2-ethylhexyl)phthalate	2021/05/07	87	30 - 130	92	30 - 130	ND,RDL=2	ug/L	NC	40		
7339336	Chrysene	2021/05/07	106	30 - 130	103	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Dibenzo(a,h)anthracene	2021/05/07	120	30 - 130	112	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Dibenzo(a,i)pyrene	2021/05/07	115	30 - 130	104	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Dibenzo(a,j) acridine	2021/05/07	122	30 - 130	116	30 - 130	ND, RDL=0.4	ug/L	NC	40		
7339336	Di-N-butyl phthalate	2021/05/07	98	30 - 130	97	30 - 130	ND,RDL=2	ug/L	NC	40		
7339336	Fluoranthene	2021/05/07	97	30 - 130	100	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Indeno(1,2,3-cd)pyrene	2021/05/07	118	30 - 130	111	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Pentachlorophenol	2021/05/07	86	30 - 130	60	30 - 130	ND,RDL=1	ug/L	NC	40		
7339336	Perylene	2021/05/07	100	30 - 130	107	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Phenanthrene	2021/05/07	96	30 - 130	89	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339336	Pyrene	2021/05/07	95	30 - 130	101	30 - 130	ND, RDL=0.2	ug/L	NC	40		
7339567	Mercury (Hg)	2021/05/07	90	75 - 125	91	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
7339673	Total Suspended Solids	2021/05/11					ND, RDL=10	mg/L	NC	25	99	85 - 115
7340100	Total Cyanide (CN)	2021/05/10	70 (1)	80 - 120	100	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
7340175	Chromium (VI)	2021/05/11	102	80 - 120	93	80 - 120	ND, RDL=0.50	ug/L	NC	20		
7342497	Total Oil & Grease	2021/05/10			98	85 - 115	ND, RDL=0.50	mg/L	1.8	25		



BUREAU
VERITAS

BV Labs Job #: C1C0586
Report Date: 2021/05/14

QUALITY ASSURANCE REPORT(CONT'D)

B.I.G Consulting Inc.
Client Project #: BIGC-ENV-457A
Site Location: 166 South Service Road, Oakville.
Sampler Initials: AB

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7342500	Total Oil & Grease Mineral/Synthetic	2021/05/10			94	85 - 115	ND, RDL=0.50	mg/L	1.6	25		
7342702	a-Chlordane	2021/05/11	88	50 - 130	88	50 - 130	ND, RDL=0.005	ug/L	7.8	30		
7342702	Aldrin	2021/05/11	83	50 - 130	72	50 - 130	ND, RDL=0.005	ug/L	NC	30		
7342702	Dieldrin	2021/05/11	102	50 - 130	104	50 - 130	ND, RDL=0.005	ug/L	NC	30		
7342702	g-Chlordane	2021/05/11	89	50 - 130	89	50 - 130	ND, RDL=0.005	ug/L	8.3	30		
7342702	Hexachlorobenzene	2021/05/11	86	50 - 130	81	50 - 130	ND, RDL=0.005	ug/L	3.1	30		
7342702	Lindane	2021/05/11	97	50 - 130	98	50 - 130	ND, RDL=0.003	ug/L	7.0	30		
7342702	Mirex	2021/05/11	92	30 - 130	91	30 - 130	ND, RDL=0.005	ug/L	12	40		
7342702	o,p-DDT	2021/05/11	88	50 - 130	87	50 - 130	ND, RDL=0.005	ug/L	9.4	30		
7342702	p,p-DDT	2021/05/11	87	50 - 130	86	50 - 130	ND, RDL=0.005	ug/L	9.1	30		
7344667	Total Arsenic (As)	2021/05/11	101	80 - 120	98	80 - 120	ND, RDL=1.0	ug/L				
7344667	Total Cadmium (Cd)	2021/05/11	98	80 - 120	95	80 - 120	ND, RDL=0.090	ug/L				
7344667	Total Chromium (Cr)	2021/05/11	98	80 - 120	95	80 - 120	ND, RDL=5.0	ug/L				
7344667	Total Copper (Cu)	2021/05/11	104	80 - 120	99	80 - 120	ND, RDL=0.90	ug/L	2.5	20		
7344667	Total Lead (Pb)	2021/05/11	97	80 - 120	94	80 - 120	ND, RDL=0.50	ug/L				
7344667	Total Manganese (Mn)	2021/05/11	97	80 - 120	93	80 - 120	ND, RDL=2.0	ug/L				
7344667	Total Nickel (Ni)	2021/05/11	94	80 - 120	94	80 - 120	ND, RDL=1.0	ug/L				
7344667	Total Phosphorus (P)	2021/05/11	104	80 - 120	95	80 - 120	ND, RDL=100	ug/L				
7344667	Total Selenium (Se)	2021/05/11	102	80 - 120	100	80 - 120	ND, RDL=2.0	ug/L				
7344667	Total Silver (Ag)	2021/05/11	98	80 - 120	96	80 - 120	ND, RDL=0.090	ug/L				
7344667	Total Zinc (Zn)	2021/05/11	96	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	13	20		



BUREAU
VERITAS

BV Labs Job #: C1C0586

Report Date: 2021/05/14

QUALITY ASSURANCE REPORT(CONT'D)

B.I.G Consulting Inc.

Client Project #: BIGC-ENV-457A

Site Location: 166 South Service Road, Oakville.

Sampler Initials: AB

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7345651	Nonylphenol (Total)	2021/05/12	79	50 - 130	77	50 - 130	ND, RDL=0.001	mg/L	NC	40		
7345655	Nonylphenol Ethoxylate (Total)	2021/05/12	82	50 - 130	79	50 - 130	ND, RDL=0.005	mg/L	NC	40		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



BV Labs Job #: C1C0586
Report Date: 2021/05/14

B.I.G Consulting Inc.
Client Project #: BIGC-ENV-457A
Site Location: 166 South Service Road, Oakville.
Sampler Initials: AB

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

Soham Patel, Analyst 2

BV Labs 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 Signature Page.



BUREAU

VERITAS

BV Labs Job #: C1C0586

Report Date: 2021/05/14

B.I.G Consulting Inc.

Client Project #: BIGC-ENV-457A

Site Location: 166 South Service Road, Oakville.

Sampler Initials: AB

Exceedance Summary Table – Oakville Storm Sewer

Result Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
MW1	PML524-08	Total Manganese (Mn)	50	200	2.0	ug/L
MW1	PML524-05	Total Suspended Solids	15	48	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 – Halton Sanitary Sewer

Result Exceedances



Sample ID	BV Labs 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 Laboratories
6740 Campbell Road, Mississauga, Ontario Canada L5N 2L8 Tel: (905) 817-5700 Toll-free: 800-563-5266 Fax: (905) 817-5777 www.bvlab.com

CHAIN OF CUSTODY RECORD

INVOICE TO: Company Name: #31796 B.I.G Consulting Inc. Attention: Accounts Payable Address: 12-5500 Tomken Road Mississauga ON L4W 2Z4 Tel: (416) 214-4880 Fax: _____ Email: ldougherty@brownfieldigi.com; admin@brownfieldigi.co		REPORT TO: Company Name: <u>BIG Consulting Inc.</u> Attention: Eileen Liu Address: <u>Same as Report Invoice to</u> Tel: _____ Fax: _____ Email: eliu@brownfieldigi.com		PROJECT INFORMATION: Quotation #: B64476 P.O. #: _____ Project: BIGC-ENV-457A Project Name: _____ Site #: 166 South Service Road, Oakvil Sampled By: <u>AB</u>		Laboratory Use Only: BV Labs Job #: _____ Bottle Order #:  825290 COC #: _____  C#825290-01-01 Project Manager: Christine Gripton	
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MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY					Field Filtered (please circle): Metals / Hg / Cr VI	Hullon Sanitary + Oakville Storm	ANALYSIS REQUESTED (PLEASE BE SPECIFIC)										Turnaround Time (TAT) Required: Please provide advance notice for rush projects	
Regulation 153 (2011)		Other Regulations		Special Instructions													Regular (Standard) TAT: (will be applied if Rush TAT is not specified)	
<input type="checkbox"/> Table 1	<input type="checkbox"/> Res/Park	<input type="checkbox"/> Medium/Fine	<input type="checkbox"/> CCME				<input checked="" type="checkbox"/> Sanitary Sewer Bylaw											Standard TAT = 5-7 Working days for most tests.
<input type="checkbox"/> Table 2	<input type="checkbox"/> Ind/Comm	<input type="checkbox"/> Coarse	<input type="checkbox"/> Reg 558	<input checked="" type="checkbox"/> Storm Sewer Bylaw											Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.			
<input type="checkbox"/> Table 3	<input type="checkbox"/> Agri/Other	<input type="checkbox"/> For RSC	<input type="checkbox"/> MISA	Municipality: <u>Oakville</u>											Job Specific Rush TAT (if applies to entire submission)			
<input type="checkbox"/> Table			<input type="checkbox"/> PWOO	<input type="checkbox"/> Reg 406 Table											Date Required: _____ Time Required: _____			
Include Criteria on Certificate of Analysis (Y/N)? <u>Y</u>															Rush Confirmation Number: _____ (call lab for #)			
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix												# of Bottles	Comments	
1	<u>MUV1</u>	<u>May 5, 2015</u>	<u>13:25</u>	<u>GW</u>												<u>19</u>		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

05-May-21 15:16
Christine Gripton

C1C0586
ATM ENV-658

* RELINQUISHED BY: (Signature/Print) <u>CP</u>		Date: (YY/MM/DD) <u>21/05/15</u>	Time <u>15:15</u>	RECEIVED BY: (Signature/Print) <u>Tracy Alexander Poyon</u>		Date: (YY/MM/DD) <u>20/05/15</u>	Time <u>15:16</u>	# jars used and not submitted	Laboratory Use Only				
									Time Sensitive	Temperature (°C) on Receipt <u>14/15/15 0.5°C</u>	Custody Seal Present	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
											Intact	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' 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.BVLABS.COM/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.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

APPENDIX E: CONSTRUCTION DEWATERING ESTIMATE RATE CALCULATIONS

Construction Dewatering Rate Estimate

166 South Service Road East, Oakville, Ontario

Seven (7) levels of underground parking, unconfined aquifer, groundwater seepage to rectangular excavation (line source)

Table E-1: Construction Dewatering Rate Estimates

Description	Symbol	Values	Unit	Explanation
Input				
Established Grade Elevation (Tower 1)		105.90	m asl	Based on Drawing AZ501 prepared by SCA, dated September 6, 2024
Highest Groundwater Level		103.04	m asl	Highest groundwater elevation (May 31, 2022)
Footing Elevation		80.10	m asl	Assumed 2 m below P7 FFE. P7 FFE is 82.1 m asl based on Drawing AZ501 prepared by SCA, dated September 6, 2024
Aquifer Bottom		77.10	m asl	Assumed 3.0 m below footing level
Hydraulic Conductivity	K	3.79E-07	m/s	Geometric mean K
Length of Excavation	x	140.0	m	Based on Drawing AZ102 Level P6, prepared by SCA, dated September 6, 2024
Width of Excavation	a	60.0	m	Based on Drawing AZ102 Level P6, prepared by SCA, dated September 6, 2024
Output				
Top of Aquifer		103.04	m asl	Water table for unconfined aquifer
Target Water Level		79.10	m asl	Assumed 1.0 m below footing elevation
Water Level above aquifer bottom before dewatering	H	25.9	m	
Target water level above aquifer bottom	h	2.0	m	
Radius of Influence	L (R ₀)	25.78	m	Sichardt's Formula C=1750
Construction dewatering flow rate - Steady State	Q	166.77	m ³ /day	Construction Dewatering flow – Dupuit Equation
Maximum construction dewatering flow rate (safety factor of 2)	2Q	339.54	m ³ /day	During the initial period and after rains
Construction Dewatering Flow Rate - Steady State	Q	170,000	L/day	
Maximum Construction Flow Rate (safety factor of 2)	2Q	340,000	L/day	

APPENDIX F: LONG TERM DRAINAGE FLOW RATE ESTIMATE CALCULATIONS

Foundation Drain Flow Rate Estimate

166 South Service Road East, Oakville, Ontario

Seven (7) levels of underground parking, unconfined aquifer, groundwater seepage to rectangular excavation (line source)

Table F-1: Foundation Drain Flow Rate Estimate of Southern Portion

Description	Symbol	Values	Unit	Explanation
Input				
Established Grade Elevation (Tower 1)		105.90	m asl	Based on Drawing AZ501 prepared by SCA, dated September 6, 2024
Highest Groundwater Elevation		87.34	m asl	Highest groundwater elevation in deep aquifer (May 31, 2022)
P7 FFE		82.10	m asl	Based on Drawing AZ501 prepared by SCA, dated September 6, 2024
Aquifer Bottom		79.10	m asl	Assumed 3 m below basement
Hydraulic Conductivity	K	3.19E-07	m/s	Geometric mean K for deep aquifer
Length of Excavation	x	140.0	m	Based on Drawing AZ102 Level P6, prepared by SCA, dated September 6, 2024
Width of Excavation	a	60.0	m	Based on Drawing AZ102 Level P6, prepared by SCA, dated September 6, 2024
Output				
Top of Aquifer		87.3	m asl	Water table for unconfined aquifer
Target Water Level		81.60	m asl	Assumed 0.5 m below FFE
Water Level above aquifer bottom before dewatering	H	8.2	m	
Target water level above aquifer bottom	h	2.5	m	
Radius of Influence	L (R ₀)	21.33	m	Weber's Equation
Long-Term Flow Rate - Steady State	Q	15.95	m ³ /day	Long-term flow rate - Dupuit Equation
Maximum Foundation Drain Flow Rate (safety factor of 3)	3Q	47.86	m ³ /day	During the initial period and after rains
Estimated Long-term Foundation Drain Flow Rate	Q	16,000	L/day	
Estimated Maximum Foundation Drain Flow Rate	3Q	48,000	L/day	