ORBITENGINEERING
Consulting Engineers

HYDROGEOLOGICAL INVESTIGATION

PROPOSED RESIDENTIAL DEVELOPMENT
5, 7 & 9 BEVERLEY STREET, MISSISSAUGA, ON

Prepared for:

2862505 ONTARIO LTD.

By:

Orbit Engineering Limited

Project No. OE211273AH

September 13, 2022

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Attention: Arjun Kumar

Dear Mr. Kumar,

RE:

Hydrogeological Investigation
Proposed Residential Development
5, 7 & 9 Beverley Street, Mississauga, Ontario

Enclosed please find the Hydrogeological Investigation report related to the above noted site.

For and on behalf of Orbit Engineering Limited

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LIST OF ACRONYMS AND DEFINITIONS

BH	Borehole
EASR	Environmental Activity and Sector Registry
K	Hydraulic Conductivity
mbgs	Metres Below Ground Surface
MOECC	Ontario Ministry of the Environment and Climate Change
ORCA	Otonabee Region Conservation Authority
O.Reg.903	Ontario's Wells Regulation
PTTW	Permit to Take Water
PHCs	Petroleum Hydrocarbons
VOCs	Volatile Organic Compounds
PAHs	Polycyclic Aromatic Hydrocarbons
WWIS	Water Well Information System
WWR	Water Well Records

1 INTRODUCTION

1.1 General

Orbit Engineering Limited (Orbit) was retained by Mr. Arjun Kumar from 2862505 Ontario Limited. to complete a Hydrogeological Investigation to evaluate the existing site conditions for the medium-rise condominium building located at 5, 7 & 9 Beverley Street in the City of Mississauga, Ontario. The approximate location of the proposed structure (the Site) and the approximate borehole location plan are shown on **Drawings 1** and **2.**

It is our understanding that the project will consist of the construction of three (3) stories residential building (16 units) with one level basement. The finish basement elevation is located -2.4 m below the average of ground surface (169.5m) as per the information provided by the client to Orbit (see attached drawing in Appendix E for details).

1.2 Purpose

The purpose of the Hydrogeological Investigation was to characterize the existing hydrogeological conditions at and in the vicinity of the Site, assess the groundwater regime, and provide recommendations for groundwater control/dewatering (if needed) during the construction of the proposed development at the Site by means of two (2) deep exploratory boreholes (BH101/MW, BH102/MW) installed by Orbit and for the proposed development, and also to provide associated hydrogeological recommendations for the construction activities. For the Hydrogeological Investigation, all two (2) boreholes drilled by Orbit were converted to monitoring wells to assess groundwater level fluctuations and groundwater quality at the Site.

The hydrogeological investigation was also requested to evaluate the potential impacts on the local groundwater system in the vicinity of the Site as a consequence of the proposed construction activities and to identify appropriate mitigative measures, if and where necessary. This investigation will also act as a guideline in the assessment of the substructure and the perimeter drainage flow (permanent dewatering) if needed. The hydrogeological investigation was performed based on the information and drawings provided to Orbit by the Client (**Appendix E**).

2 METHOD OF INVESTIGATION

2.1 General

This Hydrogeological Investigation began with a review of the previously completed geotechnical report by Orbit Engineering Limited (Orbit 2022) and published information within the Site area, including previously published regional physiographic and geologic mapping from Ontario Geological Survey (OGS). Many of these documents are referred to throughout various sections of this report and the relevant details can be found in the **References** section following the text of the report.

In particular, the work completed during this Hydrogeological Investigation consisted of the following tasks:

- Reviewing and interpreting of available reports and publicly published data;
- Developing Health and Safety and, the Field Sampling and Analysis Plans for work at the Site;
- Assessing the current Site conditions, areas of interest and to confirm the previous borehole locations;
- Reviewing water well records available from the Ministry of the Environment, Conservation and Parks (MECP);
- Developing the groundwater monitoring wells installed at the Site;
- Completion of in-situ hydraulic conductivity tests (slug tests) at two (2) monitoring wells;
- Measuring groundwater levels in the monitoring wells located at the Site;
- Collecting and analyzing groundwater quality samples from the monitoring wells;
- Evaluating potential dewatering requirements for the proposed construction at the Site;
- Estimation of the underfloor and perimeter drainage flow for permanent dewatering (if needed); and,
- Preparation of this Hydrogeological Investigation report that provides a summary and interpretation of hydrogeological data collected during the investigation program, as well as an assessment and quantification of groundwater control/dewatering requirements for construction.

2.2 Boreholes and Monitoring Wells

Orbit carried out a Hydrogeological Investigation at the Site on 27 July 2022, and drilled two boreholes (BH101/MW, BH102/MW). For this hydrogeological investigation, all two (2) boreholes were converted into groundwater monitoring wells (BH101/MW, BH102/MW).

The logs of the Two (2) boreholes are provided in **Appendix A**. The approximate borehole locations are shown in **Drawing 2.**

The ground surface elevation at the borehole locations were inferred from a topography plan provided to Orbit by the Client. The elevations of the boreholes are presented on the borehole log sheets attached in **Appendix A**. The construction details of the monitoring wells are summarized in **Table 2.1** below.

Table 2.1: Information on Groundwater Monitoring Wells

Monitoring Well / Borehole ID	Northing	Easting	Approximate Ground Surface Elevation (mASL)	Depth of Well / Borehole (mBGS)
	NAD 83, UTM Zone 17T			
BH101/MW	4840244.74	608925.6	169.0	5.6
BH102/MW	4840248.71	608872.73	169.4	5.6

2.3 Groundwater Monitoring and Sampling

Orbit's staff visited the site on August 08, 2022, to collect groundwater samples to be analyzed under guidelines of the City of Mississauga (Region of Peel) Sanitary and Storm Sewer Use By-laws. Prior to sampling and hydraulic conductivity testing, the monitoring wells (BH101/MW, BH102/MW) were developed using a low-density polyethylene tubing and a Waterra foot valves.

The development of the monitoring well was conducted by purging and surging the well water to stress the formation around the well screen so that mobile particulates were removed. The purpose of the well development is to improve the hydraulic connection between the well and the geologic materials in the vicinity of the well, and to subsequently obtain a groundwater sample representative of the in-situ conditions. The groundwater level was measured in the monitoring wells after completing the development process.

The collected samples were submitted to Eurofins Laboratories, a member of the Canadian Association for Laboratory Accreditation (CALA), for chemical analysis. Copies of the laboratory certificates of analysis are provided in **Appendix B**.

2.4 In-Situ Hydraulic Conductivity Testing

Single well response tests were conducted on the monitoring wells (BH101/MW, BH102/MW) to assess the subsurface hydraulic conductivity conditions.

A summary of the single well response test (hydraulic conductivity test) methodology was as follows:

- At the start of the test, the static groundwater level in the monitoring well was initially measured and recorded.

- A datalogger was installed in the well below the water level and configured to measure absolute pressure (water pressure + atmospheric pressure) on a regular interval.

- Falling head tests were carried out using a solid slug of known volume introduced into the well, and the reverse technique was also carried out (i.e., slug removal) for a corresponding rising head test.

- The water level was then measured and recorded at regular time intervals and until the water level had recovered to a level close to the static water level measured before the start of the test.

The water level data from the monitoring well were analysed using AQTESOLV Professional V4.5 and the Bouwer-Rice equation to estimate the hydraulic conductivity (K) of the geologic materials adjacent to the screened portion of the well.

3 SITE CONDITIONS

3.1 Physical Setting

The subject site is located at 5, 7 & 9 Beverley Street in the City of Mississauga, Ontario. The site topography is relatively flat and located in a highly developed setting surrounded by commercial developments in all directions. The project site has a residential unit on civic (5,7) and a vacant land on civic no. 9 surrounded by park and residential buildings. **Drawings 1** and **2** present a site plan and approximate boreholes/monitoring wells location. According to the Oak Ridges Moraine Atlas, which is available online at (https://www.ontario.ca/page/oak-ridges-moraine) and the Niagara Escarpment Plan (NEP) Maps available online at (https://www.escarpment.org/home), the Site is not located within an area where either the Oak Ridges Moraine Conservation Plan or the Niagara Escarpment Plan would be applicable.

3.2 Climatic Conditions

Average monthly climate data from an Environment Canada climate station(https://climate.weather.gc.ca/climate_normals/index_e.html) located at the Toronto Lester B. Pearson Int'l A (Station ID 6158733), approximately 3.55 km Southeast of the Site, for the period between 1981 and 2010 is provided in **Table 3.1**. The data indicates that the climate in the study area is typical continental with cold winters and warm summers and precipitation records showing local seasonal variation. As shown in **Table 3.1**, below, the mean annual precipitation is 785.9 mm/year, with an annual mean rainfall of 681.6 mm/year (86.72% of total precipitation). Average monthly precipitation ranged from 47.7mm in February to 78.1mm in August. The mean annual daily temperature is 8.2 degrees Celsius (°C), ranging from -5.5 °C in January to 21.5 °C in July.

Table 3.1: Climate Data Summary (1981 – 2010) – Toronto Lester B. Pearson Int'l A (ID 6158733)

MONTH	Daily Average Temperature (°C)	Average Rainfall (mm)	Average Snow (cm)	Average Precipitation (mm)
January	-5.5	25.1	29.5	51.8
February	-4.5	24.3	24	47.7
March	0.1	32.6	17.7	49.8
April	7.1	63.0	4.5	68.5
May	13.1	74.3	0	74.3
June	18.6	71.5	0	71.5
July	21.5	75.7	0	75.7
August	20.6	78.1	0	78.1
September	16.2	74.5	0	74.5
October	9.5	60.6	0.4	61.1
November	3.7	68.0	7.5	75.1
December	-2.2	34.0	24.9	57.9
Year	8.2	681.6	108.5	785.9
NOTE: Data was obtained from the Environment Canada website (Environment Canada, 2017).				

3.3 Physiography and Drainage

The Site is located in the physiographic region known as the Peel Plain as shown in **Drawing 3**. The physiographic landform in which the Site exists is called the Bevelled Till Plains. This physiographic region is characterized by level to gently rolling topography, with a consistent, gradual slope toward Lake Ontario (Chapman & Putman, 1984). The natural landscape of Peel Region is the result of the action of glaciers that once covered southern Ontario. The Plain is made up of deep deposits of dense, limestone and shale imbued till, often covered by a shallow layer of clay sediment. Because of the difference in material and hydrologic function, the region is often locally described as three separate regions, namely the South Slope and the Iroquois Sand Plain. The South Slope is characterized a smooth, faintly drumlinized, clay till plain that slopes gently towards Lake Ontario. The Iroquois Sand Plain is the final physiographic area and comprises sand, silt and clay deposits, with the finer materials being closer to the current Lake Ontario. The Iroquois Plain, particularly the beach deposits, is an important source of groundwater within the watershed.

Local, shallow, groundwater flow patterns are expected to mimic local topography and be directed to the South towards Lake Ontario.

3.4 Geological Mapping

A review of available published surficial geology mapping from OGS (2010) indicates that fine textured glaciolacustrine deposits of silt and clay, minor sand, gravel on Interbedded silt and clay and gritty, pebbly flow till and rainout deposits occur in the immediate vicinity of the Site. As shown in **Drawing 4**, one (1)

primary surficial geologic unit are interpreted by OGS to occur within the vicinity of the Site, including (chronologically from older to younger units)

- Unit 8b: fine textured glaciolacustrine deposits of silt and clay, minor sand, gravel on Interbedded silt and clay and gritty, pebbly flow till and rainout deposits in.

3.5 Subsurface Soil Conditions

The subsurface soil conditions encountered during boreholes advanced at the Site are shown on the borehole logs attached in **Appendix A**. A summary of the soil conditions is provided below. The borehole logs indicate the subsurface conditions only at the borehole locations. Note that the material boundaries indicated on the attached logs are approximate and based on visual observations. These boundaries typically represent a transition from one material type to another and should not be regarded as an exact plane of geological change. It should be pointed out that the subsurface conditions will vary across this Site.

3.6 Soil Conditions

The soils explored in the boreholes generally consisted of fill and native soil layers.

3.1.1 Pavement

Pavement structure was encountered at the location of boreholes (BH101/MW and BH102/MW) that typically comprised 60 to 75mm asphalt over 200mm granular base material. The data provided here pertaining to the thickness of the pavement is confirmed at the borehole locations (BH101/MW and BH102/MW) only and may vary between and beyond the boreholes.

3.1.2 Fill

Fill material was encountered in boreholes/monitoring wells (BH101/MW to BH102/MW) drilled by Orbit staff. The explored fill extended to depths of 0.1 to 1.5 m below the existing ground surface. The fill material was generally consisted of moist, brown clayey silt. The explored fill deposits were typically with occasional layers of compact sandy deposits. The fill materials also contained topsoil pockets, rootlets and construction debris. Noted that depth of fill could vary across the site especially in the area of previous structures or previous excavation.

3.1.3 Native Soil

In boreholes (BH101/MW and BH102/MW), the native soil underneath the fill was generally consisted of dense to very dense sandy silt to silty sand till which extended to approximate depths of 1.5 and 3.0 m below the existing grade. The sandy till deposits were typically grey and wet. Below the sandy till deposits, grey, very stiff to hard clayey silt to silty clay till was encountered and extended to maximum explored depth of 5.6 m below the existing ground surface as observed at the location of BH101/MW. The till deposit at the site as usual has potential to contain cobbles and boulders.

4 GROUNDWATER CONDITIONS

4.1 Regional Groundwater Recharge

Recharge is the process by which groundwater is replenished and involves the vertical infiltration of water through the subsoil deposits and geologic materials to the saturated zone. The major sources of recharge in the study area are a result of precipitation and freshet. The amount of groundwater recharge in a particular area depends on surficial geology, topography, and the extent of land development in that area. Generally, regional groundwater recharge is irregularly distributed temporally and spatially as interpreted from specific climatic conditions, local geology, and land development status.

The Site is located in a highly developed area, surrounded by commercial and some residential development lots contained impermeable paved surfaces and rooftops surrounding the site. The groundwater recharge is expected in the limited green open space located at the North of Site. Generally, the area of the Site is expected to have a low to moderate groundwater recharge rate due to the presence of Fine-textured lacustrine deposits and limited open spaces. The existing site is located in an unrestricted paved area and no major changes are expected in the groundwater recharge rate due to the planned construction.

4.2 Groundwater Level Fluctuations

The groundwater level data collected from the monitoring wells are provided in **Table 4.1**, below and in the borehole logs in **Appendix A**. The groundwater level elevations range from a low of 163.4 mASL in well BH101/MW to a high of 169.0 mASL and in well BH102/MW groundwater level elevations range from a low of 163.8 mASL to a high of 169.4 mASL installed by Orbit.

It should be noted that groundwater conditions vary depending on factors such as temperature, season, precipitation, construction activity, and other situations, which may be different from those encountered at the time of the monitoring. The possibility of groundwater level fluctuations at the Site should be considered when designing and developing the construction plans for the project.

Regional groundwater flow in the area typically reflects the local topography and generally occurs from topographic highs to topographic lows. The dominant regional groundwater flow direction is expected to be South towards the Lake Ontario.

4.3 Inferred Hydrostratigraphy

The subsurface investigations revealed that beneath the surficial materials, the subsurface conditions encountered in the boreholes consisted of fill materials overlaying native geologic material of clayey silt to silty clay till which extended to approximate depths of 2.3 and 3.0 m below the existing grade. Below the silty till deposits, sandy silt to silty sand till was encountered and extended to maximum explored depth of 5.6 m below the existing ground surface. Groundwater was encountered in the native soil layer in all deep monitoring wells installed by Orbit BH101/MW – BH102/MW. Conditions encountered in the monitoring

wells in the native layer indicated that the groundwater in this layer can be considered under unconfined aquifer conditions.

Table 4.1: Summary of Groundwater Level Observations in Monitoring Wells

BH No.	Ground Surface Elevation	Date of Monitoring Well Installation	Date of Measurement	Depth of Water Level (m)	Groundwater Elevation (m)
BH101/MW	169	July 27, 2022	August 03, 2022	3.32	165.68
			August 08, 2022	3.76	165.24
			Sept. 01, 2022	3.60	165.40
BH102/MW	169.4	July 27, 2022	August 03, 2022	2.32	167.08
			August 08, 2022	2.34	167.06
			Sept. 01, 2022	2.32	167.08

4.4 Results of In-Situ Hydraulic Conductivity Tests

Table 4.2 summarizes the results of the slug testing (hydraulic conductivity) estimated using AQTESOLV-Pro Software for the collected data and the hydro-stratigraphic units in which the monitoring wells were screened. Monitoring wells BH101/MW and BH102/MW were tested for hydraulic conductivity. The hydraulic conductivity in monitoring well BH102/MW was very low due to the presence of dense sandy silt till at the depth of 5.6m. The hydraulic conductivity data analysis sheets are presented in **Appendix C**.

Table 4.2: Summary of In-Situ Hydraulic Conductivity Test Results

Monitoring Well ID	Analytical Method	Type of Slug Test	Hydraulic Conductivity (cm/Sec)	Screened Stratigraphic Unit(s)
BH101/MW	KGS Model	Falling Head	1.125×10^{-4}	**Sandy Silt to Silty Sand Till:** trace to some clay, trace gravel
BH102/MW	Bouwer Rice	Falling Head	2.51×10^{-5}	**Sandy Silt to Silty Sand Till:** trace to some clay, trace gravel

4.5 Groundwater Use in the Study Area

A review of the available data from the MECP Water Well Information System (WWIS) database was carried out to identify active wells near the Site. The database search was requested for the area located within 500m from the Site. This search identified records for 25 monitoring wells.

Drawing 5 presents the locations of the identified wells as well as the associated water use categories within 500 m around the Site. A detailed table showing water well record (WWR) information for these wells is provided in **Appendix D**.

The observation wells identified in the database search were installed between the year 1947-2018 for monitoring and are considered most likely to be associated with recent construction activities and/or infrastructure upgrades in the area. This is consistent with the expectations that potable water in the study area is available from the City of Mississauga.

Based on the hydrogeological information and data analysis in this report, the potential impacts to surface water and groundwater resources in the vicinity of the site due to construction of the proposed structure at the subject site are not considered significant. The area of the subject site is currently serviced with the municipal water supply from the City of Mississauga.

4.6 Groundwater Quality for Temporary Dewatering

Orbit understands that during construction, the groundwater pumped in conjunction with excavation dewatering (where required) may be discharged into the city of Mississauga sanitary or/and storm sewer systems.

As part of the hydrogeological investigation, Orbit collected water samples from well BH102/MW for chemical analysis. The purpose of the chemical analysis was to identify potential disposal options for excess water generated during the construction. The water samples were examined in the field for aesthetic evidence of impacts (i.e., debris, staining, and odours). In accordance with the Ministry of the Environment, Conservation and Parks (MECP) sampling protocols, the water samples were placed directly into laboratory supplied containers for chemical analysis.

Eurofins Laboratories of Ottawa, Ontario conducted the chemical analyses on the collected samples. Eurofins is a member of the Canadian Association for Laboratory Accreditation Inc. (CALA) and meets the requirements of Section 47 of Ontario Regulation 153/04 (O. Reg. 153/04) certifying that the analytical laboratory is accredited in accordance with the International Standard ISO/IEC 17025 and with standards developed by the Standards Council of Canada. The results of the water samples submitted to chemical analyses were compared to the City of Mississauga Sanitary and Storm Sewer Guidelines.

The laboratory certificates of analysis are provided in **Appendix B**. These results showed that most concentrations of analyzed parameters were found to be below the City of Mississauga Sanitary and Storm sewer limits, except for the Total suspended solids, Hg, Al, Cu, and Total Phosphorus for storm sewer guidelines and Total suspended solids in the sanitary sewer guidelines. **Table 4.3** summarizes the water quality exceedances from the City of Mississauga Sanitary Sewer By-Law guidelines. **Table 4.4** summarizes the water quality exceedances from the City of Mississauga Storm Sewer By-Law guidelines.

Based on these results, it is anticipated that groundwater removed for dewatering purposes during excavation can be discharged into the municipal sanitary sewer system, provided that a discharge permit is obtained from the City of Mississauga. Care should be taken to prevent the movement of sediment with the groundwater, a proper filtration or sediment settlement tank should be used. In addition to that, care should be taken with regards to the total suspended solids that were found to be exceeding the City of Mississauga sanitary sewer guidelines.

Table 4.3: Summary of the Water Quality Exceedances from the City of Mississauga Sanitary Sewer Guidelines – Well BH102/MW

Guideline	Group	Analyte
City of Mississauga – Sanitary Sewer	General Chemistry	Total Suspended Solids (TSS)

Table 4.4: Summary of the Water Quality Exceedances from the City of Mississauga Storm Sewer Guidelines – Well BH102/MW

Guideline	Group	Analyte
City of Mississauga – Storm Sewer	General Chemistry	Total Suspended Solids (TSS)
	Metals	Mercury (Hg), Aluminum (Al), and Copper (Cu)
	Nutrients	Total Phosphorus (Total P)

5 GROUNDWATER DEWATERING ESTIMATES

5.1 Introduction

Based on the information provided to us by the client, we understand that the proposed project will consist of three (3) stories residential building (16 units) with one level basement, which it is labelled as Phase 2 based on the drawings provided by the client. The existing average ground surface at the project site is estimated at geodetic elevation 169.5 m±. The finish basement elevation is located at -2.4 m below the existing ground surface as per the information provided by the client to Orbit (see attached drawing in Appendix E for details).

It is our further understanding that the foundations for the proposed structure will be designed on undisturbed compact to dense native soil. The maximum anticipated depth of footings would be 3.5 m, approximately, below the existing grade. The highest groundwater level measured in the monitoring wells installed at the Site was about 2.32m below the existing ground surface measured in monitoring well

BH102/MW. It is assumed that the base of the footing will be below the groundwater table. Therefore, dewatering during excavation construction may be required for the proposed structure to keep ground water level at least 1 m below the excavation level.

The summary of preliminary assessment of dewatering requirements is presented in **Table 5.1.**

Table 5.1: Summary of Preliminary Assessment of Dewatering Requirements

Planned Construction Information						Groundwater Information			Dewatering Estimation Information		
Structure Name	**Approx. Length of Excavation (m)**	**Approx. Width of Excavation (m)**	**Average Ground Surface Elevation (mASL)**	**Elevation of Approx. Depth of Excavation [A] (mASL)**	**Approx. Depth of Excavation (m)**	**Representative Monitoring Well**	**Measured Highest Groundwater Level Elevation [B] (mASL)**	**Estimated Drawdown (m) [B-A+1[1]]**	**Construction Dewatering Needed? (Yes/No)**	**Dominant Soil Type(s)**	**Hydraulic Conductivity (cm/s)**
Phase 2 - Proposed Three Stories Building (16 Units)	41	21	169.5	166	3.5	BH101/MW	167.18	2.18	Yes	**Sandy Silt to Silty Sand Till:** trace to some clay, trace gravel	$1.125x10^{-4}$

5.2 Dewatering Rate Estimation

Anticipated daily dewatering rates were estimated using the equations provided in the reference book "Construction Dewatering and Groundwater Control: New Methods and Applications - Third Edition. New York, New York: John Wiley & Sons (Powers et. al., 2007)", for a trench excavation. Steady flow to the excavation was assumed for the purpose of the analysis. The "trench excavation" referred to herein is an excavation configuration of a rectangular, where the ratio of the length to the width is less than 1.5. The referred equation considers a total groundwater inflow rate (Q_T) to an excavation trench consisting of two (2) components, Q_M and Q_R, as follows:

$$Q_T = Q_M + Q_R$$

Where:

Q_M Linear flow rate for the trench section.

Q_R Radial flow through the two ends of the excavated trench.

Using this equation and considering the proposed excavation area, and based on the hydrogeological parameters of the formation expected to be encountered as well as the drawdown needed (assumed 1.0 m below the invert of the trench excavation), the estimated daily pumping rate to achieve the required drawdown was calculated as follows:

The linear flow component QM [m^3/d], represents groundwater inflow portion to the trench through the excavation length. The linear flow rate depends on the aquifer properties such as hydraulic conductivity, thickness, and static water level as well as excavation length and depth, and the zone of influence. The linear flow rate calculation equation is as follows:

$$Q_M = \frac{x\,K\left(H^2 - h^2\right)}{L_o}$$

Where:

- x Length of the trench [m];
- K Hydraulic conductivity [m/d];
- H Distance from static water level to the bottom of the aquifer [m];
- h Distance from lowered water level to the bottom of the aquifer [m], and;
- L Distance from a point of greatest drawdown to a point where there is no drawdown (zone of influence) [m]. It was estimated approximately using the following empirical relationship developed by Sichart:
- $L_o = 3000(H - h)K^{0.5}$ (K in m/s) (Powers et al., 2007).

The radial flow component, Q_R [m^3/d], represents the groundwater inflow portion to the trench through the two ends of the excavated trench. The radial flow rate depends on aquifer properties such as

hydraulic conductivity, thickness, and static water level, as well as the excavation length, width, and depth, and the zone of influence. The radial flow rate calculation equation is as follows:

$$Q_R = \frac{\pi K \left(H^2 - h^2 \right)}{\ln \left(\frac{R}{r_e} \right)}$$

Where:

K Hydraulic conductivity [m/d];

H Distance from static water level to the bottom of the aquifer [m];

h Distance from lowered water level to the bottom of the aquifer [m];

R Radius of the cone of depression (zone of influence) [m], estimated approximately using the following empirical relationship developed by Sichart.

$$R_o = r_s + C(H - h)\sqrt{K}$$

C = constant (unitless; 3,000 for radial flow to pumped wells and between 1,500 and 2,000 for line flow to trenches or to a line of wellpoints)

r_s equivalent radius estimated to be equal to half the width of the trench (Cashman and Preene, 2001).

To lower the water table 1 m below the bottom of the excavation ,it is estimated that the total dewatering rate for the entire project is estimated to be approximately **19.4 m^3/day** for the area of the excavation. The total flow at any time will depend on the length of excavation that needs dewatering and the expected rate of progress. The zone of influence (R_o) is estimated to be approximately **23.5 m**.

Allowing for changes in soil properties, specifically hydraulic conductivity, and transmissivity, it is expected that there will be variations and changes in the amount of groundwater that can be pumped from any part of the site. Allowing a contingency of 100% for the variability in hydraulic conductivity that could be experienced, the expected pumping rate needed for the site is anticipated to be **38.8 m^3/day** (for the entire project site excavation). The dewatering calculation sheet showing the equations and assumptions is provided in **Appendix F**.

In this calculation, water volume due to precipitation has not been considered and it was assumed that the contractor would prevent the surface water from entering the open excavation. The estimated amount of dewatering in this project was calculated that entire project site will be excavated.

The estimated rate is below the MECP threshold of 50 m^3/day for the Environmental Activity and Sector Registry (EASR) registration. **Table 5.2** summarizes the estimated groundwater dewatering requirements to lower the water table to 1m below the bottom of the excavation.

Based on the assumptions and the results of the Dewatering Assessment presented herein, it is not recommended that the water-taking activity be filed on MECP's Environmental Activity and Sector Registry (EASR) system, in accordance with the requirements of O.Reg. 63/16 (as amended). In this regard,

a maximum water-taking volume allocation of 38,800 L/day is recommended for the duration of Project construction to provide the Contractor with a certain degree of operational flexibility and to account for:

- Incident precipitation;
- Water table fluctuations; and,
- Local presence of more pervious water-bearing lenses or horizons within the overburden soil profile.

The maximum construction dewatering R_o calculated for the Site dewatering is approximately 23.5 m. Depending on the dewatering system used by the Contractor and the effectiveness of the support of excavation measures selected for limiting groundwater inflow to the excavation area, R_o may vary, and further evaluation could be required. Should potential receptors be identified, preparation and implementation of a detailed monitoring plan and consideration of pre- and post-construction surveys are recommended.

Table 5.2: Summary of Estimated Groundwater Dewatering Requirements for the Entire Project

Planned Construction Information			Wells and Groundwater Information			Dewatering Estimation Information		
Construction Type	Ground Surface Elevation (mASL)	Elevation of Approximate Depth of Excavation (mASL)	Representative Monitoring Well	Measured Highest Groundwater Level Elevation (mASL)	Hydraulic Conductivity (cm/s)	Estimated Dewatering Rate (m^3/day)	Estimated Dewatering Rate with 100% Contingency (m^3/day)	Zone of Influence (R_o) (m)
Phase 2- Proposed Three Stories Building (16 Units)	169.5	166.0	BH101/MW	167.18	$1.125x10^{-4}$	19.4	38.8	23.5

5.3 Long-Term Drainage System

Orbit understands that the foundation of the basement of the planned building at the Site is designed to resist hydrostatic uplift using the sub-slab drainage system or foundation drainage in conjunction with a perimeter drainage system for long-term control of the groundwater level to avoid wet conditions in this basement. The permanent drainage is intended to collect passive groundwater seepage from the surrounding soils. It is important to address that no design of the sub-slab drainage system was provided when preparing this hydrogeological site assessment. The sub-drainage system is assumed to be at least 4.0 to 4.5 m, approximately, below ground surface. Water quantities from rain and storm events are not considered in the calculation of the quantities of long-term dewatering. During and after storm events, significantly higher drainage rates may be anticipated to accumulate from direct precipitation and runoff into the sub-floor drainage system. Based on the conservative assumptions described above, the maximum long-term drainage rate is 19.4 m^3/day without consideration of storm events, and the maximum zone of influence was preliminary estimated to be 23.5 m. As the long-term drainage rate in this project is anticipated to be less than 50,000 L/day, then EASR from MECP for the long-term drainage is not required. The water can potentially be discharged into City of Mississauga sanitary sewer systems as outlined in Section 4.6 of this report provided that a water discharge permit from the City of Mississauga is obtained.

In order to discharge to the City of Mississauga sanitary sewer system, additional treatment would be required to reduce movement of sediment with the groundwater, a proper filtration or sediment settlement tank should be used. The Filtration system can potentially be filter bags and/or settlement tanks. In addition to that, care should be taken with regards to the total suspended solids (TSS) that was found to be exceeding the City of Mississauga sanitary sewer guidelines. Allowing for variations in grain size in the aquifer, specifically hydraulic conductivity and transmissivity, seepage through floor or from surface, it is expected that there will be variations in the amount of groundwater that can be drained by foundation drainage systems. It is prudent to consider a contingency factor in designing the drainage capacity. It is recommended that the drainage capacity including sumps, pumps and related utilities is designed for minimum 27 L/min (7.0 gpm). It is important to emphasize that the assumed sub-drain depths and areas for the dewatering volume estimation in this report are based on our understanding of the proposed development and the information provided by the Client.

In the case of any modifications of the design or the assumed depths and areas are changed compared to the data provided by the Client during report preparation time, Orbit must be consulted, and the dewatering estimation may need to be revised accordingly. It is known that the subsurface soil conditions may change significantly between and beyond the onsite boreholes. As the information obtained and assumptions made in this investigation report are based on the results obtained from a limited number of investigated locations, unexpected water-bearing zones with a hydraulic conductivity higher than that used in these calculations may be present. In addition, the above-estimated dewatering volumes are based on the estimated hydraulic conductivities (K-value) from limited number of K-tests. It should be noted that it is the responsibility of the contractor to design the sump size and pump capacity based on the quantities of water provided in **Table 5.2** to ensure dry conditions are always maintained below the basement finish floor.

6 PREDICTED EFFECTS

Based on the hydrogeological information and data analysis in this report, the potential impacts to surface water and groundwater resources in the vicinity of the Site due to construction of the proposed structure at the Site are described below.

6.1 Groundwater Use

As indicated in Section 4.5, the search of the MECP water well records indicated that about 25 monitoring wells exist within approximately 500m of the Site. The area of the Site is currently serviced with a municipal water supply from the City of Mississauga. Since the wells identified in MECP were used for construction monitoring and no water supply wells were identified, interference with off-Site groundwater users due to the short-term construction-related dewatering for this project is not anticipated. Therefore, a water well survey is not recommended for this project.

6.2 Surface Water Resources

No permanent surface water streams are present within the estimated zone of influence. Based on this assessment, impacts to the surface water are not anticipated.

6.3 Potential Ground Settlement

Potential ground settlement/subsidence related to existing pavements, sidewalks, buildings, utilities, sewers, and other structures/infrastructure within the possible dewatering radius of influence (R_o) has not been assessed under this hydrogeological investigation. Orbit recommends that the construction contractor retain a qualified and an experienced engineer to complete this assessment based on the estimated dewatering R_o and the magnitude of drawdown required to allow for the construction of the planned project at the Site.

7 SUMMARY AND CONCLUSION

Based on the results of the subsurface investigation, hydrogeological assessment, and analysis of hydraulic conductivity testing and groundwater level monitoring data, the following summary of conclusions and recommendations is provided:

- The soil lithology in the proposed construction area is generally composed of fill deposits overlying native clayey silt to silty clay till and sandy silt to silty sand till, which extended to approximate depth of 5.6 m below the existing grade.
- Groundwater table fluctuations within the project Site were encountered between 2.32 and 3.32 m in monitoring wells (BH102/MW & BH101/MW respectively), the water levels were measured at depths of 2.32m (BH102/MW) and 3.76m (BH101/MW) below the existing ground surface. For the purpose of dewatering assessment, monitoring well BH102/MW data was considered.
- It is estimated that the maximum total dewatering rate for the whole project is to be approximately **38.8m3/day** after allowing **100% contingency** for the variability in hydraulic conductivity that could be experienced. The highest zone of influence (Ro) was estimated to be approximately **23.5m**. The estimated rate is below the MECP threshold of **50 m3/day** for the Environmental Activity and Sector Registry (EASR) registration, then EASR for short term dewatering is not required for this project.
- The maximum long-term drainage rate for the whole project is **38.8 m3/day** without consideration of storm events, and the maximum zone of influence was preliminary estimated to be **23.5 m.** As the long-term drainage rate in this project is anticipated to be less than **50,000 L/day,** then EASR from MECP for the long-term drainage is not required. The water can potentially be discharged into city of Mississauga Sanitary Sewer systems after treatment as outlined in Section 4.6 of this report provided that a water discharge permit from the City of Mississauga is obtained. In addition to that, care should be taken with regards to the total suspended solids (TTS) that were found to be exceeding the City of Mississauga sanitary sewer guidelines.
- For long-term dewatering, it is recommended that the drainage capacity including sumps, pumps and related utilities for the whole project is designed for minimum 27 L/min (7.0 gpm).
- It is recommended that the short-term dewatering system be designed and evaluated by a qualified engineer and performed by a licensed dewatering contractor. The dewatering engineer/contractor should be reminded that during the dewatering activities, care must be taken to prevent the removal of fine soil particles with the pumped water or to use proper filtration prior to discharge to the city sewer system.
- Discharge from temporary dewatering during the construction can potentially be directed into the sanitary sewer system of the City of Mississauga after filtration, and treatment for total suspended solids (TSS) that was found to be exceeding the City of Mississauga sanitary sewer guidelines provided that a water discharge permit from the City of Mississauga is obtained and that ongoing monitoring indicates that the discharge quality meets the relevant municipal sewer use standards. The filtration system can potentially be filter bags and/or settlement tanks. The groundwater should be tested prior to discharge

into the sanitary sewer for the parameters identified in the City of Mississauga Sanitary Sewer Use By-Law.

- No surface water within the zone of influence was observed. Based on this assessment, impacts to the surface water are not anticipated.
- Orbit recommends the decommissioning of existing groundwater monitoring wells after completion of the construction of the project. In conformance with Ontario's Wells Regulation (O.Reg.903) of the Ontario Water Resources Act, the installation and eventual decommissioning of groundwater wells must be carried out by a licensed well contractor. If a well will be damaged/destroyed during the construction activities, then the well should be properly decommissioned in advance of that work.
- Potential ground settlement/subsidence related to existing pavements, sidewalks, buildings, utilities, sewers, and other structures/infrastructure within the possible dewatering radius of influence (Ro) has not been assessed under this hydrogeological investigation. Orbit recommends that the construction contractor retain a qualified and an experienced engineer to complete this assessment based on the dewatering Ro and magnitude of drawdown required to allow for the construction of the planned project at the Site.

8 STATEMENT OF LIMITATIONS

The contents of this report are subject to the attached 'Limitations of Report' sheet attached to this report. The reader's attention is specifically drawn to these conditions as it is considered essential that they be followed for proper use and interpretation of this report. The Statement of Limitations is not intended to reduce the level of responsibility accepted by Orbit, but rather to ensure that all parties who have been given reliance for this report are aware of the responsibilities each assumes in so doing.

This report was prepared by Orbit exclusively for the account of Mr. Arjun Kumar from 2182402 Ontario Inc. (the CLIENT). Other than by the CLIENT, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of Orbit. Any use, reliance on or decision made by any person other than CLIENT based on this report is the sole responsibility of such other person. The CLIENT and Orbit make no representation or warranty to any other person with regard to this report and the work referred to in this report and the CLIENT and Orbit accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

9 CLOSURE

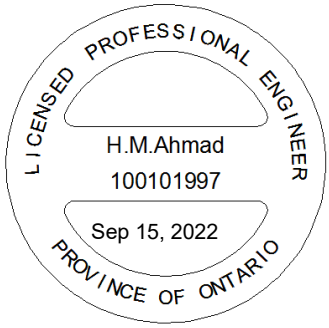
We trust that this information is satisfactory for your present requirements. Should you have any questions or require additional information, please do not hesitate to contact this office.

For and Behalf of Orbit Engineering Limited,

Aly Ahmed, Ph.D., P.Eng.
Principal Engineer

Reviewed by

Hafiz Muneeb Ahmad, M.Eng., M.Sc., P.Eng., QP$_{ESA}$
Senior Principal



10 REFERENCES

Cashman, P.M. and Preene, M. (2001). Groundwater Lowering in Construction: A Practical Guide to Dewatering, Spon Press, 476p.

Chapman, L.J., and Putnam, D.F. (1984). The Physiography of Southern Ontario, Third Edition, Ontario Geological Survey, Special Volume 2.

Riley P.M. Mulligan (2013). Quaternary Landform and Sediment Analysis of the Alliston Area (Southern Simcoe County), Ontario, Canada.

Conservation Authorities Geoscience Working Group. 2013. Hydrogeological Assessment Submissions-Conservation Authority Guidelines for Development Applications.

Bouwer, H. and R.C. Rice, 1976 A Slug Test Method for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

Toronto Region Conservation, Final Draft October 2010

Archaeology and First Nations Policy Study - City of Vaughan

Environment Canada (2021) Canadian National Climate Archive, Canadian Climate Norms and Averages (1981 – 2010), Toronto Lester B. Pearson Int'l A (Station ID 6158733)

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. (1998). Ecological Land Classification for Southern Ontario: First Approximation and Its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02. 225 p.

Ministry of the Environment. 2003. Stormwater Management Planning and Design Manual.

Ministry of Environment and Energy (MOEE). 1995, MOEE Hydrogeological Technical Information Requirements for Land Development Applications.

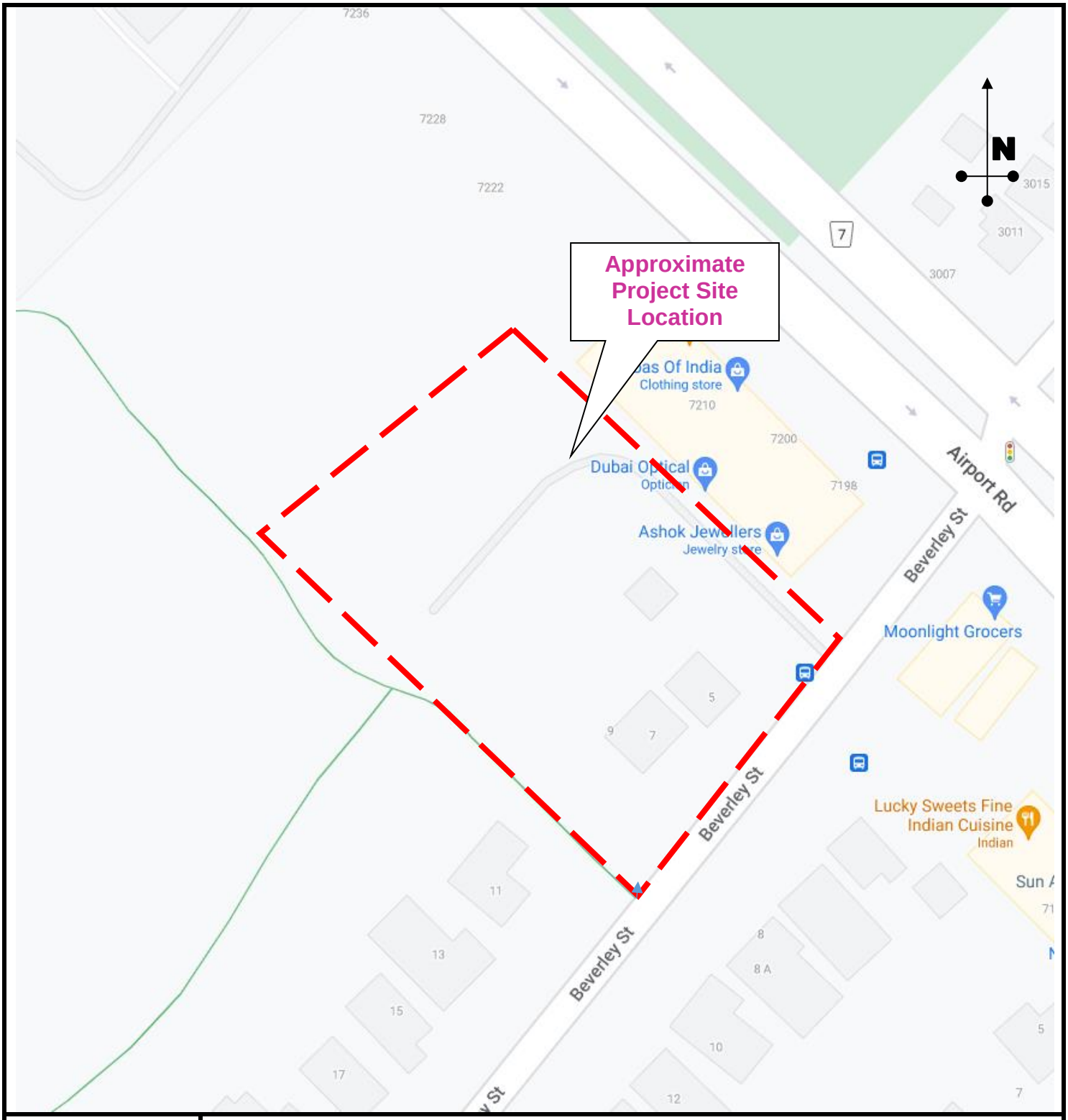
Orbit (2021). Geotechnical Investigation - Proposed Truck Centre, 0 Healey Road, Caledon, Ontario

Powers, J.P., Corwin, A.B., Paul, C.S. and Kaeck, W.E. (2007). Construction Dewatering and Groundwater Control: New Methods and Applications - Third Edition. New York, New York: John Wiley & Sons.

Sichart, W. and W. Kyrieleis, 1930. Grundwasser Absekungen bei Fundierungsarbeiten. Berlin, Germany.

T.S. Steenhuis, W.H. Van Der Molen, 1986: The Thornthwaite-Mather procedure as a simple engineering method to predict recharge, Journal of Hydrology, Volume 84, Issues 3–4, 30 May 1986, Pages 221-229, ISSN 0022-1694, 10.1016/0022-1694(86)90124-1.

Drawings



ORBITENGINEERING	APPROXIMATE SITE LOCATION PLAN		
	Date: **SEP 2022**	**HYDROGEOLOGICAL INVESTIGATION PROPOSED RESIDENTIAL DEVELOPMENT 5, 7 & 9 BEVERLEY STREET, MISSISSAUGA, ON**	Prepared By: **ZA**
	Project: **OE211273AH**		Reviewed By: **HA**
		Prepared for: **2862505 ONTARIO INC.**	Drawing No. **1**

NOTES:

1. The boundaries and soil types have been established only at borehole locations. Between boreholes they are assumed and may be subject to considerable error.
2. Soil samples will be retained in storage for three months and then destroyed unless the client advises an extended time period is required.
3. Granular base fill quantities should not be established from the information provided at the borehole locations.
4. Borehole elevations should not be used to design building(s) or floor slab(s) or parking lot(s) grades.
5. This drawing forms part of the report (project number as referenced) and should only be used in conjunction with this report.

LEGEND

BH/MW **Approximate Borehole/Monitoring Well Location**

SCALE 1 : 200

0 1 2 3 4 5 10 15M

Drawn	ZA
Approved	HA
Date	SEP 2022
Scale	AS SHOWN
Original size	TABLOID

ORBITENGINEERING
Consulting Engineers

Client: **2862505 ONTARIO Ltd.**

Project: **HYDROLOGEOLOGICAL INVESTIGATION PROPOSED BUILDING ADDITION**
5,7 & 9 BEVERLEY ST, MISSISSAUGA, ON

Title: **APPROXIMATE BOREHOLE LOCATION PLAN**

Project no: **OE211273AH**

Drawing no: **1A**

LEGEND

33 Peel Plain

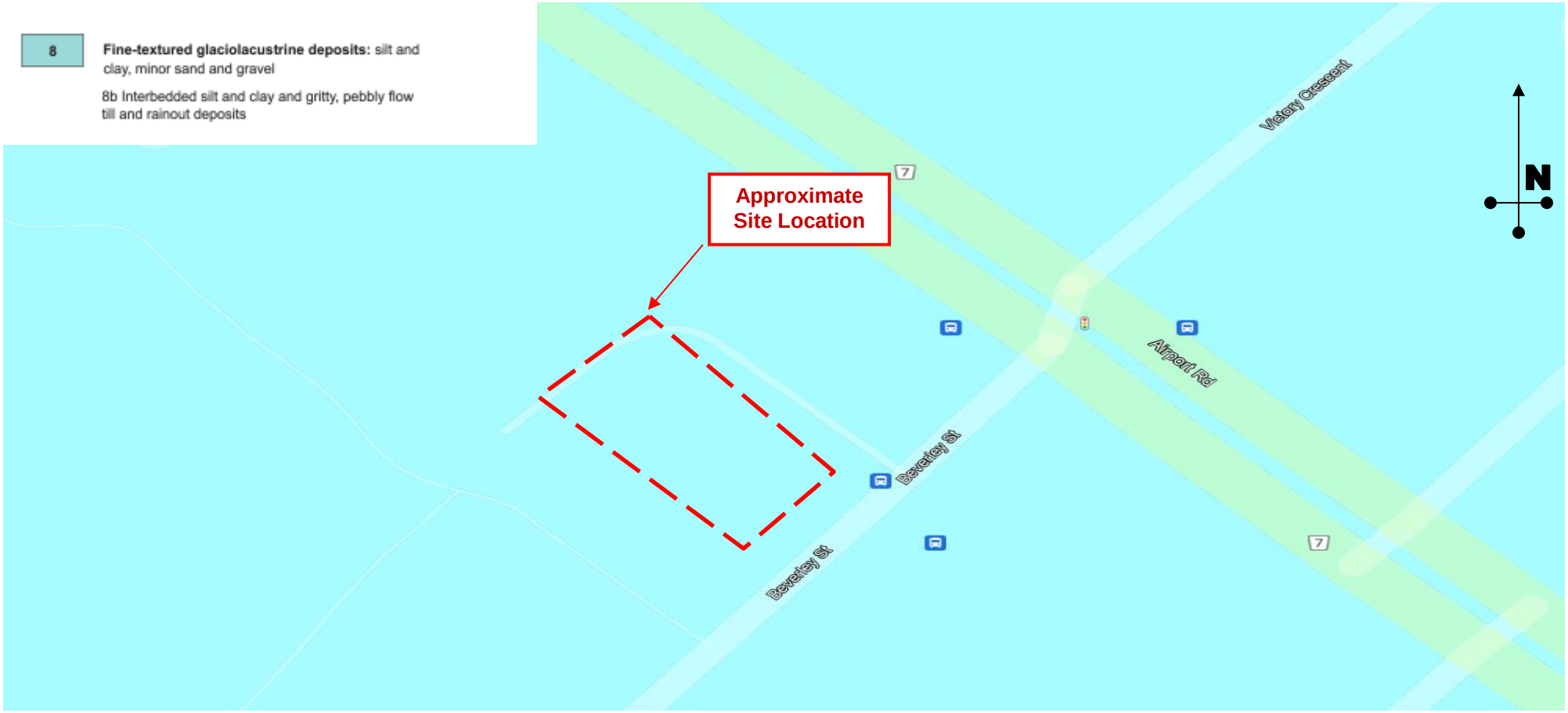
ORBITENGINEERING

Site Physiography

Date: SEP 2022	HYDROGEOLOGICAL INVESTIGATION PROPOSED RESIDENTIAL DEVELOPMENT 5, 7 & 9 BEVERLEY STREET, MISSISSAUGA, ON	Prepared By: Z.A.
Project: OE211273AH		Reviewed By: H.A.
	Prepared for: 2862505 ONTARIO LTD.	Drawing No.: 3

LEGEND

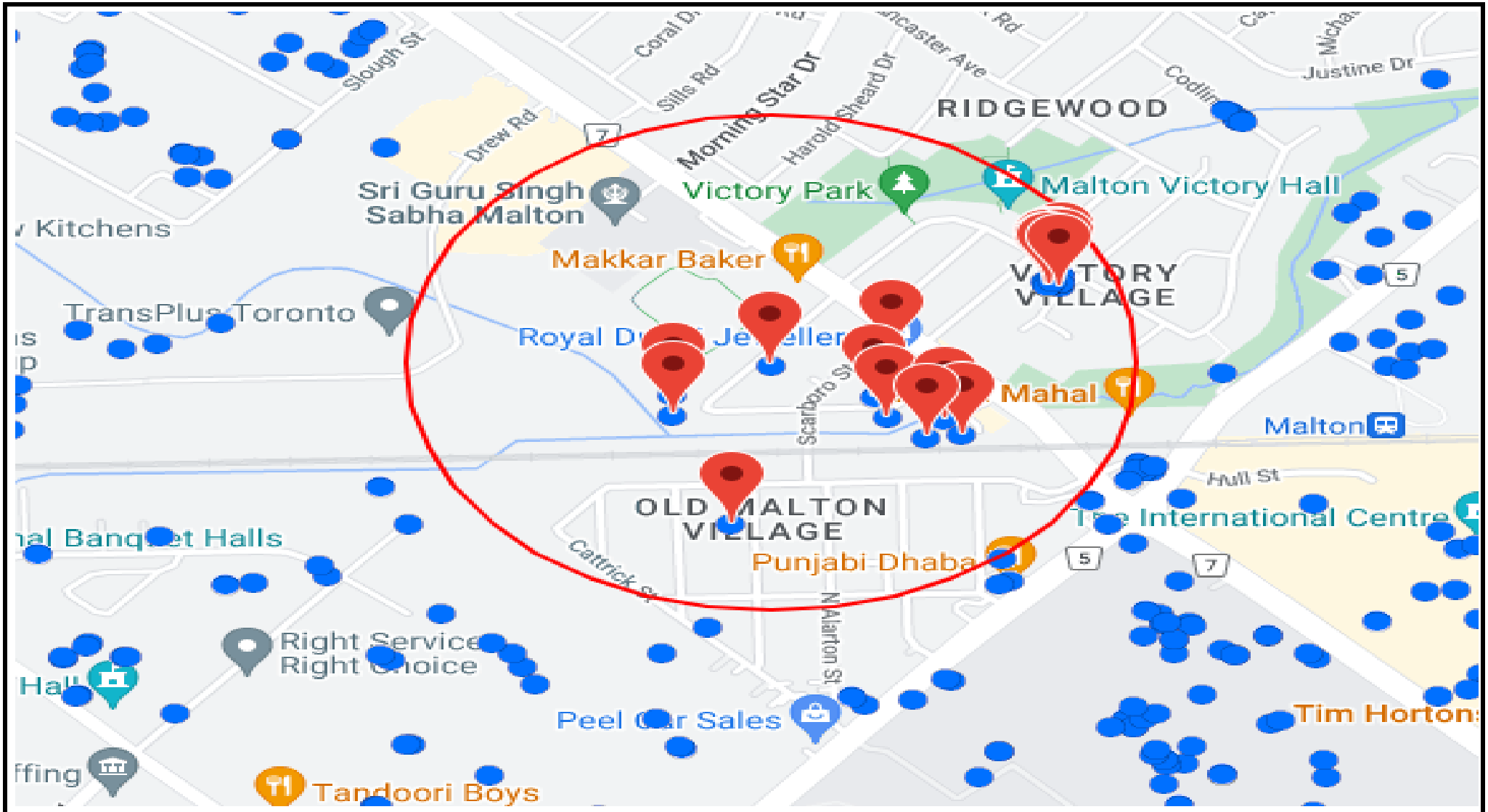
8	**Fine-textured glaciolacustrine deposits:** silt and clay, minor sand and gravel
	8b Interbedded silt and clay and gritty, pebbly flow till and rainout deposits



Surficial Geology

ORBITENGINEERING

Date: **SEP 2022**	**HYDROGEOLOGICAL INVESTIGATION PROPOSED RESIDENTIAL DEVELOPMENT 5, 7 & 9 BEVERLEY STREET, MISSISSAUGA, ON**	Prepared By: **Z.A.**
Project: **OE211273AH**		Reviewed By: **H.A.**
	Prepared for: **2862505 ONTARIO LTD.**	Drawing No.: **4**



MECP Water Well Records Near the Site

ORBITENGINEERING

Date: **SEP 2022**	**HYDROGEOLOGICAL INVESTIGATION PROPOSED RESIDENTIAL DEVELOPMENT** **5, 7 & 9 BEVERLEY STREET, MISSISSAUGA, ON**	Prepared By: **Z.A.**
Project: **OE211273AH**	Prepared for: **2862505 ONTARIO LTD.**	Reviewed By: **H.A.**
		Drawing No.: **5**

Borehole Logs

ORBITENGINEERING

LOG OF BOREHOLE BH/MW101

PROJECT: Geotechnical Investigation for Proposed Residential Development
CLIENT: 2862505 Ontario Ltd
PROJECT LOCATION: 5,7 & 9 Beverley Street, Mississauga, ON
DATUM: Geodetic
BH LOCATION: Refer to Borehole Location Plan (Drawing 1A) N 4840244.74 E 608925.6

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Jul-25-2022

PROJECT NO.: OE211273AG
DRAWING NO.: 8

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
169.0												
169.0	**Asphalt:** 60mm											
0.1 168.7	**Granular Fill:** 200mm											
0.3	**Fill:** clayey silt, trace gravel and sand, brown, moist, compact		1	SS	21							
1			2	SS	15		168					
167.5												
1.5	**Clayey Silt to Silty Clay Till:** trace sand and gravel, brown, moist, stiff to very stiff		3	SS	23		167					
2												
166.7												
2.3	**Sandy Silt to Silty SandTill:** trace to some clay, trace gravel, greyish brown, moist, compact to dense		4	SS	36		166					
3	grey below 3.0 m		5	SS	18	▽ W. L. 165.7 m Aug 03, 2022 ▽ W. L. 165.4 m Sep 01, 2022 W. L. 165.2 m Aug 08, 2022	165					
4												
5			6	SS	31		164					3 28 52 17
163.4	Refusal @ 5.6 (Due to possible cobble)											
5.6	**End of Borehole:**											

Notes:

Water Levels:
(i) During Drilling: 4.5m
(ii) At Completion: 50mm monitoring well was installed
(iii) Aug 03,2022 - 3.32 m
Aug 08,2022 - 3.76 m
Sep 01,2022 - 3.60 m

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

ORBITENGINEERING

LOG OF BOREHOLE BH/MW102

PROJECT: Geotechnical Investigation for Proposed Residential Development
CLIENT: 2862505 Ontario Ltd
PROJECT LOCATION: 5,7 & 9 Beverley Street, Mississauga, ON
DATUM: Geodetic
BH LOCATION: Refer to Borehole Location Plan (Drawing 1A) N 4840248.71 E 608872.73

DRILLING DATA
Method: Hollow Stem Auger
Diameter: 200mm
Date: Jul-25-2022

PROJECT NO.: OE211273AG
DRAWING NO.: 9

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS/0.3 m "N"	ELEVATION
169.4 / 0.0	**Asphalt:** 75mm				
169.3 / 0.1	**Granular Fill:** 200mm				
169.1 / 0.3	**Fill:** clayey silt to sandy silt, trace to some gravel, trace rootlets, brown, moist, compact	1	SS	35	169
	loose below 0.8 m	2	SS	8	
167.9 / 1.5	**Clayey Silt to Silty Clay Till:** trace sand and gravel, brown, moist, stiff	3	SS	15	168
	grey below 2.3 m	4	SS	19	
166.4 / 3.0	**Sandy Silt to Silty SandTill:** trace to some clay, trace gravel, greyish brown, moist, compact to dense	5	SS	16	166
		6	SS	29	165
163.8 / 5.6	**End of Borehole:**				164

W. L. 167.1 m Aug 03, 2022

Water Levels:
(i) During Drilling: 3.6m
(ii) At Completion: 50mm monitoring well was installed
(iii) Aug 03,2022 - 2.32 m
Aug 08,2022 - 2.34 m
Sep 01,2022 - 2.30 m

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)
SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)
PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%) (10 20 30)
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
8	36	47	9

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Water Quality Certificates of Analysis

Certificate of Analysis

Client: Orbit Engineering
1900 Clark Blvd
Brampton, ON
L6T 0E9
Attention: Mr Zubair Ahmed
PO#:
Invoice to: Orbit Engineering

Report Number: 1983249
Date Submitted: 2022-08-08
Date Reported: 2022-08-18
Project: OE211273AG
COC #: 888009

Dear Zubair Ahmed:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____
Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

eurofins | Environment Testing

Client: Orbit Engineering
1900 Clark Blvd
Brampton, ON
L6T 0E9
Attention: Mr Zubair Ahmed
PO#:
Invoice to: Orbit Engineering

Report Number: 1983249
Date Submitted: 2022-08-08
Date Reported: 2022-08-18
Project: OE211273AG
COC #: 888009

				Lab I.D.	1642494
				Sample Matrix	WW
				Sample Type	
				Sampling Date	2022-08-08
				Sample I.D.	BH102/MW
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Anions	F	0.10	mg/L	MAC 10	0.10
	SO4	1	mg/L	MAC 1500	361
General Chemistry	BOD5	1	mg/L	MAC 300	1
	Cyanide (total)	0.005	mg/L	MAC 2	<0.005
	pH	1.00		MAC 5.5-10.0	6.99
	Phenols	0.002	mg/L	MAC 1.0	0.004
	Total Suspended Solids	2	mg/L	MAC 350	4710*
Mercury	Hg	0.0005	mg/L	MAC 0.01	<0.0005
Metals	Ag	0.01	mg/L	MAC 5	<0.01
	Al	0.1	mg/L	MAC 50	30.5
	Aqua-Regia Digest		mg/L		y
	As	0.02	mg/L	MAC 1	<0.02
	Cd	0.008	mg/L	MAC 0.7	<0.008
	Co	0.01	mg/L	MAC 5	0.02
	Cr	0.05	mg/L	MAC 5	<0.05
	Cu	0.01	mg/L	MAC 3	0.05
	Mn	0.01	mg/L	MAC 5	1.55
	Mo	0.01	mg/L	MAC 5	<0.01
	Ni	0.01	mg/L	MAC 3	0.05
	Pb	0.01	mg/L	MAC 3	0.02
	Sb	0.01	mg/L	MAC 5	<0.01
	Se	0.02	mg/L	MAC 1	<0.02
	Sn	0.1	mg/L	MAC 5	<0.1
	Ti	0.1	mg/L	MAC 5	0.5
	Zn	0.04	mg/L	MAC 3	0.10

Guideline = Sanitary Sewer - Peel *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

eurofins | Environment Testing

Certificate of Analysis

Client: Orbit Engineering
1900 Clark Blvd
Brampton, ON
L6T 0E9
Attention: Mr Zubair Ahmed
PO#:
Invoice to: Orbit Engineering

Report Number: 1983249
Date Submitted: 2022-08-08
Date Reported: 2022-08-18
Project: OE211273AG
COC #: 888009

Group	Analyte	MRL	Units	Guideline	1642494
				Lab I.D.	1642494
				Sample Matrix	WW
				Sample Type	
				Sampling Date	2022-08-08
				Sample I.D.	BH102/MW
Microbiology	Escherichia Coli	0	ct/100mL		0
Nutrients	Total Kjeldahl Nitrogen	0.100	mg/L	MAC 100	1.05
	Total P	0.020	mg/L	MAC 10	2.13
Oil and Grease	Oil & Grease - Mineral	1	mg/L	MAC 15	<1
	Oil & Grease - Non-mineral	1	mg/L	MAC 150	<1
	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L	MAC 1	<0.1
Semi-Volatiles	1,2-dichlorobenzene	0.2	ug/L	MAC 50	<0.2
	1,4-dichlorobenzene	0.4	ug/L	MAC 80	<0.4
	Bis(2-ethylhexyl)phthalate	0.4	ug/L	MAC 12	1.3
	Di-n-butylphthalate	1.3	ug/L	MAC 80	<1.3
Subcontract	Nonylphenol Ethoxalate (Total)	2	ug/L	MAC 200	<2
	Nonylphenols (Total)	1	ug/L	MAC 20	<1
VOCs Surrogates	1,2-dichloroethane-d4	0	%		121
	4-bromofluorobenzene	0	%		94
	Toluene-d8	0	%		102
Volatiles	1,1,2,2-tetrachloroethane	0.5	ug/L	MAC 1400	<0.5
	Benzene	0.5	ug/L	MAC 10	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L	MAC 4000	<0.4
	Chloroform	0.5	ug/L	MAC 40	<0.5
	Dichloromethane	4.0	ug/L	MAC 2000	<4.0
	Ethylbenzene	0.5	ug/L	MAC 160	<0.5
	m/p-xylene	0.4	ug/L		<0.4
	Methyl Ethyl Ketone (MEK)	10	ug/L	MAC 8000	<10
	o-xylene	0.4	ug/L		<0.4

Guideline = Sanitary Sewer - Peel *** = Guideline Exceedence**

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Certificate of Analysis

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Client: Orbit Engineering
1900 Clark Blvd
Brampton, ON
L6T 0E9
Attention: Mr Zubair Ahmed
PO#:
Invoice to: Orbit Engineering

Report Number: 1983249
Date Submitted: 2022-08-08
Date Reported: 2022-08-18
Project: OE211273AG
COC #: 888009

				Lab I.D.	1642494
				Sample Matrix	WW
				Sample Type	
				Sampling Date	2022-08-08
				Sample I.D.	BH102/MW
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Volatiles	Styrene	0.5	ug/L	MAC 200	<0.5
	t-1,3-Dichloropropylene	0.5	ug/L	MAC 140	<0.5
	Tetrachloroethylene	0.3	ug/L	MAC 1000	<0.3
	Toluene	0.4	ug/L	MAC 270	<0.4
	Trichloroethylene	0.3	ug/L	MAC 400	<0.3
	Xylene; total	0.5	ug/L	MAC 1400	<0.5

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 426587 **Analysis/Extraction Date** 2022-08-13 **Analyst** C M **Method** B 625/P 8270			
Dichlorobenzene, 1,2-	<0.2 ug/L	106	20-140
Dichlorobenzene, 1,4-	<0.4 ug/L	108	20-140
Bis(2-ethylhexyl)phthalate	<0.4 ug/L	96	20-140
Di-n-butylphthalate	<1.3 ug/L	96	20-140
Run No 427007 **Analysis/Extraction Date** 2022-08-10 **Analyst** DRA **Method** AMBCOLM1			
Escherichia Coli			
Run No 427052 **Analysis/Extraction Date** 2022-08-09 **Analyst** Z S **Method** SM4500-CNC/MOE E3015			
Cyanide (total)	<0.005 mg/L	85	61-139
Run No 427079 **Analysis/Extraction Date** 2022-08-10 **Analyst** PJ **Method** SM 5520B/F			
Oil & Grease - Mineral	<1 mg/L	100	60-120
Oil & Grease - Non-mineral	<1 mg/L	120	60-120
Oil & Grease - Total	<1 mg/L	110	60-120
Run No 427139 **Analysis/Extraction Date** 2022-08-10 **Analyst** SKH **Method** EPA 351.2			

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Total Kjeldahl Nitrogen	<0.100 mg/L	101	70-130
Run No 427151 **Analysis/Extraction Date** 2022-08-10 **Analyst** SKH **Method** EPA 365.1			
Total P	<0.020 mg/L	97	80-120
Run No 427167 **Analysis/Extraction Date** 2022-08-15 **Analyst** CK **Method** SM 5210B			
BOD5	<1 mg/L	77	75-125
Run No 427193 **Analysis/Extraction Date** 2022-08-11 **Analyst** AaN **Method** SM 4110			
SO4	<5 mg/L	100	90-110
Run No 427230 **Analysis/Extraction Date** 2022-08-11 **Analyst** SD **Method** EPA 200.8			
Silver	<0.01 mg/L	110	70-130
Aluminum	<0.1 mg/L	121	70-130
Aqua-Regia Digest			
Arsenic	<0.02 mg/L	110	70-130
Cadmium	<0.008 mg/L	112	70-130
Cobalt	<0.01 mg/L	106	70-130
Chromium Total	<0.05 mg/L	107	70-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Copper	<0.01 mg/L	110	70-130
Manganese	<0.01 mg/L	118	70-130
Molybdenum	<0.01 mg/L	108	70-130
Nickel	<0.01 mg/L	108	70-130
Lead	<0.01 mg/L	115	70-130
Antimony	<0.01 mg/L	114	70-130
Selenium	<0.02 mg/L	112	70-130
Sn	<0.1 mg/L	91	70-130
Titanium	<0.1 mg/L	114	
Zinc	<0.04 mg/L	119	70-130
Run No 427283 **Analysis/Extraction Date** 2022-08-11 **Analyst** AsA **Method** SM2320,2510,4500H/F			
F	<0.10 mg/L	102	90-110
pH		100	90-110
Run No 427296 **Analysis/Extraction Date** 2022-08-12 **Analyst** SKH **Method** C SM2540			
Total Suspended Solids	<2 mg/L	98	90-110
Run No 427320 **Analysis/Extraction Date** 2022-08-12 **Analyst** AS **Method** M SM3112B-3500B			

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Mercury	<0.0005 mg/L	97	76-123
Run No 427330 **Analysis/Extraction Date** 2022-08-12 **Analyst** IP **Method** SM5530D/EPA420.2			
Phenols	<0.002 mg/L	105	50-120
Run No 427395 **Analysis/Extraction Date** 2022-08-15 **Analyst** R G **Method** EPA 8081B			
Polychlorinated Biphenyls	<0.1 ug/L	91	60-140
Run No 427421 **Analysis/Extraction Date** 2022-08-13 **Analyst** SS **Method** EPA 8260			
Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	111	60-130
Benzene	<0.5 ug/L	106	60-130
Dichloroethylene, 1,2-cis-	<0.4 ug/L	94	60-130
Chloroform	<0.5 ug/L	112	60-130
Methylene Chloride	<4.0 ug/L	112	60-130
Ethylbenzene	<0.5 ug/L	117	60-130
m/p-xylene	<0.4 ug/L	120	60-130
Methyl Ethyl Ketone	<10 ug/L		60-130
o-xylene	<0.4 ug/L	111	60-130
Styrene	<0.5 ug/L	112	60-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Dichloropropene,1,3-trans-	<0.5 ug/L	82	60-130
Tetrachloroethylene	<0.3 ug/L	102	60-130
Toluene	<0.4 ug/L	108	60-130
Trichloroethylene	<0.3 ug/L	98	60-130
Run No 427428 **Analysis/Extraction Date** 2022-08-15 **Analyst** SS **Method** EPA 8260			
Xylene Mixture			
Run No 427662 **Analysis/Extraction Date** 2022-08-14 **Analyst** AET **Method** SUBCONTRACT-A			
Nonylphenol Ethoxalate (Total)			
Nonylphenols (Total)	<1.0 ug/L	102	

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Dear Zubair Ahmed:

Please find attached the analytical results for your samples. If you have any questions regarding this report, please do not hesitate to call (613-727-5692).

Report Comments:

APPROVAL: _____
Emma-Dawn Ferguson, Chemist

All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise indicated.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at: https://directory.cala.ca/.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is licensed by the Ontario Ministry of the Environment, Conservation, and Parks (MECP) for specific tests in drinking water (license #2318). A copy of the license is available upon request.

Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) is accredited by the Ontario Ministry of Agriculture, Food, and Rural Affairs for specific tests in agricultural soils.

Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline values listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official provincial or federal guideline as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Certificate of Analysis

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				Lab I.D.	1642494
				Sample Matrix	WW
				Sample Type	
				Sampling Date	2022-08-08
				Sample I.D.	BH102/MW
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Anions	F	0.10	mg/L		0.10
	SO4	1	mg/L		361
General Chemistry	BOD5	1	mg/L	MAC 15	1
	Cyanide (total)	0.005	mg/L	MAC 0.02	<0.005
	pH	1.00		6.0-9.0	6.99
	Phenols	0.002	mg/L	MAC 0.008	0.004
	Total Suspended Solids	2	mg/L	MAC 15	4710*
Mercury	Hg	0.0005	mg/L	MAC 0.0004	<0.0005*
Metals	Ag	0.01	mg/L	MAC 0.12	<0.01
	Al	0.1	mg/L	MAC 1.0	30.5*
	Aqua-Regia Digest		mg/L		y
	As	0.02	mg/L	MAC 0.02	<0.02
	Cd	0.008	mg/L	MAC 0.008	<0.008
	Co	0.01	mg/L		0.02
	Cr	0.05	mg/L	MAC 0.08	<0.05
	Cu	0.01	mg/L	MAC 0.04	0.05*
	Mn	0.01	mg/L	MAC 2	1.55
	Mo	0.01	mg/L		<0.01
	Ni	0.01	mg/L	MAC 0.08	0.05
	Pb	0.01	mg/L	MAC 0.12	0.02
	Sb	0.01	mg/L		<0.01
	Se	0.02	mg/L	MAC 0.02	<0.02
	Sn	0.1	mg/L		<0.1
	Ti	0.1	mg/L		0.5
	Zn	0.04	mg/L	MAC 0.2	0.10

Guideline = Storm Sewer - Mississauga *** = Guideline Exceedence**

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				Lab I.D.	1642494
				Sample Matrix	WW
				Sample Type	
				Sampling Date	2022-08-08
				Sample I.D.	BH102/MW
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Microbiology	Escherichia Coli	0	ct/100mL	MAC 200	0
Nutrients	Total Kjeldahl Nitrogen	0.100	mg/L		1.05
	Total P	0.020	mg/L	MAC 0.4	2.13*
Oil and Grease	Oil & Grease - Mineral	1	mg/L		<1
	Oil & Grease - Non-mineral	1	mg/L		<1
	Oil & Grease - Total	1	mg/L		<1
PCBs	Polychlorinated Biphenyls (PCBs)	0.1	ug/L	MAC 0.4	<0.1
Semi-Volatiles	1,2-dichlorobenzene	0.2	ug/L	MAC 5.6	<0.2
	1,4-dichlorobenzene	0.4	ug/L	MAC 6.8	<0.4
	Bis(2-ethylhexyl)phthalate	0.4	ug/L		1.3
	Di-n-butylphthalate	1.3	ug/L		<1.3
Subcontract	Nonylphenol Ethoxalate (Total)	2	ug/L		<2
	Nonylphenols (Total)	1	ug/L		<1
VOCs Surrogates	1,2-dichloroethane-d4	0	%		121
	4-bromofluorobenzene	0	%		94
	Toluene-d8	0	%		102
Volatiles	1,1,2,2-tetrachloroethane	0.5	ug/L		<0.5
	Benzene	0.5	ug/L	MAC 2.0	<0.5
	c-1,2-Dichloroethylene	0.4	ug/L		<0.4
	Chloroform	0.5	ug/L		<0.5
	Dichloromethane	4.0	ug/L	MAC 5.2	<4.0
	Ethylbenzene	0.5	ug/L	MAC 2.0	<0.5
	m/p-xylene	0.4	ug/L		<0.4
	Methyl Ethyl Ketone (MEK)	10	ug/L		<10
	o-xylene	0.4	ug/L		<0.4

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				Lab I.D.	1642494
				Sample Matrix	WW
				Sample Type	
				Sampling Date	2022-08-08
				Sample I.D.	BH102/MW
Group	**Analyte**	**MRL**	**Units**	**Guideline**	
Volatiles	Styrene	0.5	ug/L		<0.5
	t-1,3-Dichloropropylene	0.5	ug/L		<0.5
	Tetrachloroethylene	0.3	ug/L	MAC 4.4	<0.3
	Toluene	0.4	ug/L	MAC 2.0	<0.4
	Trichloroethylene	0.3	ug/L	MAC 7.6	<0.3
	Xylene; total	0.5	ug/L	MAC 4.4	<0.5

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COC #: 888009

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Run No 426587 **Analysis/Extraction Date** 2022-08-13 **Analyst** C M **Method** B 625/P 8270			
Dichlorobenzene, 1,2-	<0.2 ug/L	106	20-140
Dichlorobenzene, 1,4-	<0.4 ug/L	108	20-140
Bis(2-ethylhexyl)phthalate	<0.4 ug/L	96	20-140
Di-n-butylphthalate	<1.3 ug/L	96	20-140
Run No 427007 **Analysis/Extraction Date** 2022-08-10 **Analyst** DRA **Method** AMBCOLM1			
Escherichia Coli			
Run No 427052 **Analysis/Extraction Date** 2022-08-09 **Analyst** Z S **Method** SM4500-CNC/MOE E3015			
Cyanide (total)	<0.005 mg/L	85	61-139
Run No 427079 **Analysis/Extraction Date** 2022-08-10 **Analyst** PJ **Method** SM 5520B/F			
Oil & Grease - Mineral	<1 mg/L	100	60-120
Oil & Grease - Non-mineral	<1 mg/L	120	60-120
Oil & Grease - Total	<1 mg/L	110	60-120
Run No 427139 **Analysis/Extraction Date** 2022-08-10 **Analyst** SKH **Method** EPA 351.2			

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Total Kjeldahl Nitrogen	<0.100 mg/L	101	70-130
Run No 427151 **Analysis/Extraction Date** 2022-08-10 **Analyst** SKH **Method** EPA 365.1			
Total P	<0.020 mg/L	97	80-120
Run No 427167 **Analysis/Extraction Date** 2022-08-15 **Analyst** CK **Method** SM 5210B			
BOD5	<1 mg/L	77	75-125
Run No 427193 **Analysis/Extraction Date** 2022-08-11 **Analyst** AaN **Method** SM 4110			
SO4	<5 mg/L	100	90-110
Run No 427230 **Analysis/Extraction Date** 2022-08-11 **Analyst** SD **Method** EPA 200.8			
Silver	<0.01 mg/L	110	70-130
Aluminum	<0.1 mg/L	121	70-130
Aqua-Regia Digest			
Arsenic	<0.02 mg/L	110	70-130
Cadmium	<0.008 mg/L	112	70-130
Cobalt	<0.01 mg/L	106	70-130
Chromium Total	<0.05 mg/L	107	70-130

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QC Summary

Analyte	Blank	QC % Rec	QC Limits
Copper	<0.01 mg/L	110	70-130
Manganese	<0.01 mg/L	118	70-130
Molybdenum	<0.01 mg/L	108	70-130
Nickel	<0.01 mg/L	108	70-130
Lead	<0.01 mg/L	115	70-130
Antimony	<0.01 mg/L	114	70-130
Selenium	<0.02 mg/L	112	70-130
Sn	<0.1 mg/L	91	70-130
Titanium	<0.1 mg/L	114	
Zinc	<0.04 mg/L	119	70-130
Run No 427283 **Analysis/Extraction Date** 2022-08-11 **Analyst** AsA **Method** SM2320,2510,4500H/F			
F	<0.10 mg/L	102	90-110
pH		100	90-110
Run No 427296 **Analysis/Extraction Date** 2022-08-12 **Analyst** SKH **Method** C SM2540			
Total Suspended Solids	<2 mg/L	98	90-110
Run No 427320 **Analysis/Extraction Date** 2022-08-12 **Analyst** AS **Method** M SM3112B-3500B			

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COC #: 888009

QC Summary

Analyte	Blank	QC % Rec	QC Limits
Mercury	<0.0005 mg/L	97	76-123
Run No 427330 **Analysis/Extraction Date** 2022-08-12 **Analyst** IP **Method** SM5530D/EPA420.2			
Phenols	<0.002 mg/L	105	50-120
Run No 427395 **Analysis/Extraction Date** 2022-08-15 **Analyst** R G **Method** EPA 8081B			
Polychlorinated Biphenyls	<0.1 ug/L	91	60-140
Run No 427421 **Analysis/Extraction Date** 2022-08-13 **Analyst** SS **Method** EPA 8260			
Tetrachloroethane, 1,1,2,2-	<0.5 ug/L	111	60-130
Benzene	<0.5 ug/L	106	60-130
Dichloroethylene, 1,2-cis-	<0.4 ug/L	94	60-130
Chloroform	<0.5 ug/L	112	60-130
Methylene Chloride	<4.0 ug/L	112	60-130
Ethylbenzene	<0.5 ug/L	117	60-130
m/p-xylene	<0.4 ug/L	120	60-130
Methyl Ethyl Ketone	<10 ug/L		60-130
o-xylene	<0.4 ug/L	111	60-130
Styrene	<0.5 ug/L	112	60-130

Guideline = Storm Sewer - Mississauga *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

Certificate of Analysis

Client: Orbit Engineering
1900 Clark Blvd
Brampton, ON
L6T 0E9
Attention: Mr Zubair Ahmed
PO#:
Invoice to: Orbit Engineering

Report Number: 1983249
Date Submitted: 2022-08-08
Date Reported: 2022-08-18
Project: OE211273AG
COC #: 888009

QC Summary

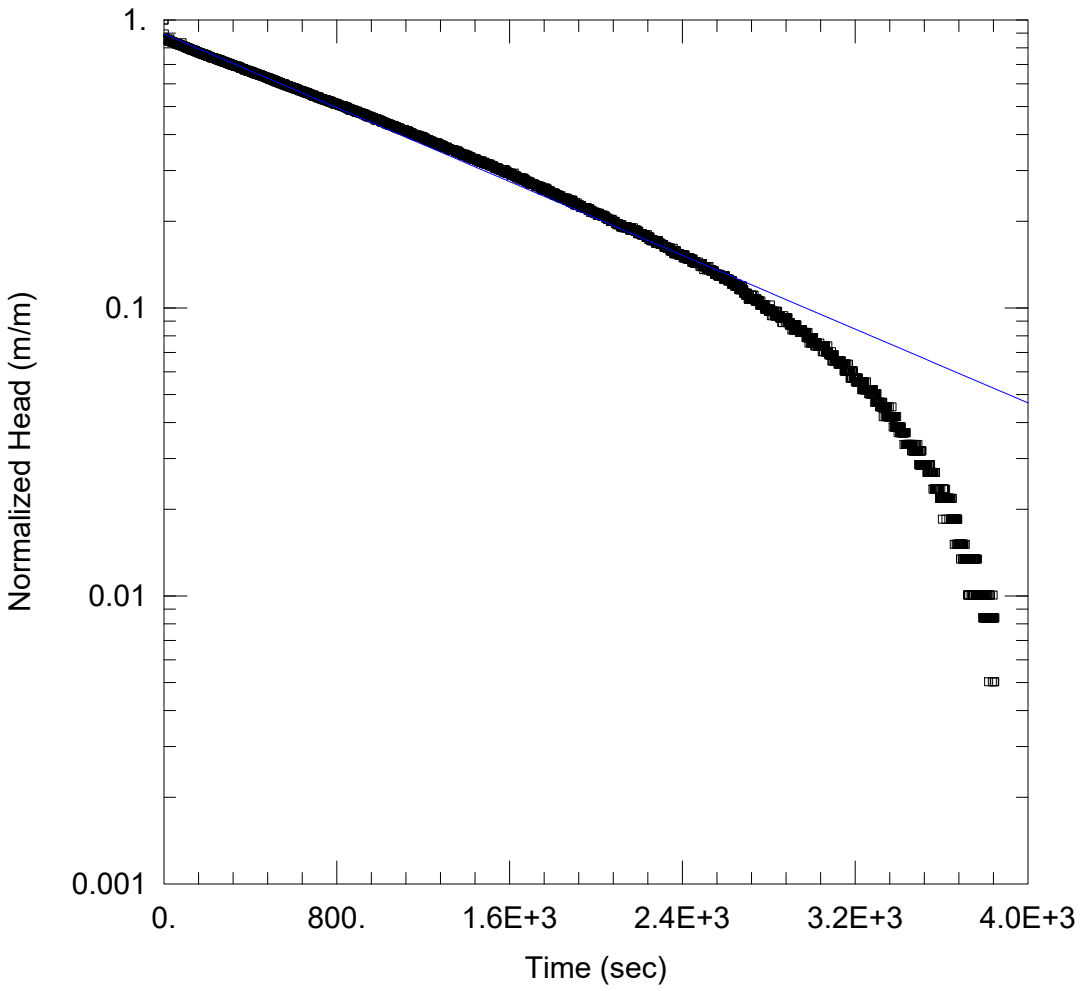
Analyte	Blank	QC % Rec	QC Limits
Dichloropropene,1,3-trans-	<0.5 ug/L	82	60-130
Tetrachloroethylene	<0.3 ug/L	102	60-130
Toluene	<0.4 ug/L	108	60-130
Trichloroethylene	<0.3 ug/L	98	60-130
Run No 427428 **Analysis/Extraction Date** 2022-08-15 **Analyst** SS **Method** EPA 8260			
Xylene Mixture			
Run No 427662 **Analysis/Extraction Date** 2022-08-14 **Analyst** AET **Method** SUBCONTRACT-A			
Nonylphenol Ethoxalate (Total)			
Nonylphenols (Total)	<1.0 ug/L	102	

Guideline = Storm Sewer - Mississauga *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

In-Situ Hydraulic Conductivity Testing Results



BH102/MW_FALLING HEAD_TEST ANALYSIS

Data Set: C:\...\BH102MW.aqt
Date: 09/01/22 Time: 12:11:56

PROJECT INFORMATION

Company: Orbit Engineering Limited
Client: City of Mississauga
Project: OE211273AH
Location: 5, 7 & 9 Beverly Street, Mississauga, ON
Test Well: BH102/MW
Test Date: 01 SEP 2022

AQUIFER DATA

Saturated Thickness: 6. m Anisotropy Ratio (Kz/Kr): 1.

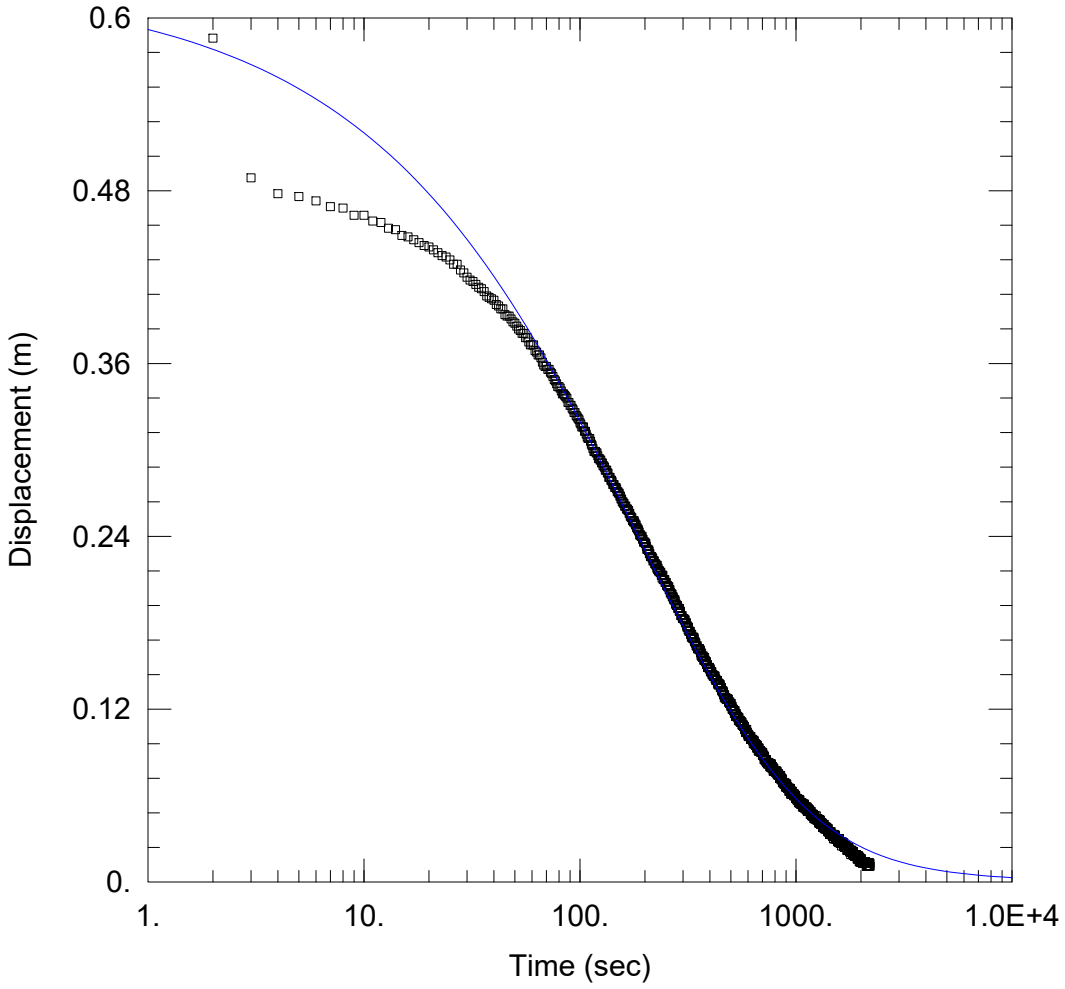
WELL DATA (BH101/MW)

Initial Displacement: 0.596 m
Total Well Penetration Depth: 5.5 m
Casing Radius: 0.025 m
Static Water Column Height: 5.5 m
Screen Length: 1.52 m
Well Radius: 0.1 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer Rice

K = 2.51E-5 cm/sec
y0 = 0.5325 m



BH102/MW_FALLING HEAD_TEST ANALYSIS

Data Set: C:\...\BH101MW.aqt
Date: 09/01/22 Time: 12:16:09

PROJECT INFORMATION

Company: Orbit Engineering Limited
Client: City of Mississauga
Project: OE211273AH
Location: 5, 7 & 9 Beverly Street, Mississauga, ON
Test Well: BH101/MW
Test Date: 9 May 2022

AQUIFER DATA

Saturated Thickness: 7.5 m

WELL DATA (BH102/MW)

Initial Displacement: 0.625 m
Total Well Penetration Depth: 7.1 m
Casing Radius: 0.025 m
Static Water Column Height: 7.04 m
Screen Length: 1.52 m
Well Radius: 0.1 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0001125 cm/sec
Ss = 0.007878 m^{-1}
Kz/Kr = 1.

Information on Water Well Records Acquired from MECP

Well ID	Well Record Information	Well Tag # (since 2003)	Audit #	Contractor Lic#	Well Depth (m)	Date of Completion (MM/DD/YYY
4902419	PDF | HTML	N/A	N/A	2642	26.8	07/15/1947
4902420	PDF | HTML	N/A	N/A	3514	27.4	10/15/1950
4902421	PDF | HTML	N/A	N/A	2636	14.0	01/25/1952
4902424	PDF | HTML	N/A	N/A	2613	29.9	07/26/1950
4902425	PDF | HTML	N/A	N/A	4623	28.0	06/30/1949
7199320	PDF | HTML	N/A	Z117509	6490	N/A	
7231732	HTML	N/A	C08484	6490	N/A	07/23/2012
7252091	PDF | HTML	A188464	Z222566	7241	6.7	10/20/2015
7252092	PDF | HTML	A188465	Z222567	7241	6.7	10/22/2015
7252093	PDF | HTML	A188466	Z222569	7241	7.6	10/20/2015
7252094	PDF | HTML	A188620	Z222568	7241	7.6	10/20/2015
7286031	PDF | HTML	A201688	Z230040	7215	4.3	04/27/2017
7289551	HTML	A188466	C37461	7215	N/A	05/03/2017
7293763	PDF | HTML	A226039	Z268907	7360	5.8	08/10/2017
7293764	PDF | HTML	A226041	Z268906	7360	6.9	08/10/2017
7293765	PDF | HTML	A226028	Z268905	7360	7.6	08/10/2017

7294160	HTML	N/A	C37396	7215	N/A	07/12/2017
7296672	PDF | HTML	A199257	Z270095	7241	6.1	09/12/2017
7296673	PDF | HTML	A199406	Z270094	7241	N/A	09/12/2017
7296674	PDF | HTML	A233838	Z270093	7241	N/A	09/12/2017
7296675	PDF | HTML	A199258	Z270092	7241	N/A	09/12/2017
7319253	PDF | HTML	A199257	Z289750	7613	N/A	09/19/2018
7319254	PDF | HTML	A199406	Z289749	7613	N/A	09/19/2018
7319255	PDF | HTML	A233838	Z289748	7613	N/A	09/19/2018
7319256	PDF | HTML	A199258	Z289751	7613	N/A	09/19/2018

Drawings Provided by the Client

7198 AIRPORT RD.

CONTEXT PLAN

N

CUMULUS ARCHITECTS INC.

Cumulus Architects Inc.
Suite 412 - 160 Pears Avenue
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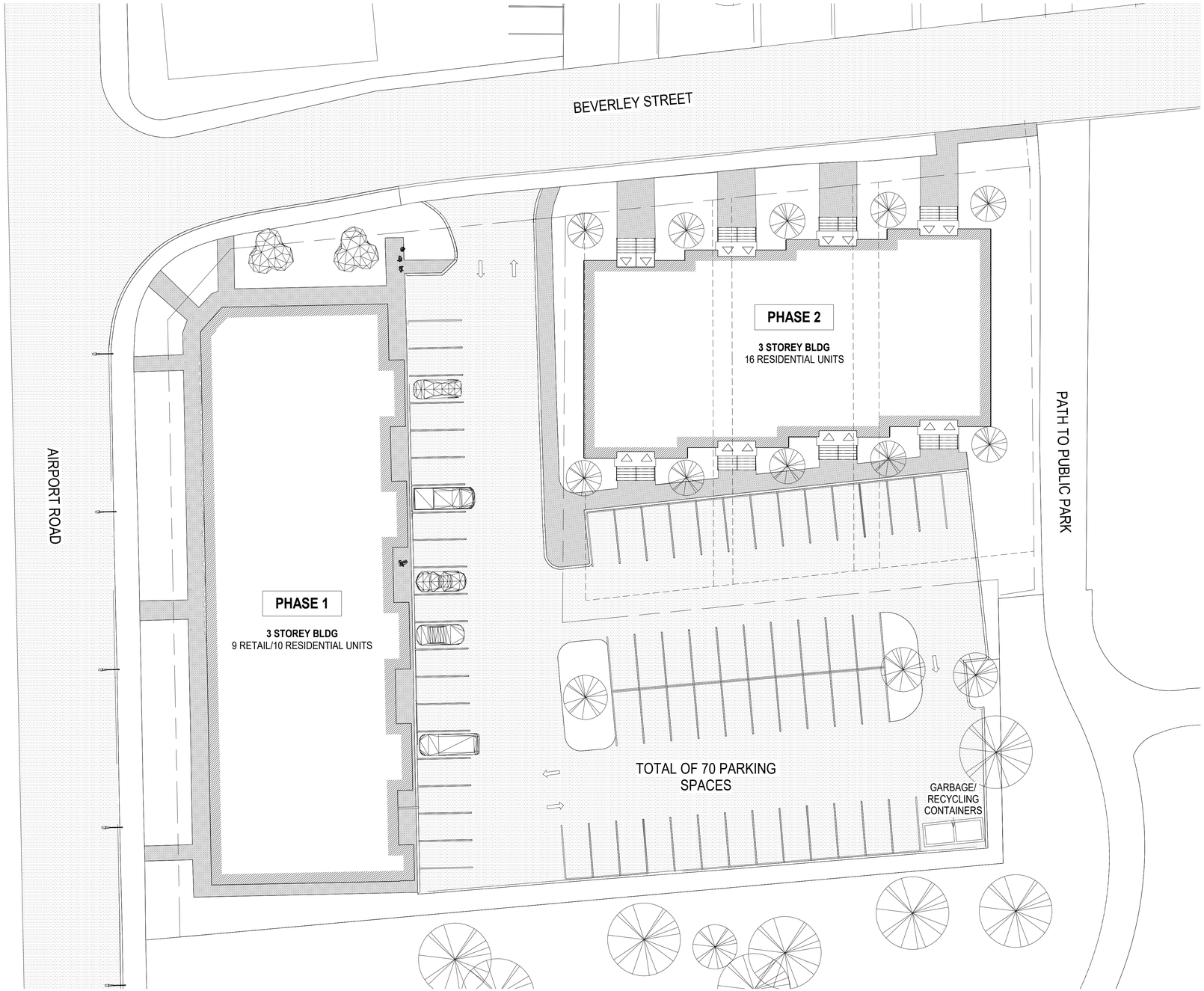
(416) 539-0763
cumulusarch.com



1 Site Plan - Phase 2
1 : 200

SITE PLAN LEGEND

- PROPERTY LINE
- LOT LINE
- SETBACK
- MAIN ENTRANCE - RETAIL
- SECONDARY ENTRANCE/EXIT - RETAIL
- MAIN ENTRANCE - RESIDENTIAL
- SECONDARY ENTRANCE - RESIDENTIAL
- FIRE HYDRANT
- VEHICULAR DIRECTION OF TRAVEL

SITE STATISTICS	REQUIRED	EXISTING	PROPOSED
ZONED USE	N/A	R3-69	C4-47
LOT AREA	N/A	1775 m^2	1775 m^2
LOT FRONTAGE	N/A	15m	
LOT DEPTH	N/A	38.2m	No Change
GFA		N/A	1792m^2 GFA
BUILDING HEIGHT (FLAT ROOF)	MIN: 2 STOREYS MAX: 12.5m & 3 STOREYS	SLOPED ROOF MAX:9.0m FLAT ROOF MAX: 7.5m	3 STOREYS/ FLAT ROOF HEIGHT: 12.3m
PARKING	18	48	22 New + 48 Exist. = 70
FRONT YARD SETBACK	MIN: 0m MAX: 3m	7.5m	4.5m
EXTERIOR SIDE SETBACK	MIN: 0m MAX: 3m	6m	0m
INTERIOR SIDE SETBACK	Abuts Institutional: 3m	1.2m + 0.61m for each additional storey	3m
REAR YARD SETBACK	Abuts Institutional: 3.5m Abuts C4 Zone: 0m	7.5m	12.5m
LANDSCAPED BUFFER DEPTH			
ABUTS REAR LOT LINE	MIN: 1.8m	N/A	
FROM A LOT LINE THAT IS A STREET LINE	MIN: 0m	N/A	
LOT LINE ABUTS INSTITUTIONAL	MIN: 3m	N/A	3m
COMMERCIAL ZONE ABUTS ANOTHER COMMERCIAL ZONE	MIN: 0m where abuts C4 Zone	N/A	
FROM ANY OTHER LOT LINE	MIN: 4.5m	N/A	

CLIENT:

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tel: (647) 990-4200
email: AKumar@live.ca

CONSULTANT:

CUMULUS ARCHITECTS INC.
160 Pears Ave. - Suite 300
Toronto, ON M5R 3P8
416-539-0763
www.cumulusarch.com

SEAL:

ONTARIO ASSOCIATION OF ARCHITECTS
SHELDON MORAD GATARINO
LICENCE 6177

KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

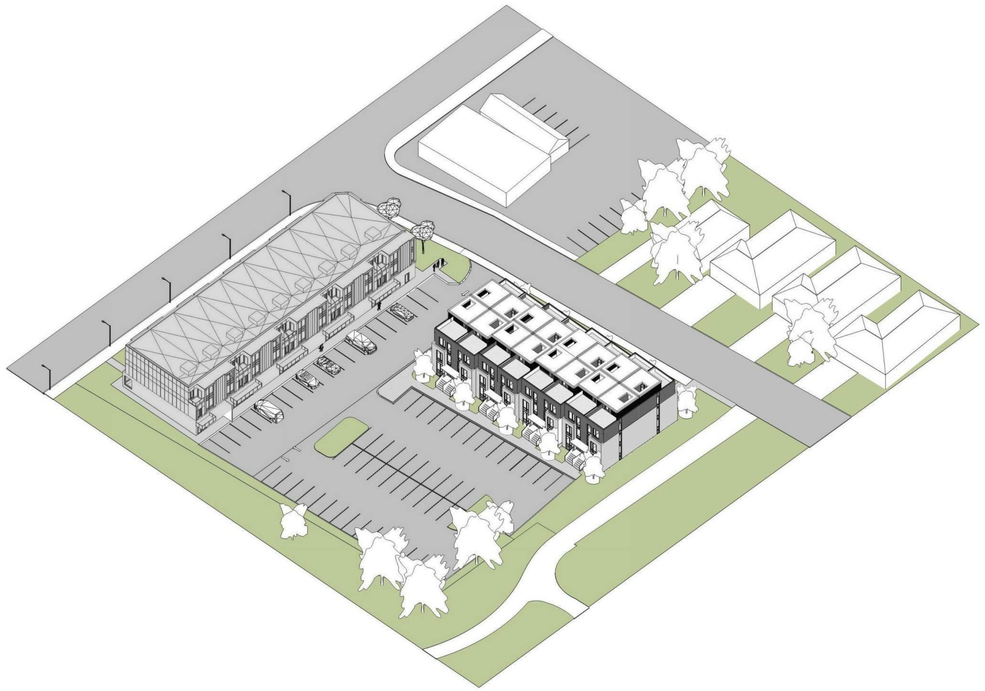
No.	Description	Date

PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

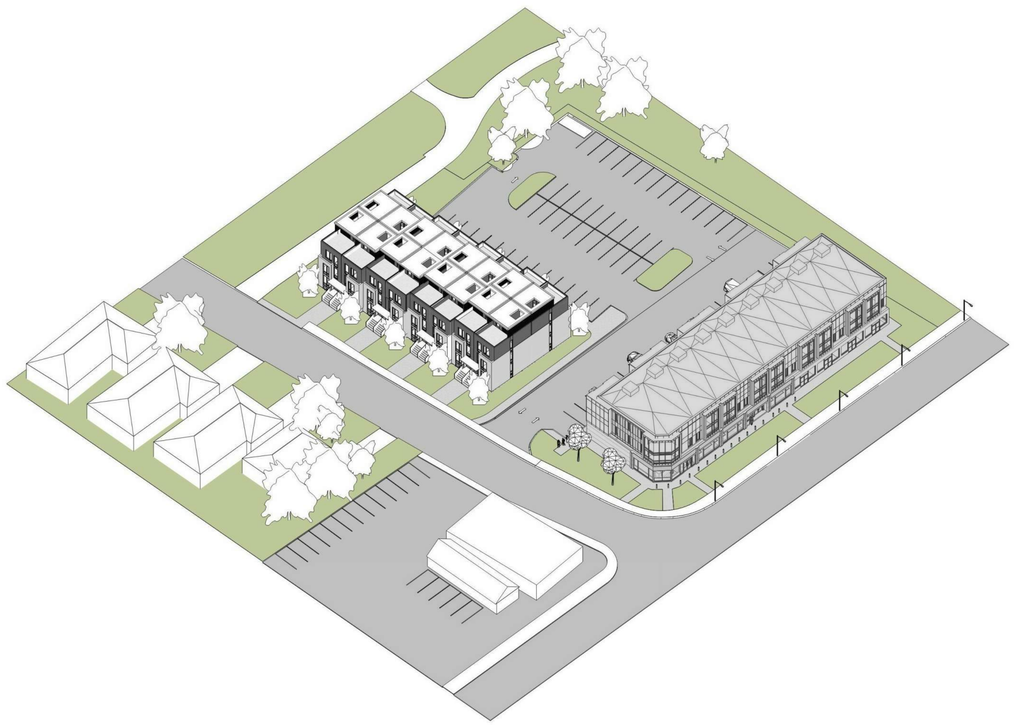
TITLE:
Site Plan

PROJECT NO: 21001
CHECKED: Checker

DRAWING NO: A100



PHASE 2 / N-E VIEW



PHASE 2 / S-W VIEW

CLIENT:

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416-539-0763
www.cumulusarch.com

SEAL:

No.	Description	Date

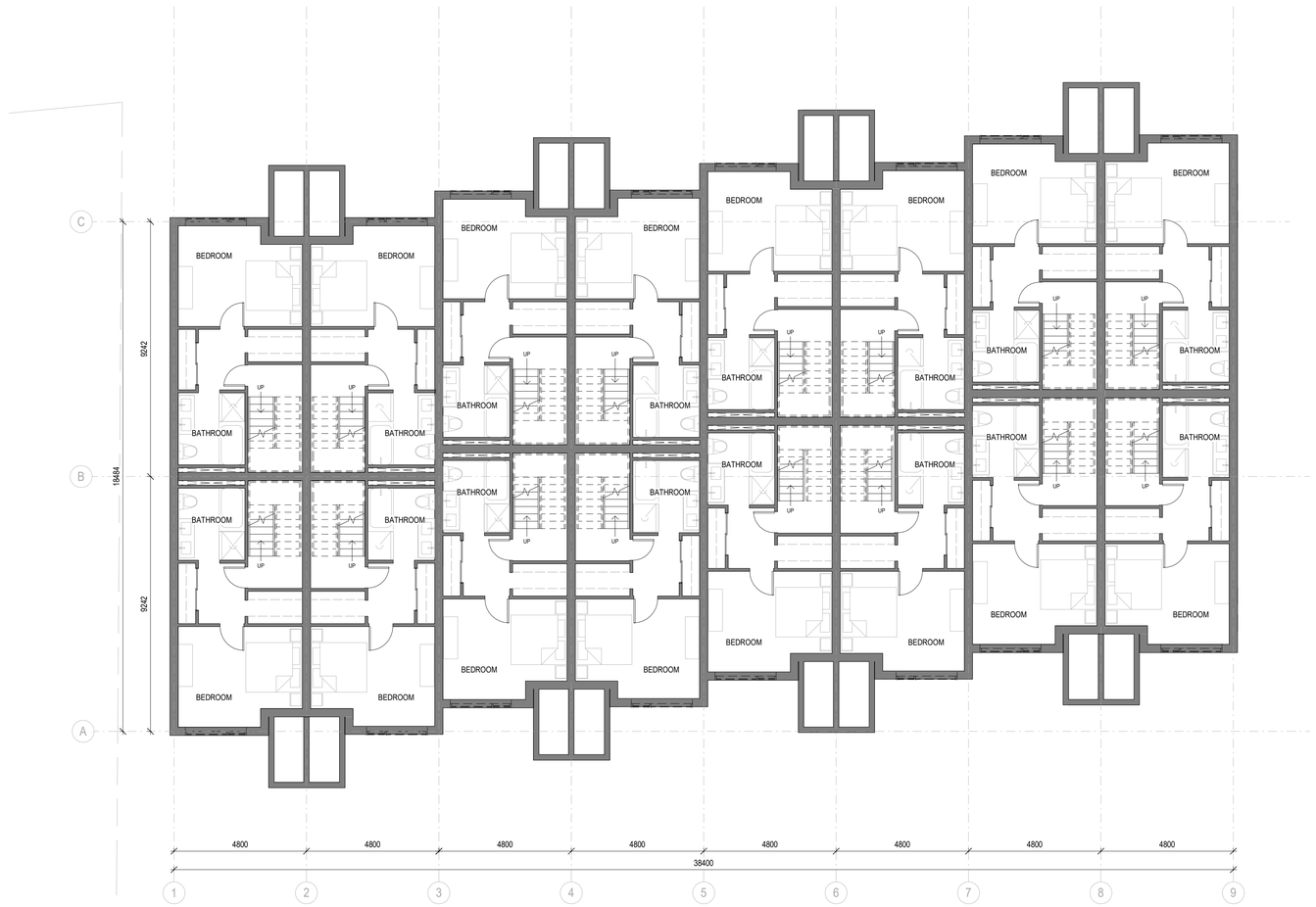
PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
AXONOMETRIC VIEWS - PHASE 2

PROJECT NO:
21001

CHECKED:
Checker

DRAWING NO:
A103



1 Floor Plan - Basement
1 : 100

CLIENT:

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SEAL:

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SHELDON MORAD GATARINO
LICENCE
6177

KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

No.	Description	Date
2	Issued for SPA-R1	05-18-2021
1	Issued for SPA	03-09-2021

PROJECT:
Phase 2
7196 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
FLOOR PLAN - BASEMENT

PROJECT NO: 21001
CHECKED: JM
DRAWING NO: A200

1 Floor Plan - Level 1
1 : 100

CLIENT:

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KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

No.	Description	Date

PROJECT:
Phase 2
7196 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
FLOOR PLAN - LEVEL 1

PROJECT NO: 21001
CHECKED: Checker

DRAWING NO: A201

1 Floor Plan - Level 2
1 : 100

CLIENT:

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SEAL:

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LICENCE
6177

KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

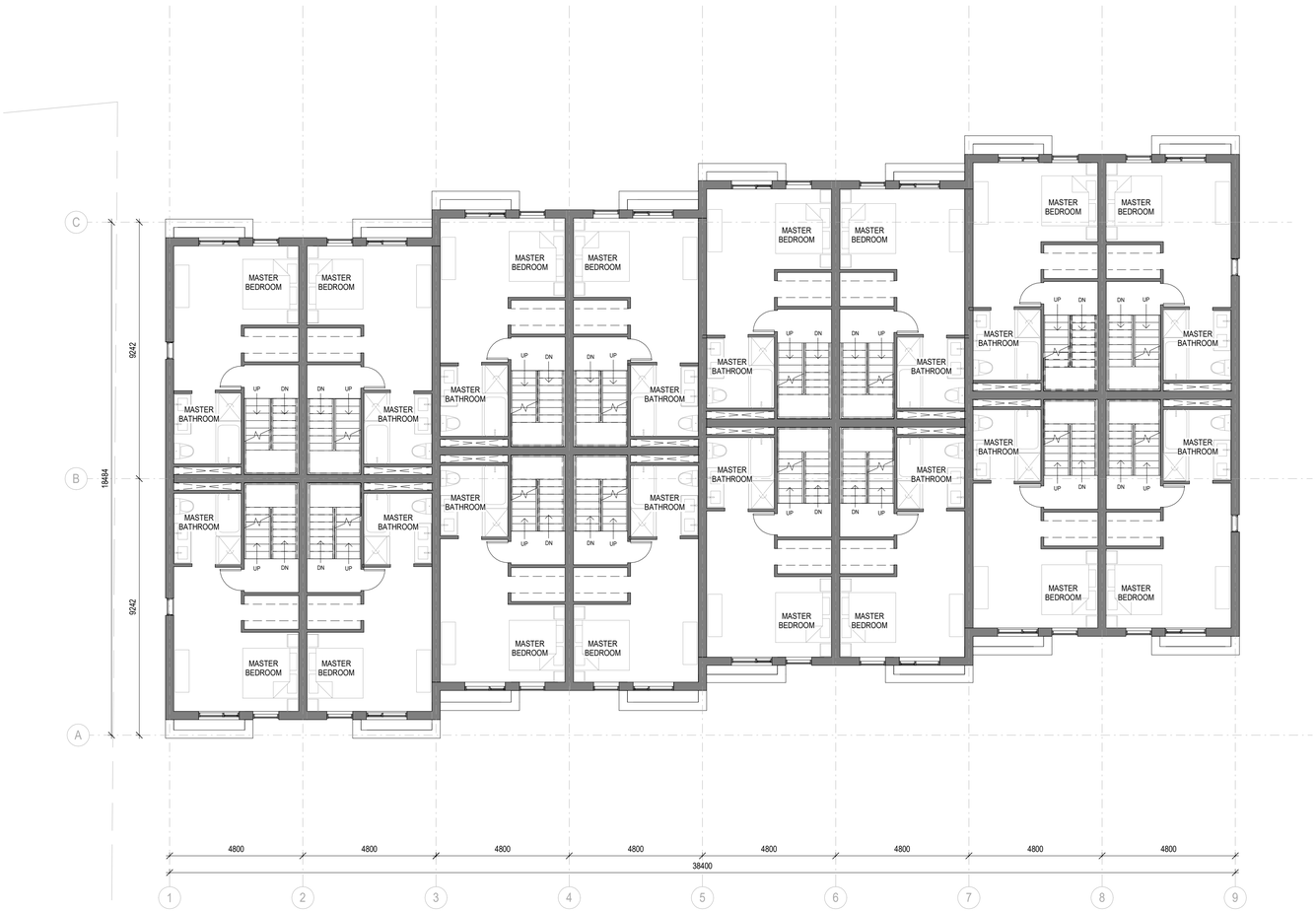
No.	Description	Date
2	Issued for SPA-R1	05-18-2021
1	Issued for SPA	03-09-2021

PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
FLOOR PLAN - LEVEL 2

PROJECT NO: 21001
CHECKED: Checker

DRAWING NO: A202



1 Floor Plan - Level 3
1 : 100

CLIENT:

Arjun Kumar / 2182402 Ontario Inc.

28 Pinewood Trail, Mississauga ON
tel: (647) 990-4200
email: AKumar@live.ca

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SHELDON MICRAD GATARINO
LICENCE 6177

KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

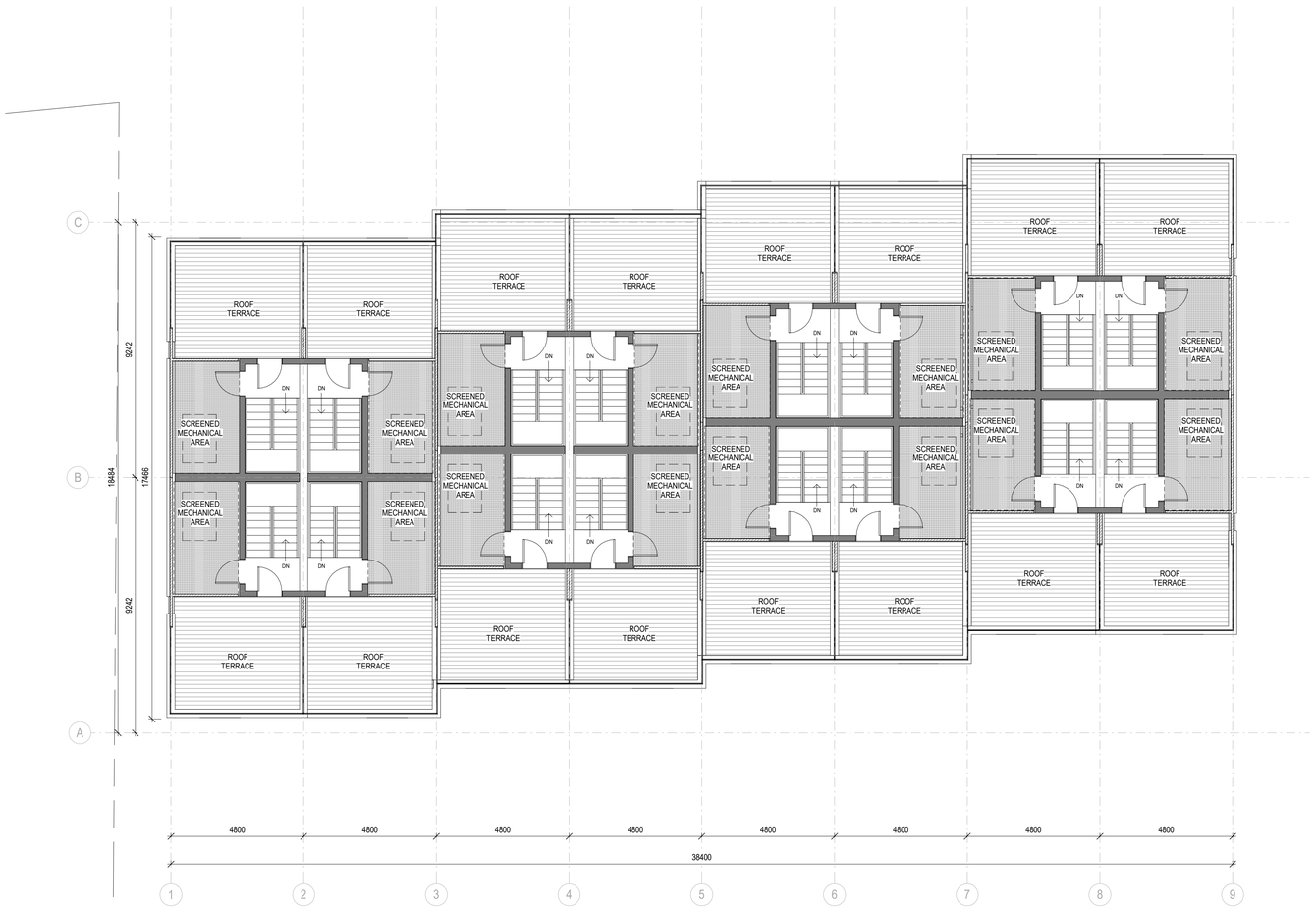
No.	Description	Date
2	Issued for SPA-R1	05-18-2021
1	Issued for SPA	03-09-2021

PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
FLOOR PLAN - LEVEL 3

PROJECT NO: 21001
CHECKED: Checker

DRAWING NO: A203



1 Floor Plan - Roof
1 : 100

CLIENT:

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KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

No.	Description	Date
2	Issued for SPA-R1	05-18-2021
1	Issued for SPA	03-09-2021

PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

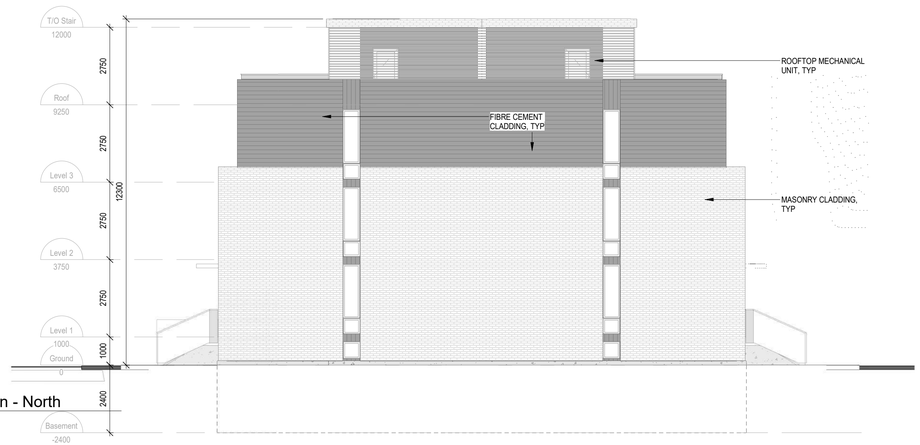
TITLE:
FLOOR PLANS - ROOF

PROJECT NO: 21001
CHECKED: Checker

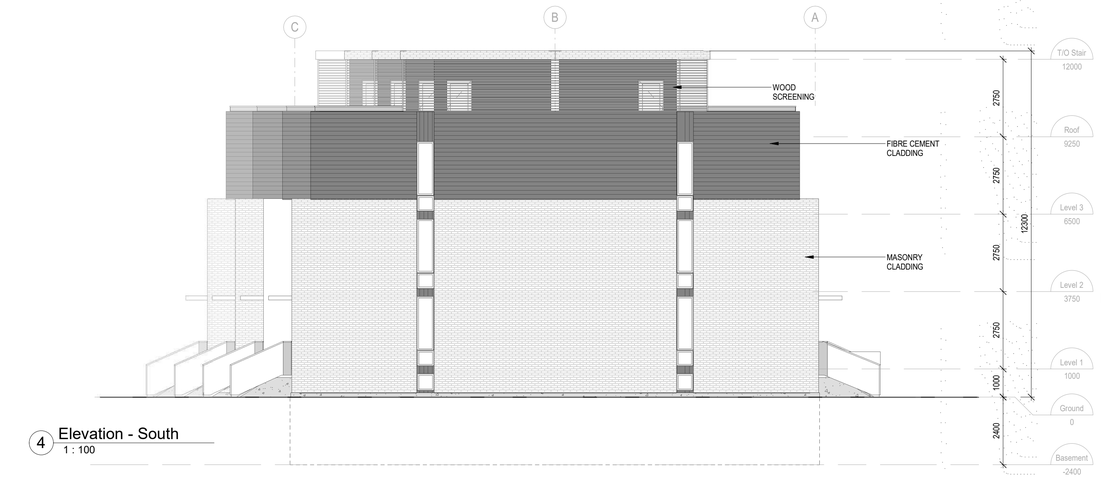
DRAWING NO: A204

1 Elevation - East
1 : 100

2 Elevation - West
1 : 100



3 Elevation - North
1 : 100



4 Elevation - South
1 : 100

CLIENT:

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LICENCE
6177

KEY PLAN — ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

N
NTS

Address:	5, 7, 9 Beverley St.
Legal Description:	ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)
Zoning:	R3-69

No.	Description	Date

PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
BUILDING ELEVATIONS - PHASE 2

PROJECT NO: 21001

CHECKED: Checker

DRAWING NO: A400

1 Building Section
1 : 50

CLIENT:

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6177

KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

No.	Description	Date

PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
BUILDING SECTION

PROJECT NO: 21001

CHECKED: Checker

DRAWING NO: A500

3 View from Parking lot

1 View from Beverley Street

CLIENT:

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SEAL:

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SHELDON MICRAD GATARINO
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6177

KEY PLAN NTS

Address: 5, 7, 9 Beverley St.

Legal Description: ALL OF LOTS 439, 440 AND 441, REGISTERED PLAN TOR-4 AND PEEL STANDARD CONDOMINIUM PLAN No. 830, CITY OF TORONTO (FORMERLY CITY OF YORK)

Zoning: R3-69

No.	Description	Date

PROJECT:
Phase 2
7198 Airport Rd.
Mississauga, ON L4T 1E9

TITLE:
Perspective Views

PROJECT NO: 21001

CHECKED: Checker

DRAWING NO: A102

Dewatering Calculation Sheet and Equations

Radius of Influence (R_o) and Groundwater Inflow Rate (Q) Calculation - Unconfined Aquifer - Square or Rectangular Excavation

Project: Proposed Residential Development
OE Project Number: OE211273AG
Client 2182402 ONTARIO INC.
Structure: Phase 2 - 16 Residentail units

1.18

Orbit Engineering Limited
1900 Clark Boulevard, Unit 9
Brampton, ON, L6T 0E9
Tel: +1 905 494 0074
Fax: +1 855 666 3355
www.orbitengineering.ca, info@orbitengineering.ca

Excavation is evaluated using the following numerical solution for square or rectangular excavations (x/a < 1.5) in an unconfined aquifer (Powers, 2007):

$$Q = [(\pi K(H^2 - h^2))/ln(Ro/rs)]$$

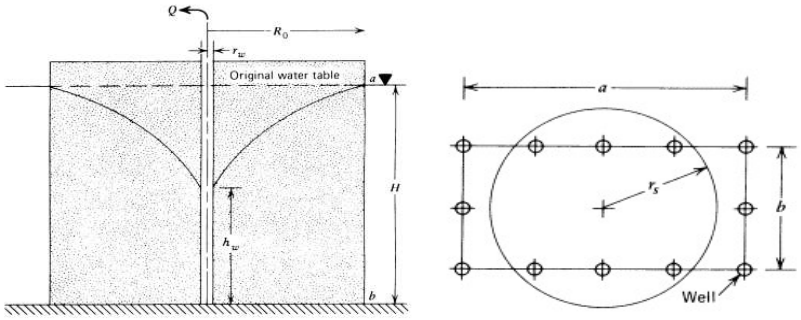

Figure 6.3 Equilibrium radial flow to a frictionless well in a water table aquifer.

Parameter		Units
K	0.000113	cm/sec
K	0.097	m/d
H	6.18	m
h	4	m
R_o	23.5	m
a	41.0	m
x	21	m
r_s	16.6	m
C	3000.0	
Ln R_o/r_s	0.350	
π =	3.1416	

Legend:

	Fill in
	Leave alone calculated number
	Copy numbers to the table

Q	19.36	m^3/d
	19,364	L/d

38,728 L/d **Expected Pumping Rate with contingency**

Where:
- Q = groundwater inflow (m^3/sec)
- K = hydraulic conductivity (m/sec)
- H = saturated thickness of the aquifer before pumping (m)
- h = saturated thickness of the aquifer after pumping (m)
- x = length of excavation (m)
- a = width of excavation (m)
- L = line source distance (m)
- R_o = radius of influence (m)
- r_s = equivalent well radius (m)

100.0% Contingency for the variability in hydraulic conductivity that could be experienced and to provide flexibility to address additional drainage needed as a result of precipitation events.

$$r_s = \sqrt{ax/\pi}$$

Where:
- r_s = equivalent well radius (m)
- a = excavation width (m)
- x = excavation length (m)

$$R_o = r_s + C(H - h)\sqrt{K}$$

Where:
- R_o = radius of influence (m)
- C = is a constant (unitless; 3,000 for radial flow to pumped wells and between 1,500 and 2,000 for line flow to trenches or to a line of wellpoints)
- r_s = equivalent well radius (m)
- H = saturated thickness of the aquifer before pumping (m)
- h = saturated thickness of the aquifer after pumping (m)
- K = hydraulic conductivity (m/sec)

REFERENCES:

Powers, J.P, Corwin, A.B., Schmall, P.C., Kaeck, W.E., and Herridge, C.J., 2007. Construction Dewatering and Groundwater Control: New Methods and Applications, 3rd Ed. John Wiley and Sons Inc.