



Updated Hydrogeological Assessment – Proposed Hotel Development

19 Lennox Drive (formerly 440 Dunlop Street West), Barrie,
Ontario

Prepared for:

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June 26, 2024

Pinchin File: 295667.007



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Issued to: Innisfil Beach Development Inc.
Issued on: June 26, 2024
Pinchin File: 295667.007
Issuing Office: Mississauga, ON

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June 26, 2024



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1.0 INTRODUCTION AND BACKGROUND

Pinchin Ltd. (Pinchin) was retained by the Innisfil Beach Development Inc. (Client) to complete a hydrogeological assessment of the property located at 19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario (Site).

The Site is located to the east of the intersection of Lennox Drive and Ferndale Drive North, on the southeast side of Lennox Drive, in the City of Barrie (City), Ontario. The approximate site location is shown on Figure 1.

The Site is part of the property formerly identified as 440 Dunlop Street West, and is developed with outdoor sports courts utilized for ball hockey. It is Pinchin's understanding that re-development has been proposed at the Site for a 6-storey hotel building.

A hydrogeological assessment was conducted in support of the proposed redevelopment. A report titled "*Hydrogeology Assessment – Proposed Hotel Development, 440 Dunlop Street West, Barrie, Ontario*" dated February 23, 2024 was prepared by Pinchin for Innisfil Beach Development Inc..

During the Pre-submission process, the hydrogeological report was submitted to and reviewed by the City, and comments relevant to the hydrogeological report were provided in a Pre-submission Memorandum dated April 5, 2024 under Subject Pre-submission - Site Plan, 19 Lennox Drive, Barrie, Ontario.

Based on the City's comments and requirements, groundwater sampling was conducted to include analysis of all the parameters specified in Appendix B – Hydrogeological Sample Analysis Parameters and Limits.

This report is intended to update the hydrogeological assessment to include the findings of the groundwater re-sampling and testing, and the results of hydrogeological assessments relevant to the updated site plans.

1.1 Purpose

The purpose of this hydrogeological assessment was to characterize the soil and groundwater conditions of the Site, evaluate the dewatering requirements for the proposed construction and operations phases of the development, assess the groundwater quality of potential discharge water, assess the pre- and post-construction water balance, evaluate potential impacts on the surrounding environment due to the proposed development, and provide recommendations concerning mitigative measures, if required.

1.2 Proposed Development Parameters

The site development plans are provided in Appendix I, which include the overall site plan issued on February 26, 2024 for site plan application by Mataj Architects Inc., and site grading/servicing/stormwater management plans issued on January 31, 2024 by Gerrits Engineering Limited.



Based on the design plans and the information presented in the Site Servicing Report, the parameters for the proposed development are summarized as follows:

- The Site has a total area of 7,084 m², currently including a grass and gravelly paved area of 3,050 m², and an asphalt/concrete paved area of 4,034 m²;
- The proposed development will consist of a 6-storey building hotel, and new sanitary and storm sewer systems and watermains to be connected to the City's existing utility services.
- The proposed building will have a building area of 1,195 m², providing a total of 101 hotel rooms/units, a meeting room, a swimming pool and a fitness room on the ground floor.
- The proposed building will be constructed slab-on-grade at a finished floor elevation (FFE) of 236.25 m above sea level (masl), surrounded by paved and landscaped areas,
- The proposed swimming pool is located in the east portion of the building, with a water pool area of 17.5' x 29.5' and a depth of 5'.
- The proposed sanitary sewer system will consist of 200 mm diameter PVC pipes and one sanitary manhole and will be connected to the City's existing sewer system on Lennox Drive, with an invert elevation of 232.18 masl;
- The proposed storm sewer system will consist of 300 ~ 450 mm diameter PVC pipes and catch basins and 5 manholes (catch basin manhole) with an underground storage tank, which will collect the water coming from the building roof and from the catch basins located across the Site and discharge into the City's storm sewer on Ferndale Drive (MH#3), with an invert elevation of 233.02 masl. The proposed storage tank has a designed storage volume of 97.1 m³ with a dimension of 19.36 m long x 4.4 m wide x 1.22 m height, and with the bottom elevation or inlet invert elevation of 233.61 m or approximately 2.1 mbgs;
- Two watermain lines (one for fire hydrant and one for water service) are located on the west side of the proposed building; and
- The post-development site will include a grassed area of 1,050 m², a building area of 1,195 m², and paved area of 4,839 m².

Based on an elevation survey of the monitoring well locations, the average existing ground elevation is estimated to be 235.70 masl.



1.3 Previous and Current Investigations

1.3.1 Previous Investigations

Pinchin concurrently conducted a Phase Two Environmental Site Assessment (Phase Two ESA) and a geotechnical investigation at the Site and on the adjacent property identified as 125 Ferndale Drive North, Barrie in 2021. The investigations were summarized in the following reports.

- *“Phase II Environmental Site Assessment, 440 Dunlop Street West Barrie, Ontario”,* dated October 15, 2021, prepared for Cassandra Projects Inc., by Pinchin Ltd.
- *“Geotechnical Investigation – Proposed Commercial Development, 125 Ferndale Drive North and 440 Dunlop Street West, Barrie, Ontario”,* dated October 18, 2021, prepared for Cassandra Projects Inc., by Pinchin Ltd.

During the previous investigations, a total of six boreholes (BH201 to BH206) were advanced at the Site and three monitoring wells identified as MW201 to MW203 were completed in the drilled boreholes. The boreholes were drilled to a maximum depth of approximately 5.2 m below ground surface (mbgs), and the monitoring wells were constructed with well screens from 1.5 mbgs to 4.6 mbgs.

The soil stratigraphy at the drilling locations below the asphalt surface generally consisted of fill material comprised of sand and gravel and/or sand and native soils. The fill material was found to extend to the maximum depth of approximately 3.1 mbgs. The encountered native soils mainly consisted of sand and silty clay that extended to the maximum borehole completion depth of 5.2 mbgs. The measured groundwater levels ranged from 0.85 mbgs to 1.82 mbgs.

The data obtained from the previous investigations will be included in this hydrogeological assessment report, where applicable.

1.3.2 Current Investigations

The current investigations include a geotechnical investigation and hydrogeological investigation to be conducted at the Site, which consisted of advancing four boreholes identified as MW301, MW302, BH303 and BH304 and installation of two monitoring wells at the MW301 and MW302 locations. The boreholes were drilled to a maximum depth of approximately 10.0 mbgs, and the monitoring wells were completed with the screen from 1.5 mbgs to 4.6 mbgs.

The two new and three existing monitoring wells were used for groundwater monitoring, sampling and testing in this hydrogeological assessment. The approximate borehole and monitoring well locations are shown on Figure 2. The monitoring well construction details are provided in Table 1.

2.0 METHODOLOGY

As mentioned above, a total of five monitoring wells (MW301, MW302 and MW201 to MW 203) were completed at the Site in the current and previous investigations.

The well construction details are presented in Table 1. The approximate borehole and monitoring well locations are shown on Figure 2. The monitoring wells installed on Site were used for groundwater monitoring, sampling and K-testing for the hydrogeological assessment.

The completed scope of work for the hydrogeological assessment consisted of the following tasks:

- A desktop water well inventory survey using data from the MECP Water Well Information System (WWIS) database within 500 m of the Site property boundaries;
- A review and summary of the regional geology and hydrogeology, and its linkage to the site-specific geology and hydrogeology;
- Water level monitoring to obtain static groundwater levels and assess seasonal high groundwater levels;
- Rising head hydraulic conductivity testing of selected monitoring wells;
- Preparation of local scale geologic cross-sections, groundwater elevation contours and flow directions;
- Background groundwater quality analysis as per the City of Barrie Sewer Use Bylaw parameters, and as per the parameters requested by the City;
- A dewatering assessment for the construction and operations phases of the proposed re-development;
- A preliminary water balance evaluation under pre- and post-development conditions;
- A potential impact assessment with mitigative measures, if required; and
- Preparation of a hydrogeological assessment report summarizing the findings of the investigation.

3.0 SITE DESCRIPTION AND GEOLOGICAL SETTING

3.1 Surface Water and Drainage

The Site is located in the Barrie Creeks Subwatershed within the Lake Simcoe Watershed under the jurisdiction of the Lake Simcoe Region Conservation Authority (LSRCA). Lake Simcoe is located approximately 2.4 km east of the Site.

As shown on Figure 3, no open water body is present on or adjacent to the Site. The Site and its vicinity appear to slope towards the east, with topographic elevations generally ranging from 235 to 240 masl.

3.2 Physiography

The Site is located in an area comprised of a Sand Plains physiographic landform, within the Simcoe Lowlands Physiographic Region (Chapman and Putnam, 2007).



3.3 Surficial Geology

Based on the Ontario Geological Survey database, the Site is located in an area covered by coarse-textured glaciolacustrine deposits or foreshore and basinal deposits composed of sand, gravel, minor silt and clay.

3.4 Bedrock Geology

Based on the Ontario Geological Survey database, the Site is located in an area underlain by the Simcoe Group Verulam Formation, consisting of limestone and shale.

3.5 MECP Water Wells

Water well records from within a 500 m radius of the Site were accessed from the Ontario Ministry of the Environment, Conservation and Parks (MECP) Water Well Information System (WWIS).

A total of 58 water well records were found within the 500 m radius of the Site. The approximate MECP water well locations are presented on Figure 3.

Based on a review of each of the water well records, 10 of the records are related to water supply wells, 29 records are related to test holes or monitoring/observation wells, two well records are for dewatering wells and 17 records are for abandoned wells or for wells with no useful information.

Among the recorded water wells, three water wells (No. 7402194, No. 7492195 and No. 7402199) were found to be plotted on Site and identified as monitoring wells, and two water wells (No. 5704799 and No. 5704800) which are identified as water supply wells were plotted along the southwest Site boundary.

The records for the five water wells are provided in Appendix II. A summary of these five water wells is presented below.

Water Well #	Well Use	Soil Encountered	Well Screen	Groundwater Condition
7402194	Monitoring/test hole	0-0.5 ft.: asphalt 0.5-5 ft.: silty sand 5-15 ft.: sandy silt	5~15 ft.	Untested water found at 5 ft.
7402195	Monitoring/test hole	0-0.5 ft.: asphalt 0.5-5 ft.: silty sand 5-15 ft.: sandy silt	5~15 ft.	Untested water found at 5 ft.
7402199	Monitoring/test hole	0-0.5 ft.: asphalt 0.5-5 ft.: silty sand 5-15 ft.: sandy silt	5~15 ft.	Untested water found at 5 ft.



Water Well #	Well Use	Soil Encountered	Well Screen	Groundwater Condition
5704799	Commercial water supply	0-18 ft.: medium Sand 18-96 ft.: Clay 96-100 ft.: medium Sand 100-101 ft.: Gravel	6" steel casing to 101 ft.	Fresh water found at 101 ft., with a static water level at 18 ft., recommended pump rate of 50 gallons per minute and recommended pump setting of 65 ft.
5704800	Domestic water supply	0-10 ft.: Clay 10-18 ft.: fine Sand 18-24 ft.: medium Sand	1" steel to 20 ft. Screen: 20~24 ft.	Fresh water found at 20 ft., with a static water level at 4 ft.

It should be noted that the three monitoring wells appear to be installed in 2021 by Pinchin. The two water supply wells were completed in overburden, with the water levels measured at a depth of approximately 1.3 mbgs and 5.5 mbgs. Bedrock was not encountered to a depth of approximately 30.8 mbgs.

Based on a water well record for Well No. 5714075, limestone (bedrock) was encountered at the depth of approximately 121.3 mbgs.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Stratigraphy

In general, the soil stratigraphy contacted within the current boreholes advanced at the Site comprised pavement structure and/or fill / possible fill underlain by sand, which in turn was underlain by clay to the maximum sampled depth of approximately 9.8 mbgs. Bedrock was not encountered at the maximum advanced depth of approximately 15.8 mbgs.

4.1.1 Pavement Structure

Borehole BH303 was advanced through the ball hockey court and Borehole BH304 was advanced through the gravel lot. The pavement structure contacted at Borehole BH303 consisted of 150 mm of asphaltic concrete underlain by 750 mm of sand and gravel fill. At Borehole BH304, a 50 mm skiff of surficial sand and gravel fill was underlain by 50 mm of asphaltic concrete.

4.1.2 Topsoil Fill

Borehole MW301 was advanced through the grassed area adjacent to the gravel lot. The topsoil thickness was 150 mm. The topsoil consisted of sandy silt.

4.1.3 Fill and Possible Fill

Fill was contacted at Boreholes MW301 (below topsoil fill), MW302 (at ground surface), and BH304 (below pavement structure) extending to depths of 2.1 to 3.4 mbgs. The fill generally ranged in composition from sandy silt to sand with variable silt content (trace silt to silty) and nil to trace gravel.



Trace organics or topsoil inclusions were contacted within the fill at Borehole MW301 and BH304. Trace asphalt was contacted within the fill at MW302.

Possible fill was contacted at Borehole MW301 underlying the fill at 3.1 mbgs and extended to 3.6 mbgs. The possible fill consisted of sand with trace silt.

4.1.4 Sand

Sand with trace silt and nil to trace gravel was contacted at Boreholes BH303 and BH304 underlying the pavement structure and fill and extended to 2.5 and 3.8 mbgs, respectively. The sand was described as very moist to wet. Moisture contents of 14 to 20% were reported. SPT N-values 12 to 21 blows per 300 mm indicated a compact relative density.

The results of a particle size distribution analysis completed on one representative sample of the sand taken from BH303 indicated gravel of 10.7%, sand of 86.2% and silt and clay of 3.1%.

It should be noted that the sand layer found in MW201 to MW203 and BH204 to BH206 extended to the depths ranging from approximately 1.9 mbgs to 3.9 mbgs. A sand sample from MW202 tested for 2021 investigation indicated the compositions of 3.8% for gravel, 94.5% for sand and 1.8% for silt and clay. The grain size analysis data are provided in Appendix IV.

4.1.5 Clay

Silty clay with nil to trace sand and gravel was contacted at all borehole locations underlying the fill / possible fill or sand at depths of 2.5 to 3.8 mbgs and extended below the sampled borehole depths of 9.8 mbgs. The clay deposit was variable very stiff to soft, based on SPT N-values ranging from 2 to 19 blows per 300 mm.

The results of a particle size distribution analysis completed on one representative sample of the clay deposit taken from BH303 indicated gravel of 0%, sand of 5.4%, silt of 53.6% and clay of 41.0%. It should be noted that two clay soil samples from MW202 and BH205 tested for 2021 investigation indicated the compositions of 0~1% for gravel, 5.6~6.7% for sand, 30.4~32.3% for silt and 60~64% for clay. The grain size analysis data are provided in Appendix IV.

Detailed soil descriptions and stratigraphy are presented in the Borehole Logs that are provided in Appendix III. Cross-sections showing the stratigraphy across the Site are presented in Figures 4A and 4B of this report.

4.2 Groundwater Conditions

Water level measurements were conducted in three existing monitoring wells and two new monitoring wells on a monthly or bi-monthly basis between March 2023 and June 2024, including March 31, April 12, May 5, May 25 and June 28, 2023, August 30, October 13, December 18, 2023 and February 9, and June 18, 2024. The measured groundwater level data is presented in Table 2.

In addition, groundwater levels obtained in September 2021 in the previous investigations are also presented in Table 2.

The measured groundwater levels ranged from 0.02 mbgs at MW302 on June 28, 2023 to 1.82 mbgs at MW203 on September 1, 2021, and the elevations ranged from 234.18 masl at MW202 on June 18, 2024 to 235.54 masl at MW203 on May 5, 2023. Among the monitoring events in 2023 and 2024, the highest groundwater table was found during the June 28, 2023 monitoring event, with an averaged groundwater level of 0.38 mbgs and averaged groundwater elevation of 235.32 masl.

Based on the groundwater elevations obtained on March 31, 2023, groundwater elevation contours were prepared and are presented on Figure 5. The groundwater flow was inferred to be generally to the south.

4.3 Hydraulic Conductivity Estimates

The hydraulic conductivities (K-values) of the soils at the Site were estimated based on the results of grain size analysis on soil samples and on the results of hydraulic conductivity tests (K-tests) in the selected monitoring wells.

4.3.1 Grain Size Analysis Method

As mentioned, grain size analysis was conducted on soil samples collected from the Site during the current and previous investigations. Based on the details of the particle size distribution (Appendix IV), K values were estimated using a formula developed by Puckett et al. (1985), which uses the percent of clay-sized particles as the predictive variables of K or an empirical formula proposed by Hazen (1911), which uses D_{10} - the effective diameter for 10% of grains as the predictive variables of K. The results of the estimated K values are presented in the table below.

Sample ID	Sample Depth (mbgs)	Soil Type	Empirical Formula	K Value (cm/sec)
BH303 SS3	1.5 – 2.1	Sand	Hazen	2.0×10^{-2}
BH303 SS5	3.1 – 3.7	Silty Clay	Puckett	1.1×10^{-6}
MW202 SS4	2.2 – 3.7	Sand	Hazen	2.6×10^{-2}
MW202 SS6	4.6 – 5.2	Silty Clay	Puckett	9.5×10^{-9}
BH205 SS5	3.1 – 3.7	Silty Clay	Puckett	2.1×10^{-8}

As presented above, the estimated K-values for sand ranged from 2.0×10^{-2} cm/sec to 2.6×10^{-2} cm/sec, and K-values for silty clay ranged from 9.5×10^{-9} cm/sec to 1.1×10^{-6} cm/sec.

4.3.2 Hydraulic Conductivity Tests Method

Hydraulic conductivity (K-) tests using the “rising head” method were conducted at five monitoring wells (MW301, MW302, MW201, MW202 and MW203) on March 31, 2023. The K-test curves and analysis are provided in Appendix V.

The estimated hydraulic conductivities (K-values) are presented as follows:

Monitoring Well	Screen Interval (mbgs)	Screened Soil	K Value (cm/sec)
MW301	1.5 – 4.6	Fill (sand); Silty Clay	1.6×10^{-3}
MW302	1.5 – 4.6	Fill (sand); Silty Clay	3.5×10^{-4}
MW201	1.5 – 4.6	Sand; Silty Clay	8.5×10^{-5}
MW202	1.5 – 4.6	Sand; Silty Clay	9.8×10^{-4}
MW203	1.5 – 4.6	Fill (sand, sand and gravel); Sand; Silty Clay	7.5×10^{-4}

As presented above, the estimated K-values for sandy soil (fill or native) and silty clay ranged from 8.5×10^{-5} cm/sec to 1.6×10^{-3} cm/sec. It should be noted that as the well screens straddle both sandy soil and silty clay, the K-values won't be representative of either of the soil types. However, the bulk excavation and trench excavations are considered to be largely conducted within the coarse fill sand or native sand deposits.

4.4 Soil Infiltration Rate Estimates

The soil infiltration rates were estimated using the method described in TRCA's Stormwater Management Criteria ("SWMC"), Version 1.0, dated August 2012, which is based on the approximate relationships between hydraulic conductivity and infiltration rate. The soil infiltration rates were converted using the K-values obtained from the grain size analysis because the K-values obtained from K-tests are considered to not be representative of a specific soil type.

The estimated hydraulic conductivities and soil infiltration rates are presented below.

Soil Sample	Sample Depth (mbgs)	Soil Type	K (cm/sec)	Infiltration Rate (mm/hour)
BH303 SS3	1.5 – 2.1	Sand	2.0×10^{-2}	191
MW202 SS4	2.2 – 3.7	Sand	2.6×10^{-2}	205
BH303 SS5	3.1 – 3.7	Silty Clay	1.1×10^{-6}	14
MW202 SS6	4.6 – 5.2	Silty Clay	9.5×10^{-9}	4
BH205 SS5	3.1 – 3.7	Silty Clay	2.1×10^{-8}	5

The infiltration rates estimated for the native sand ranged from 191 mm/hour to 205 mm/hour, and ranged from 4 mm/hour to 14 mm/hour for the native silty clay.

Please note that a safety factor should be applied for the detailed design of any Low Impact Development (LID) instruments, such as infiltration galleries, etc.



5.0 DEWATERING ASSESSMENT

It is understood that the proposed development will consist of construction of one slab-on-grade building and the local utility systems including watermain, storm sewer system and sanitary sewer system. Bulk excavation and removal of the unsuitable fill material will be required for the footing/foundation construction, which may extend to a maximum depth of approximately 3.6 mbgs. In addition, bulk excavation will be required for the underground storage tank. Trench excavations will be required for the utility installation.

Based on the design, the lowest invert elevation for the sanitary sewer is at 232.18 masl, the lowest invert elevation for the storm sewer is at 233.02 masl, and the bottom of the underground storage tank is at the elevation of approximately 233.6 masl.

Based on the seasonal groundwater level monitoring results, the highest groundwater table was measured during the June 28, 2023 monitoring event, with an averaged groundwater level of 0.38 mbgs and averaged elevation of 235.32 masl. Therefore, the anticipated excavation will occur below the local groundwater table, and construction dewatering will be required during the construction phase.

Given the presence of shallow groundwater levels at the Site, long-term dewatering will be required if a drainage system is installed for the proposed building.

The dewatering volume estimations are described in the following sections.

5.1 Short-Term Construction Dewatering Estimates

As mentioned, trench excavation and bulk excavation will be involved in the construction phase of the proposed development. As such, the short-term construction dewatering estimates were made for the assumed trench excavation and the building bulk excavation, and stormwater management tank bulk excavation scenarios. The excavation for the planned pool is covered by the bulk excavation for the

Based on the design, the worst-case scenario for the trench excavation will be related to the construction of the sanitary sewer, which is located in the northeast portion of the Site and connecting to the existing sanitary sewer on Lenox Drive.

5.1.1 Groundwater Inflow

Based on the available design parameters, conservative groundwater dewatering scenarios during construction were undertaken that employed the following parameters and assumptions.

Trench Excavation (worst-case for sanitary sewer construction)

- Assumed Trench Dimensions: 20 m long x 2.5 m wide;
- Assumed Trench Depth: 232 masl, or approximately 4.2 mbgs (the invert elevation of the existing manhole on Lennox Drive is at 232.18 masl);



- Initial Groundwater Elevation: 235.5 masl (the sanitary sewer is located to the north of MW203, and the groundwater level was recorded as 235.18 masl as shown on Figure 5);
- Target Groundwater Elevation: 231.5 masl (0.5 m below the excavation); and
- Hydraulic Conductivity: 1.6×10^{-3} cm/sec (estimated from K-testing).

Bulk Excavation for Building Construction

Bulk excavation will involve the removal of the unsuitable fill materials near surface. Given the anticipated excavation extent, the worst-case excavation will be the building footing/foundation excavation and dewatering.

- The excavation or dewatering area: assumed 1,200 m² (the proposed building area is 1,195 m²);
- The excavation depth: approximately 3.6 mbgs (the fill material was found to extend to up to 3.6 mbgs);
- The initial groundwater level will be assumed to be 0.0 mbgs (the highest groundwater was observed to be 0.02 mbgs, measured at MW302 on June 28, 2023);
- The target water level: 4.1 mbgs (0.5 m below the excavation bottom); and
- The hydraulic conductivity is 1.6×10^{-3} cm/sec (estimated from K-testing).

Bulk Excavation for Underground Storage Tank Installation

Bulk excavation will also be undertaken during the construction/installation of the underground storage tank for the storm water management system. Given the anticipated excavation extent, the worst-case excavation will be the building footing/foundation excavation and dewatering.

- The excavation or dewatering area: assumed 20 m x 5 m (the proposed storage tank has a dimension of 19.36 m long x 4.4 m wide);
- The excavation depth: approximately 2.6 mbgs (inlet/invert of the proposed storage tank is at 233.61 masl, or approximately 2.1 mbgs);
- The initial groundwater level will be assumed to be 0.3 mbgs (the proposed storage tank is located between BH206 and MW201, where the highest groundwater level measured at MW201 was 0.55 mbgs on June 28, 2023)
- The target water level: 3.1 mbgs (0.5 m below the excavation bottom); and
- The hydraulic conductivity is 1.6×10^{-3} cm/sec (estimated from K-testing).

Based on the above assumptions, the construction dewatering rates and zones of influence for the worst-case trench excavation and for the anticipated bulk excavation were estimated and are presented below.

Excavation Type	Initial Water Level	Target Water Level	K- Estimate (cm/sec)	Estimated Zone of Influence (m from Edge of Excavation)	Dewatering Rate (without Safety Factor) (L/day)	Dewatering Rate Estimate with Safety Factor of 2 or 100% (L/day)
Worst-case Trench Excavation (20 m x 2.5 m)	235.5 masl	231.5 masl	1.6×10^{-3}	48	33,817	67,634
Bulk excavation for Building (1,200 m ²)	0 mbgs	4.1 mbgs	1.6×10^{-3}	49	72,177	144,354
Bulk excavation for Underground Storage Tank (20 m x 5 m)	0.3 mbgs	3.1 mbgs	1.6×10^{-3}	34	23,815	47,630

It should be noted that the application of a Safety Factor (100% contingency amount) provides a more conservative assessment for planning purposes to account for potential variabilities in the hydraulic conductivities in the soil across the Site. In addition, during the initial stages of the construction dewatering, the dewatering volumes would be greater than those under a steady state condition, because the water stored in the soils is also being removed.

5.1.2 Stormwater Inflow

A significant amount of the dewatering demand from any construction project is the volume of water that is derived from stormwater that is generated during and after precipitation events. In the case of the proposed development, it will be necessary to handle stormwater that will accumulate within the excavation footprint.

For planning purposes, dewatering estimates are developed assuming the potential occurrence of extreme storm events, which are based upon events that have an observed “return period” or period of recurrence.

Based on the Canadian Climatic Normals 1981-2010 Station Data for Barrie WPCC Station, the accumulated days which had a precipitation rate greater than 25 mm/day vary from 0.04 to 0.81 days per year. Therefore, a precipitation rate of 25 mm/day was used for the stormwater volume estimation.



The estimated stormwater inflows that can be generated at the Site within the trench excavation area and the bulk excavation area are presented below:

Excavation Scenario	Excavation Area (m²)	Precipitation Rate (mm/day)	Stormwater Volume (L/day)
Trench Excavation (20 m x 2.5 m)	20 x 2.5	25	1,250
Bulk excavation for Building 1,200 m ²	1,200	25	30,000
Bulk excavation for Underground Storage Tank 20 m x 5 m	20 m x 5 m	25	2,500

It should be noted that the above estimate does not take into account any infiltration or evaporation in the excavation area. However, it should also be noted that, for infrequent extreme storm events, the great majority of the generated stormwater becomes run-off or accumulates within the excavation area, due to the fixed assimilative capacity of the soils and the minimal evaporation until the cessation of the event.

5.1.3 Maximum Discharge Estimates – Construction

Based on the short-term construction dewatering calculations discussed above, the estimated construction phase dewatering rates are summarized below.

Excavation Scenario	Construction Dewatering	Total Volume without Safety Factor for Groundwater (L/day)	Total Volume with Safety Factor of 2 for Groundwater (L/day)
Worst-case Trench Excavation (20 m long x 2.5 m wide x 4.2 m deep)	Discharge of Groundwater	33,817	67,634
	Discharge of Stormwater	1,250	1,250
	Discharge of Groundwater and Stormwater	35,067	68,884



Excavation Scenario	Construction Dewatering	Total Volume without Safety Factor for Groundwater (L/day)	Total Volume with Safety Factor of 2 for Groundwater (L/day)
Bulk Excavation for Building 1,200 m ²	Discharge of Groundwater	72,177	144,354
	Discharge of Stormwater	30,000	30,000
	Discharge of Groundwater and Stormwater	102,177	174,354
Bulk Excavation for Underground Storage Tank 20 m x 5 m	Discharge of Groundwater	23,815	47,630
	Discharge of Stormwater	2,500	2,500
	Discharge of Groundwater and Stormwater	26,315	50,130

Water taking during construction is regulated in terms of the estimated maximum daily groundwater and stormwater dewatering volume, which requires registration through the Environmental Activity Sector Registry (EASR) when the total volume is greater than 50,000 L/day (50 m³/day) and less than 400,000 L/day (400 m³/day), or requires a Permit To Take Water (PTTW) when the total volume is over 400,000 L/day (400 m³/day).

It is understood that trench excavation and bulk excavation for the installation of services and the fill removal/building footing construction may occur at the same time. However, based on the estimated volumes from the evaluated scenarios, it is likely that the total volume can be controlled to be within 400,000 L/day to avoid a PTTW requirement. An EASR registration will be required for the construction of the proposed development.

It should be noted that in-situ soil improvement may be applied at the Site. As a result, excavation to the maximum depth of the fill materials will not be required, which will minimize the dewatering demand and decrease the dewatering rate. However, as the footing design is not available yet, the dewatering estimate for that condition is not provided herein. The dewatering estimates can be reviewed and updated once the footing design and elevations are made available.



Moreover, trench boxes are envisioned the various utility service trench excavations, which may also minimize the dewatering demand during the construction.

5.2 Long-Term Discharge – Building Operations

Given the slab-on-grade building design, no long-term dewatering is anticipated. A PTTW will not be required for the proposed building operations.

There is a limited subsurface footprint associated with the in-ground swimming pool. This limited underground footprint will be water-proofed.

6.0 GROUNDWATER QUALITY

One unfiltered groundwater sample was obtained from MW302 (sample ID: MW302) on April 12, 2023 to evaluate the water quality with reference to the City of Barrie Sewer Use By-Law parameter criteria, for storm sewer, sanitary sewer, and/or combined sewer discharge. A lab-filtered sample was also analyzed for iron, copper and zinc.

In addition, based on the comments made by the City, groundwater re-sampling and testing were completed. One unfiltered groundwater sample was collected from MW302 (sample ID: MW302) on May 13, 2024 to evaluate the water quality with reference to Appendix B – Hydrogeological Sample Analysis Parameters and Limits.

The groundwater samples were submitted to and analyzed by Bureau Veritas (BV), which is a lab accredited by Canadian Association For Laboratory Accreditation Inc. (CALA). The Certificate of Analysis is presented in Appendix VI.

The analytical results were compared with the relevant standards (City of Barrie Sewer Use bylaw – Sanitary and Storm Sewer Discharge Limits, and Hydrogeological Sample Analysis Parameters and Limits), and are presented in Table 3. Exceedances of the Storm and Sanitary Sewer Discharge limits and Hydrogeological Sample Analysis Parameters and Limits were measured in the analyzed water samples.

A summary of exceedances for the recent sample are presented below.

Monitoring Well	Parameter	Unit	Storm Sewer Guideline Value	Sanitary Sewer Guideline Value	Hydrogeological Sample Analysis Parameters and Limits	Measured Concentration
MW302	TSS	mg/L	<u>15</u>	350	15	3,200
	Copper	ug/L	<u>10</u>	2,000	10	33.5
	Zinc	ug/L	<u>40</u>	2,000	40	500
	Toluene	ug/L	-	20	0	0.25



The 2023 sample analysis recorded an exceedance for iron (53.7 mg/L), while the 2024 sample analysis recorded an iron concentration of 24.7 mg/L, below the Hydrogeological Parameter Limit of 50 mg/L. There was also an exceedance of total xylenes recorded in the 2023 sample analysis, which was not replicated in the 2024 sample analysis.

It should be noted that the exceedances are considered to be attributed to sediment within the sample, because no exceedances were measured for iron (2023), copper or zinc in the filtered water sample.

Based on the water quality assessment, the excess water generated during the construction cannot be directly discharged into the local sewer systems without appropriate treatment, such as filtration, to reduce the sediment and minimize the concentrations of the noted parameters. Concentrations of toluene may require treatment prior to discharge. However, the toluene concentration may also be due to the presence of sediment in the sample. It is recommended that a filtered sample be submitted for analysis of toluene and total xylenes, to simulate the effects of filtration on the eventual discharge water during the construction phase of the proposed development.

7.0 PRELIMINARY WATER BALANCE

The Site is located in an area under the jurisdiction of Lake Simcoe Region Conservation Authority (LSRCA), where a water balance analysis is usually required for the land development projects. This preliminary water balance was completed as per the Conservation Authority Guidelines for Development Applications adopted by LSRCA.

For the purpose of supporting the detailed design and incorporating LID strategies, a preliminary water balance was conducted to estimate runoff and infiltration water budgets at the Site, prior to and after the proposed site re-development.

7.1 Site Condition

The Site covers an approximate area of 7,084 m², and is developed with outdoor sports courts utilized for ball hockey. The Site will be re-developed with a building to be used as a hotel.

For the purpose of the preliminary water balance assessment, the ground surface of the site area can be categorized into two (2) types of ground surface characteristics: pervious area and impervious area. The pervious area includes unpaved and landscaped areas, and the impervious area includes the building area and/or paved area.

Based on the data provided by the client, a summary of the assessed areas is presented as follows.

	Type of Land Coverage	Pre-Development Area (m ²)	Post-Development Area (m ²)
Pervious Area	Unpaved and landscaping areas	3,050	1,061
Impervious Area	Building area	0	1,195
	Paved area	4,034	4,828
	Total (m ²)	7,084	7,084

The building area and unpaved landscaping area are shown in the design plans in Appendix I.

7.2 Site Level Water Balance

Based on the Thornthwaite and Mather methodology, the water balance is an accounting of water in the hydrologic cycle. Precipitation (P) falls as rain and snow. It can run off towards lakes and streams (R), infiltrate to the groundwater table (I), or evaporate from ground and/or undergo evapotranspiration by vegetation (ET). When the long-term average values of P, R, I, and ET are utilized in the water balance equation, there is minimal to no net change to groundwater storage (ΔS). The annual water budget, can be expressed as:

$$P = ET + R + I + \Delta S$$

Where:

P = Precipitation (mm/year);

ET = Evapotranspiration/Evaporation (mm/year);

R = Run-off (mm/year);

I = Infiltration (mm/year); and

ΔS = Change in groundwater storage (taken as zero) (mm/year).

7.3 Climatic Data

Monthly average temperature and precipitation data were obtained from Environment Canada for the Barrie WPCC weather station (Climate Identifier: 6110557), located in the City of Barrie, which is approximately 2.3 km east from the Site.

The climatic data obtained from the Canadian Climatic Normals - 1981 to 2010 for the Barrie WPCC weather station are included in Appendix VII.



7.4 Precipitation and Water Surplus

Based on the data collected from 1981 to 2010 for the Barrie WPCC weather station, the average annual precipitation for the Site and vicinity is recorded to be approximately 932.9 mm/year.

In general, the difference between the recorded precipitation and the estimated evapotranspiration/ evaporation is referred to as the water surplus. In the impervious area where evaporation prevails, it is generally assumed that 20% of the precipitation (or 186.6 mm/year) will evaporate, and 80% of the precipitation (or 746.3 mm/year) will become surface runoff.

In the pervious area where evapotranspiration prevails, the evapotranspiration rate was calculated using the Thornthwaite Method based on the recorded temperature data. The water surplus was calculated to be 452.4 mm/year. A summary of the calculations is provided in Appendix VIII

7.5 Infiltration and Runoff

As mentioned above, a water surplus will be generated every year due to precipitation, which can either infiltrate into subsurface or become surface runoff.

The rate of infiltration at a given site is expected to vary, based on several factors to be considered in any infiltration model. To partition the available water surpluses into infiltration and surface runoff, MECP infiltration factors were consulted and utilized.

The water balance assessment incorporated the MECP Storm Water Management Planning and Design Manual (2003) methodology for calculating total infiltration based on topography, soil type and land cover. The actual evapotranspiration and water surplus were calculated incorporating the appropriate soil moisture storage conditions. The estimations of infiltration and runoff for the pre-development and post-development phases at the Site are provided in Appendix VIII and are summarized as follows.

Annual Pre-Development Water Balance/Budget

Land Use		Area (m ²)	Precipitation (m ³)	Water Surplus (m ³)	Infiltration (m ³)	Run-off (m ³)
Pervious Areas	Unpaved/Landscape Area	3,050	2,845	1,380	350	1,030
Impervious Areas	Building/Paved Area	4,034	3,764	3,011	0	3,011
Total Pre-development		7,084	6,609	4,391	350	4,041



Annual Post-Development Water Balance/Budget

Land Use		Area (m ²)	Precipitation (m ³)	Water Surplus (m ³)	Infiltration (m ³)	Run-off (m ³)
Pervious Areas	Unpaved/Landscape Area	1,061	990	480	122	358
Impervious Areas	Building/Paved Area	6,023	5,619	4,495	0	4,495
Total Post-development		7,084	6,609	4,975	122	4,853

Comparison of Pre- and Post-Development Water Balance Components

	Precipitation (m ³)	Water Surplus (m ³)	Infiltration (m ³)	Run-off (m ³)
Pre-Development	6,609	4,391	350	4,041
Post-Development	6,609	4,975	122	4,853
Change in Volume (m ³)	0.0	585	-228	813
Change in %	0.0	13%	-65%	20%
Infiltration deficit due to proposed development (m ³ /year)				228
Water available from roof/building area at post development condition (m ³ /year)				892

7.6 Summary

Based on the above calculations, a summary of the water balance/budget is provided as follows:

- 1) A decrease on the water surplus of approximately 13% (or 585 m³/year) is anticipated due to the proposed development, because of the changes in evaporation and evapotranspiration in the re-configured proposed paved and unpaved areas;
- 2) Without implementation of mitigation measures, there will be a 20% increase (or 813 m³/year) in run-off and a 65% decrease (or 228 m³/year) in infiltration, due to the proposed development at the Site. These changes are a result of the reduced pervious area and the increase impervious area due to the proposed development; and
- 3) A volume of 892 m³ of water is anticipated to accumulate over the course of a year from the building/roof area of the proposed building.



The above calculations assume the implementation of impervious paved surfaces. The Functional Servicing Report (FSR) prepared by Gerrits Engineering (Gerrits) includes the incorporation of more pervious surfaces. In addition, subsurface and surface detention storage will be provided that will have a total volume control of 157 m³, in excess of the Design Storm storage requirements of 132 m³ (Gerrits, Section 5.4, p. 9).

The modelling conducted by Gerrits, incorporating more pervious surfaces, indicates that the post-development infiltration will match the pre-development infiltration of 330 m³/year (Gerrits, Section 5.8, p. 10-11).

7.7 Low Impact Development Considerations

Based on the preliminary water balance assessment, a reduction in infiltration of approximately 228 m³/year will occur due to the proposed development, without any mitigative measures. Groundwater recharge is anticipated to be impacted, because of the deficit in the local infiltration.

It is understood that the local Conservation Authority encourages the proponents to incorporate low-impact development (LID) concepts and instruments in their development plans and designs. However, given that the groundwater levels were observed to be shallow, design and operation of LID instruments will not be feasible at the Site. As a result, the LSRCA Water Balance Offsetting Policy may have to be applied for the proposed development to address the infiltration deficit.

As noted above, The FSR prepared by Gerrits includes the incorporation of more pervious surfaces. In addition, subsurface and surface detention storage will be provided that will have a total volume control of 157 m³, in excess of the Design Storm storage requirements of 132 m³.

The modelling conducted by Gerrits, incorporating more pervious surfaces, indicates that the post-development infiltration will match the pre-development infiltration of 330 m³/year (Gerrits, Section 5.8, p. 10-11).

8.0 CONCLUSIONS

Pinchin provides the following conclusions arising out of the Hydrogeology Assessment activities to date:

- The Site is located in the Barrie Creeks Subwatershed within the Lake Simcoe Watershed under the jurisdiction of Lake Simcoe Region Conservation Authority (LSRCA), and the Lake Simcoe is located approximately 2.4 km east of the Site;
- The Site is located on the Simcoe Lowlands Physiographic Region, within a Sand Plains physiographic landform, covered coarse-textured glaciolacustrine deposits or foreshore and basinal deposits composed of sand, gravel, minor silt and clay. The Site is underlain by the Simcoe Group Verulam Formation, consisting of limestone and shale;



- In general, the soil stratigraphy contacted within the current boreholes advanced at the Site comprised pavement structure and/or fill / possible fill underlain by sand, which in turn was underlain by clay to the maximum sampled depth of approximately 9.8 mbgs. Bedrock was not encountered at the maximum advanced depth of approximately 15.8 mbgs;
- The groundwater levels measured at the Site between March 2023 and June 2024 ranged from 0.02 mbgs to 1.82 mbgs, and elevations ranged from 234.18 to 235.54 masl. The groundwater flow was inferred to be generally to the south direction;
- The hydraulic conductivities (K-values) estimated using grain size analytical results for sand ranged from 2.0×10^{-2} cm/sec to 2.6×10^{-2} cm/sec, and K-values for silty clay ranged from 9.5×10^{-9} cm/sec to 1.1×10^{-6} cm/sec, while K-values estimated using K-tests in monitoring wells for sandy soil (fill or native) and silty clay ranged from 8.5×10^{-5} cm/sec to 1.6×10^{-3} cm/sec;
- The soil infiltration rates estimated for the sand/fill ranged from 191 mm/hour to 205 mm/hour, and ranged from 4 mm/hour to 14 mm/hour for silty clay;
- The dewatering assessment indicated that temporary construction dewatering will be required during the construction phase, and an EASR will be required. The total volume for dewatering at multiple locations must be controlled within the range of 50,000 to 400,000 L/day.
- Given the slab-on-grade building design, long-term dewatering will not be required, and therefore, a PTTW will not be required for the operations of the proposed building;
- A groundwater quality assessment completed as per the City of Barrie Sewer Use Bylaw indicated that if not filtered, the groundwater sample did not meet several of the City of Barrie Sewer Use standards or several of the Hydrogeological Sample Analysis Parameters and Limits (TSS, iron, copper, zinc, toluene). However, the exceedances are considered to be attributed to sediment within the sample, because no exceedances were measured for iron, copper or zinc in the filtered water sample. The excess water generated during the construction cannot be directly discharged into the local sewer systems without appropriate treatment, such as filtration, to reduce the sediment and minimize the concentrations of the noted parameters.

Concentrations of toluene may require treatment prior to discharge. However, the toluene concentration may also be due to the presence of sediment in the sample;



- A preliminary water balance assessment completed for the development area indicated that there will be a post-development increase in run-off by 20% (813 m³/year), and a decrease in infiltration by 65% (228 m³/year), due to the proposed development. This post-development calculation assumes the incorporation of impervious hard surfaces. The Functional Servicing Report (FSR) prepared by Gerrits Engineering includes the incorporation of more pervious surfaces. In addition, subsurface and surface detention storage will be provided that will have a total volume control of 157 m³, in excess of the Design Storm storage requirements of 132 m³. The modelling conducted by Gerrits, incorporating more pervious surfaces, indicates that the post-development infiltration will match the pre-development infiltration of 330 m³/year (Gerrits, Section 5.8, p. 10-11); and
- Given that shallow groundwater conditions are present at the Site, infiltration galleries are not feasible, and the LSRCA Water Balance Offsetting Policy may have to be applied for the proposed development at the Site.

9.0 RECOMMENDATIONS

It is recommended that a filtered sample be submitted for analysis of toluene and total xylenes, to simulate the effects of filtration on the eventual discharge water during the construction phase of the proposed development.

10.0 REFERENCES

Cuddy, S., Soo Chan, G. and Pos, R. June 2013. *Hydrogeological Assessment Submissions, Conservation Authority Guidelines for Development Applications*.

Lake Simcoe Region Conservation Authority (LSRCA), 2012. *Barrie Creeks, Lovers Creek, and Hewitt's Creek Subwatershed Plan*.

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Ontario Geological Survey. 2010, *Surficial Geology of Southern Ontario*. Ontario Geological Survey, Miscellaneous Release--Data 128-REV.

Armstrong, D.K. and Dodge, J.E.P. 2007. *Paleozoic Geology Map of Southern Ontario*; Ontario Geological Survey, Miscellaneous Release--Data 219.

Ontario Geological Survey online database.

Ontario Ministry of Environment, Conservation and Parks (MECP) on-line water well information database.

Gerrits Engineering Limited. June 21, 2024. *Site Servicing Report, 19 Lennox Drive, Barrie, Ontario*.



Pinchin Limited. May 7, 2024. *Geotechnical Investigation, Proposed Hotel Development, 19 Lennox Drive (formerly 440 Dunlop Street West, Barrie, Ontario).*

11.0 TERMS AND LIMITATIONS

This Hydrogeology Assessment was performed for the exclusive use of Innisfil Beach Development Inc. (Client), the City of Barrie (City), and Lake Simcoe Region Conservation Authority (LSRCA) in order to evaluate the subsurface conditions at 19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practises in the field of hydrogeology for the Site. Classification and identification of soil and geologic units have been based upon commonly accepted methods employed in professional geotechnical and geological engineering practice. No warranty or other conditions, expressed or implied, should be understood. Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations.

The performance of this Hydrogeological Assessment to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the subgrade soil and groundwater conditions at the Site and recognizes reasonable limits on time and cost.

Regardless of how exhaustive a geological/hydrogeological investigation is performed, the investigation cannot identify all of the subsurface conditions. In addition, this report is intended to be supplemented and updated with future, more extensive, investigations at the detailed design stage(s) of the Project.

Therefore, no warranty is expressed or implied that the entire Site is representative of the subsurface information obtained at the specific locations of our investigation and previous investigations done by others. If, during construction, subsurface conditions differ from then what was encountered within our test locations and the additional subsurface information provided to us, Pinchin should be contacted to review our recommendations. This report does not alleviate the contractor, owner, or any other parties of their respective responsibilities.

This report has been prepared for the exclusive use of the Client, the City, LSRCA and Client's authorized agents. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third parties. If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice.

The liability of Pinchin or our officers, directors, shareholders or staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Pinchin will not be responsible for any consequential or indirect damages. Pinchin will only be liable for damages resulting from the negligence of Pinchin.



Pinchin will not be liable for any losses or damage if the Client has failed, within a period of two years following the date upon which the claim is discovered (Claim Period), to commence legal proceedings against Pinchin to recover such losses or damage unless the laws of the jurisdiction which governs the Claim Period which is applicable to such claim provides that the applicable Claim Period is greater than two years and cannot be abridged by the contract between the Client and Pinchin, in which case the Claim Period shall be deemed to be extended by the shortest additional period which results in this provision being legally enforceable.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

Specific limitations related to the legal and financial and limitations to the scope of the current work are outlined in our proposal and any subsequent Change Order documentation, the attached Methodology and the Authorization to Proceed, Limitation of Liability and Terms of Engagement which accompanied the proposal.

Information provided by Pinchin is intended for Client, the City, LSRCA, and Client's authorized agents' use only. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law. Any use by a third party of reports or documents authored by Pinchin or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. No other warranties are implied or expressed.

295667.007 Hydrogeological Assessment 19 Lennox Drive Barrie ON June 26 2024

Template: Master Geotechnical Investigation Report – Ontario, GEO, April 18, 2019

TABLES

TABLE 1 MONITORING WELL CONSTRUCTION DETAILS**Innisfil Beach Development Inc.****19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario**

<i>Well Number</i>	<i>Ground Elevation (masl)</i>	<i>Top of Pipe Elevation (masl)</i>	<i>Height of Stickup (m)</i>	<i>Well Size</i>	<i>Screen Interval (mbgs/mbfs)</i>	<i>Stratigraphy</i>
MW301	235.55	236.50	0.95	2"	1.5- 4.6	Fill (sand); Silty Clay
MW302	235.45	236.48	1.03	2"	1.5- 4.6	Fill (sand); Silty Clay
MW201	235.59	235.55	-0.04	2"	1.5- 4.6	Sand, Silty Clay
MW202	235.48	235.37	-0.11	2"	1.5- 4.6	Sand, Silty Clay
MW203	236.43	236.38	-0.05	2"	1.5- 4.6	Fill, Sand, Silty Clay

Notes:

m - Metres

TOP - Top of Pipe

masl - Metres Above Sea Level

mbgs - Metres Below Ground Surface

TABLE 2 GROUNDWATER ELEVATION DATA
Innisfil Beach Development Inc.
19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario

Well Number	Ground Elevation (masl)	Top of Pipe Elevation (masl)	Height of Stickup (m)	Screen Interval (mbgs/mbfs)	September 1, 2021			September 22, 2021			March 31, 2023			April 12, 2023		
					Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)
MW301	235.55	236.50	0.95	1.5- 4.6	-	-	-	-	-	-	1.66	0.71	234.84	1.69	0.74	234.81
MW302	235.45	236.48	1.03	1.5- 4.6	-	-	-	-	-	-	1.54	0.51	234.94	1.59	0.56	234.89
MW201	235.59	235.55	-0.04	1.5- 4.6	1.26	1.30	234.29	1.36	1.40	234.19	1.03	1.07	234.52	1.00	1.04	234.55
MW202	235.48	235.37	-0.11	1.5- 4.6	0.74	0.85	234.63	0.59	0.70	234.78	0.19	0.30	235.18	0.29	0.40	235.08
MW203	236.43	236.38	-0.05	1.5- 4.6	1.77	1.82	234.61	1.65	1.70	234.73	1.20	1.25	235.18	1.31	1.36	235.07

Notes:

- m - Metres
- TOP - Top of Pipe
- masl - Metres Above Sea Level
- mbgs - Metres Below Ground Surface

TABLE 2 GROUNDWATER ELEVATION DATA
Innisfil Beach Development Inc.
19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario

Well Number	Ground Elevation (masl)	Top of Pipe Elevation (masl)	Height of Stickup (m)	Screen Interval (mbgs/mbfs)	May 5, 2023			May 25, 2023			June 28, 2023			August 30, 2023		
					Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)
MW301	235.55	236.50	0.95	1.5- 4.6	1.61	0.66	234.89	1.32	0.37	235.18	1.29	0.34	235.21	1.44	0.49	235.06
MW302	235.45	236.48	1.03	1.5- 4.6	1.50	0.47	234.98	1.19	0.16	235.29	1.05	0.02	235.43	1.29	0.26	235.19
MW201	235.59	235.55	-0.04	1.5- 4.6	0.82	0.86	234.73	0.55	0.59	235.00	0.51	0.55	235.04	0.61	0.65	234.94
MW202	235.48	235.37	-0.11	1.5- 4.6	0.17	0.28	235.20	0.00	0.11	235.37	-0.01	0.10	235.38	0.39	0.50	234.98
MW203	236.43	236.38	-0.05	1.5- 4.6	1.24	1.29	235.14	0.95	1.00	235.43	0.84	0.89	235.54	1.23	1.28	235.15

Notes:

- m - Metres
- TOP - Top of Pipe
- masl - Metres Above Sea Level
- mbgs - Metres Below Ground Surface

TABLE 2 GROUNDWATER ELEVATION DATA
Innisfil Beach Development Inc.
19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario

Well Number	Ground Elevation (masl)	Top of Pipe Elevation (masl)	Height of Stickup (m)	Screen Interval (mbgs/mbfs)	October 13, 2023			December 18, 2023			February 9, 2024			June 18, 2024		
					Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)	Water Level from Top of Pipe (mbTOP)	Water Level from Ground Surface (mbgs)	Water Level Elevation (masl)
MW301	235.55	236.50	0.95	1.5- 4.6	1.67	0.72	234.83	1.96	1.01	234.54	1.97	1.02	234.53	2.10	1.15	234.40
MW302	235.45	236.48	1.03	1.5- 4.6	1.55	0.52	234.93	1.87	0.84	234.61	1.87	0.84	234.61	1.99	0.96	234.49
MW201	235.59	235.55	-0.04	1.5- 4.6	0.96	1.00	234.59	1.20	1.24	234.35	1.18	1.22	234.37	1.30	1.34	234.25
MW202	235.48	235.37	-0.11	1.5- 4.6	0.29	0.40	235.08	0.49	0.60	234.88	0.42	0.53	234.95	1.19	1.30	234.18
MW203	236.43	236.38	-0.05	1.5- 4.6	1.30	1.35	235.08	1.49	1.54	234.89	1.45	1.50	234.93	1.70	1.75	234.68

Notes:

- m - Metres
- TOP - Top of Pipe
- masl - Metres Above Sea Level
- mbgs - Metres Below Ground Surface

TABLE 3 GROUNDWATER ANALYTICAL RESULTS

Innisfil Beach Development Inc.

19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario

Sample Location		City of Barrie Sanitary Limit	City of Barrie Storm Limit	City of Barrie Hydrogeological Assessment Water Quality Limit	MW302	MW302
Sampling Date					12-Apr-23	13-May-24
Screen Depth (mbgs)					1.5- 4.6	1.5- 4.6
Parameters	unit					
General Chemistry						
Temperature	° C			30 Degrees Celsius	< 30	< 30
pH				6.5-8.5	7.67	7.87
Ammonia (Total)	mg/L				-	1.4
Biochemical Oxygen Demand (BOD5)	mg/L	300	15	15	< 2	< 2
Chloride	mg/L	1500	-	1500	330	300
Cyanide	mg/L	1.2	-	1.2	< 0.005	0.013
Fluoride	mg/L	10	-	10	< 0.10	< 0.10
Oil & Grease (animal & veg)	mg/L	150	-	0	< 0.50	< 0.50
Oil & Grease (mineral)	mg/L	15	-	0	0.5	< 0.50
Petroleum Hydrocarbons (PHC) (F1-F4)	mg/L	-	-	0	-	-
PHC F1 (C6 - C10)	ug/L	-	-	-	< 25	< 25
PHC F1 (C6 - C10) - BTEX	ug/L	-	-	-	< 25	< 25
PHC F2 (C10 - C16)	ug/L	-	-	-	< 100	< 100
PHC F3 (C16 - C34)	ug/L	-	-	-	< 200	< 200
PHC F4 (C34 - C50)	ug/L	-	-	-	< 200	< 200
Phenolics	mg/L	0.1	-	0.01	0.0049	0.006
Platinum	mg/L	5	-	5	< 0.0005	< 0.0002
Polycyclic Aromatic Hydrocarbons (PAH)	mg/L	0.005	-	0.005	< 0.0002	< 0.0002
Sulphate	mg/L	1500	-	1500	18	13
Sulphides	mg/L	1	-	1	0.033	0.49
Total Kjeldahl Nitrogen (TKN)	mg/L	100	-	100	1.3	2
Total Phosphorus (TP)	mg/L	10	-	10	2.09	1.02
Total Suspended Solids (TSS)	mg/L	350	15	15	33	3,200
Metals						
Aluminum	mg/L	50	-	50	30.3	16.9
Antimony	mg/L	5	-	5	0.00015	0.000118
Arsenic	mg/L	1	-	1	0.00757	0.00299
Barium	mg/L	5	-	5	0.531	0.307
Bismuth	mg/L	5	-	0.01	0.000149	0.000106
Cadmium	mg/L	0.7	0.001	0.001	0.000408	0.000228
Chromium	mg/L	2	0.08	0.08	0.0468	0.025
Cobalt	mg/L	5	-	5	0.0207	0.0104
Copper	mg/L	2	0.01	0.01	0.0758	0.0335
Gold	mg/L	5	-	5	< 0.0005	< 0.0002
Iron	mg/L	50	-	50	53.7	24.7
Lead	mg/L	0.7	0.05	0.05	0.0291	0.0146
Manganese	mg/L	5	-	5	1.46	0.719
Mercury	mg/L	0.01	-	0.01	<0.00010	< 0.0015
Molybdenum	mg/L	5	-	5	0.00088	0.00265
Nickel	mg/L	2	0.05	0.05	0.0447	0.0228
Platinum	mg/L	5	-	5	< 0.0005	< 0.0002
Rhodium	mg/L	5	-	5	< 0.0005	< 0.0005
Selenium	mg/L	1	-	0.1	0.00182	0.00103
Silver	mg/L	0.4	-	0.0001	0.000121	0.000061
Tin	mg/L	5	-	5	0.0014	0.00076
Vanadium	mg/L	5	-	5	0.0774	0.0439
Zinc	mg/L	2	0.04	0.04	0.125	0.5
VOCs						
Benzene	mg/L	0.01	-	0	< 0.0002	< 0.00017

TABLE 3 GROUNDWATER ANALYTICAL RESULTS

Innisfil Beach Development Inc.

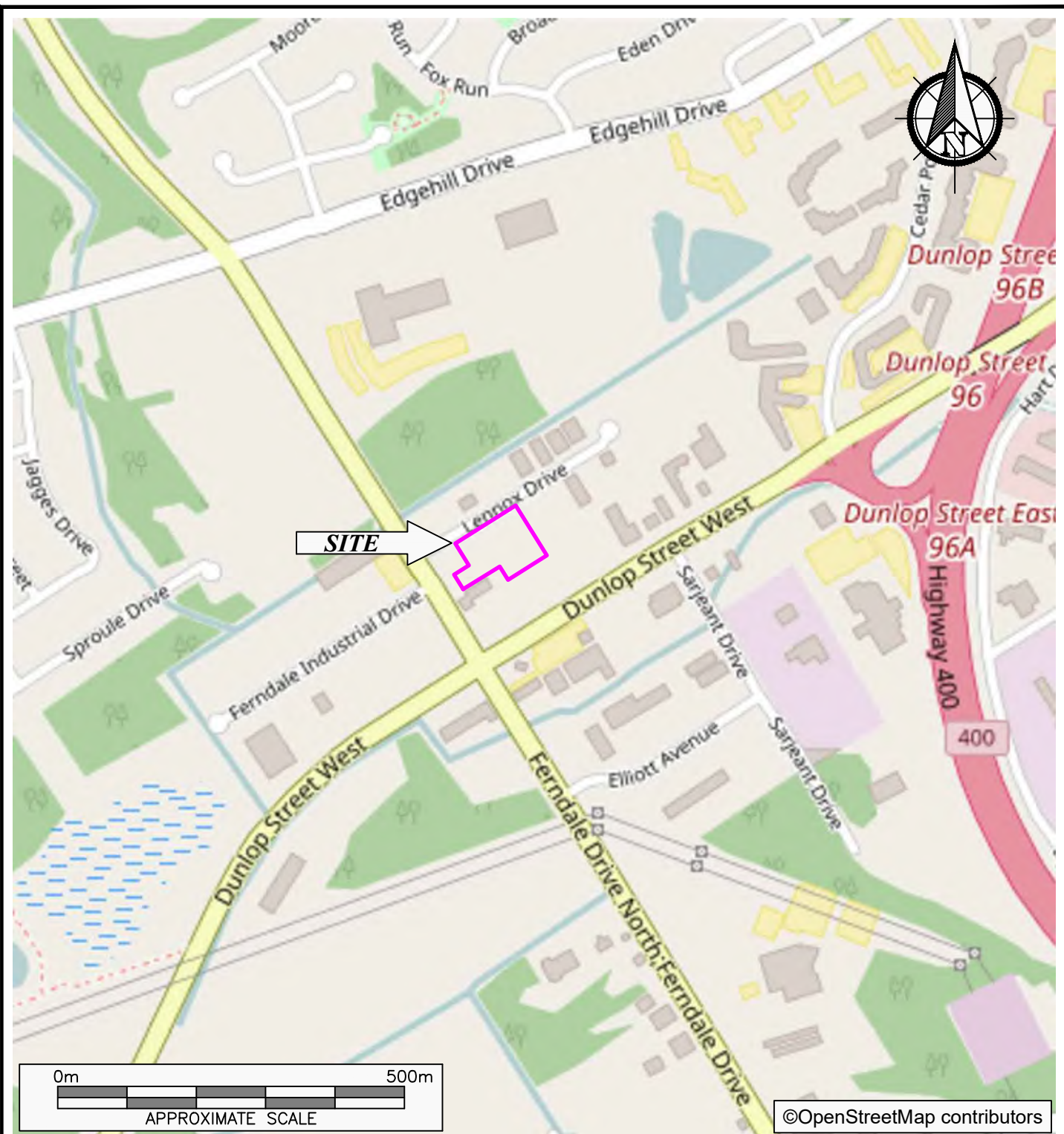
19 Lennox Drive (formerly 440 Dunlop Street West), Barrie, Ontario

Sample Location		City of Barrie Sanitary Limit	City of Barrie Storm Limit	City of Barrie Hydrogeologic Assessment Water Quality Limit	MW302	MW302
Sampling Date					12-Apr-23	13-May-24
Screen Depth (mbgs)					1.5- 4.6	1.5- 4.6
Parameters	unit					
Bromodichloromethane	mg/L	-	-	0	-	< 0.0005
Bromoform	mg/L	-	-	0	-	< 0.001
Bromomethane	mg/L	-	-	0	-	< 0.0005
Chlorobenzene	mg/L	-	-	0	-	< 0.0002
Chloromethane	mg/L	-	-	0	-	< 0.005
1,2-Dichlorobenzene	mg/L	0.05	-	0	< 0.0004	< 0.0005
1,3-Dichlorobenzene	mg/L	-	-	0	-	< 0.0005
1,4-Dichlorobenzene	mg/L	0.08	-	0	< 0.0004	< 0.0005
1,1-Dichloroethane	mg/L	-	-	0	-	< 0.0002
1,2-Dichloroethane	mg/L	-	-	0	-	< 0.0005
1,1-Dichloroethylene	mg/L	-	-	0	-	< 0.0002
1,2-Dichloroethylene	mg/L	-	-	0	-	< 0.0005
1,2-Dichloropropane	mg/L	-	-	0	-	< 0.0002
Ethylbenzene	mg/L	0.06	-	0	< 0.0002	< 0.0002
Hexachlorobenzene	mg/L	0.0001	-	0	< 0.000005	< 0.00005
Methyl tert-butyl ether	mg/L	-	-	0	-	< 0.01
Methylene Chloride	mg/L			0	< 0.002	< 0.002
Styrene	mg/L	-	-	0	-	< 0.0005
1,1,1,2-Tetrachloroethane	mg/L	-	-	0	-	< 0.0005
1,1,2,2-Tetrachloroethane	mg/L	0.06	-	0	< 0.0004	< 0.0005
Tetrachloroethylene	mg/L	0.06	-	0	< 0.0002	< 0.0002
Toluene	mg/L	0.02	-	0	0.00038	0.00025
1,2,4-Trichlorobenzene	mg/L	-	-	0	-	< 0.0005
1,1,1-Trichloroethane	mg/L	-	-	0	-	< 0.0002
1,1,2-Trichloroethane	mg/L	-	-	0	-	< 0.0005
Trichloroethylene	mg/L	0.05	-	0	< 0.0002	< 0.0002
Trichlorofluoromethane	mg/L	-	-	0	-	< 0.0005
1,3,5-Trimethylbenzene	mg/L	-	-	0	-	< 0.0002
Vinyl Chloride	mg/L	-	-	0	-	< 0.0002
Xylenes (Total)	mg/L	0.3	-	0	0.00022	< 0.0002

Note: standard value of 0 indicating non-detected as per lab detection limit

3200	exceeding both the City sewer's limit and City's hydrogeological assessment quality limit
0.00038	exceeding the City's hydrogeological assessment quality limit

FIGURES



PROJECT NAME

HYDROGEOLOGICAL ASSESSMENT

CLIENT NAME

INNISFIL BEACH DEVELOPMENT INC.

PROJECT LOCATION

440 DUNLOP STREET WEST, BARRIE, ONTARIO

FIGURE NAME

KEY MAP

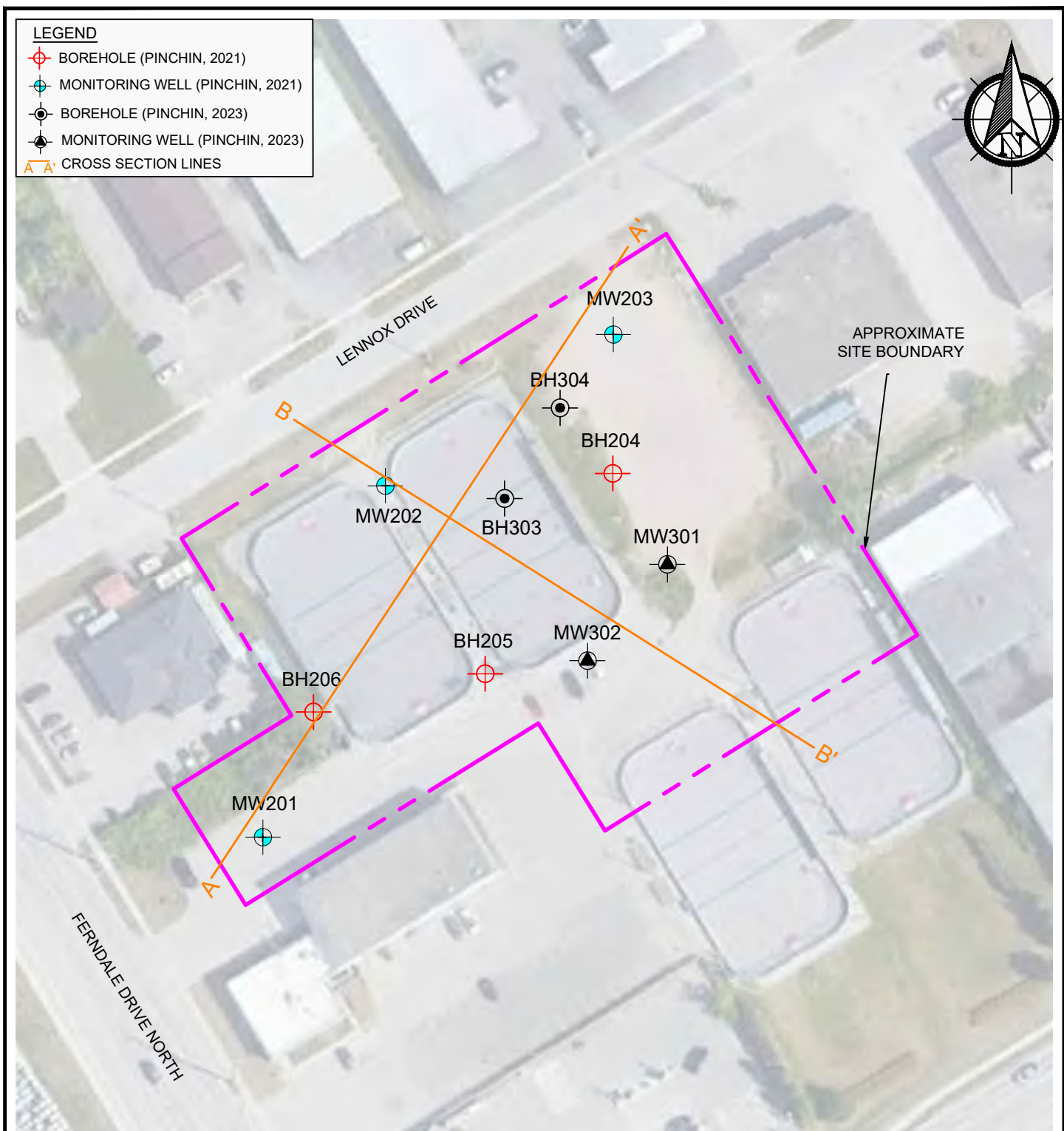
FIGURE NO.

APPROXIMATE SCALE
AS SHOWN

PROJECT NO.
295667.007

DATE
JULY 2023

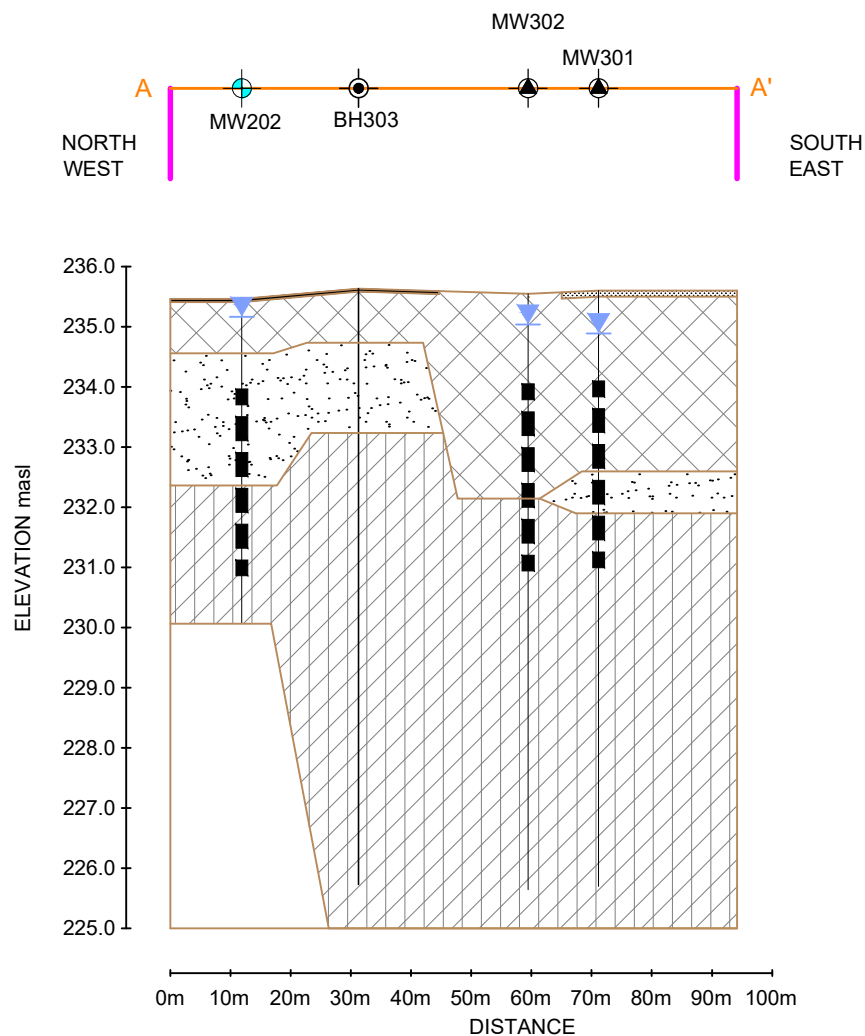
1



	PROJECT NAME			FIGURE NO. 2
	HYDROGEOLOGICAL ASSESSMENT			
	CLIENT NAME			
	INNISFIL BEACH DEVELOPMENT INC.			
	PROJECT LOCATION			
	440 DUNLOP STREET WEST, BARRIE, ONTARIO			
FIGURE NAME				2
BOREHOLE AND MONITORING WELL LOCATION PLAN				
APPROXIMATE SCALE	PROJECT NO.	DATE		
AS SHOWN	295667.007	JULY 2023		

LEGEND

-  BOREHOLE (PINCHIN, 2021)
-  MONITORING WELL (PINCHIN, 2021)
-  BOREHOLE (PINCHIN, 2023)
-  MONITORING WELL (PINCHIN, 2023)
-  FILL
-  SAND
-  TOPSOIL
-  ASPHALT
-  SILTY CLAY
-  SITE BOUNDARY
-  WELL CASING/BENTONITE
-  MEASURED GROUNDWATER ELEVATION
-  WELL SCREEN



PROJECT NAME

HYDROGEOLOGICAL ASSESSMENT

CLIENT NAME

INNISFIL BEACH DEVELOPMENT INC.

PROJECT LOCATION

440 DUNLOP STREET WEST, BARRIE, ONTARIO

FIGURE NAME

CROSS-SECTION B-B'

FIGURE NO.

4

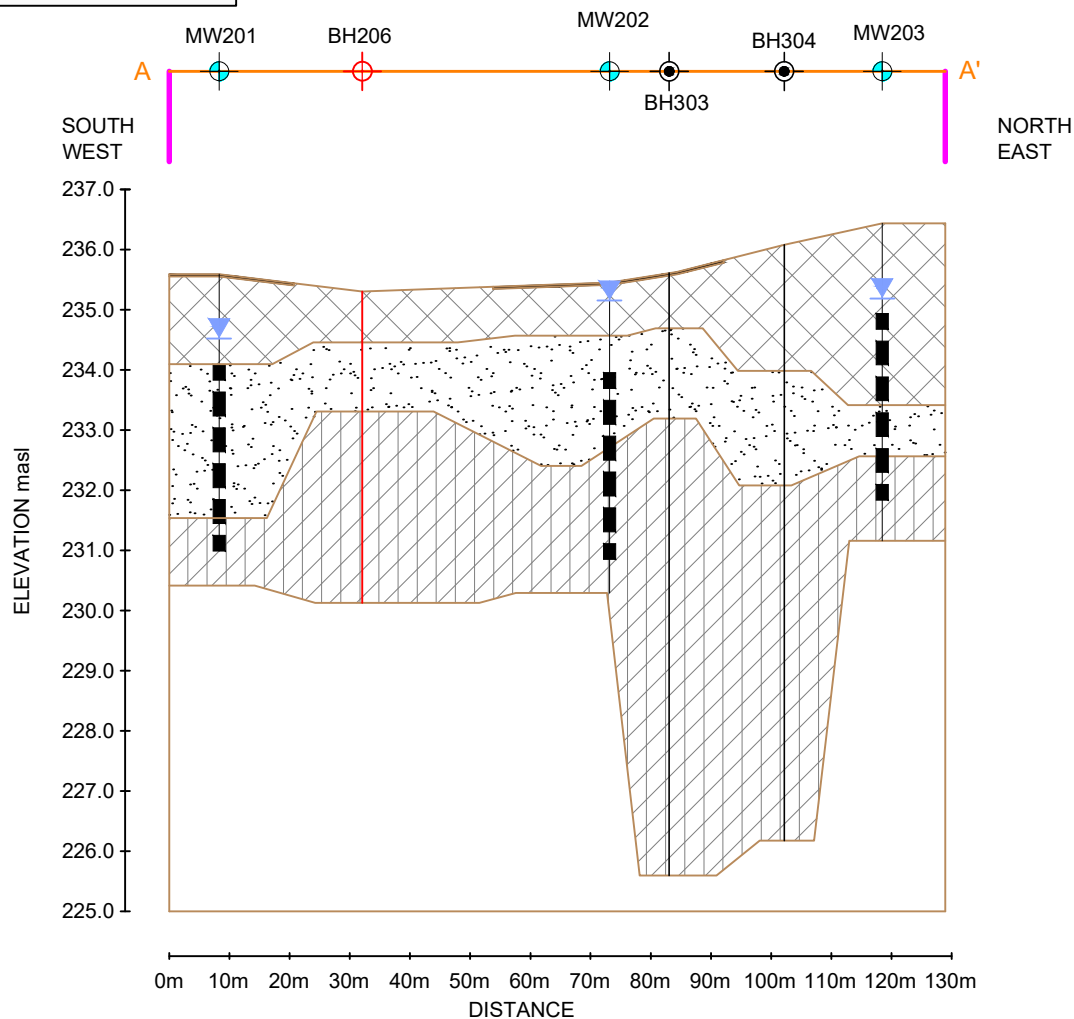
APPROXIMATE SCALE
AS SHOWN

PROJECT NO.
295667.007

DATE
MAY 2023

LEGEND

-  BOREHOLE (PINCHIN, 2021)
-  MONITORING WELL (PINCHIN, 2021)
-  BOREHOLE (PINCHIN, 2023)
-  MONITORING WELL (PINCHIN, 2023)
-  ASPHALT
-  SAND
-  FILL
-  SILTY CLAY
-  SITE BOUNDARY
-  WELL CASING/BENTONITE
-  MEASURED GROUNDWATER ELEVATION
-  WELL SCREEN



PROJECT NAME

HYDROGEOLOGICAL ASSESSMENT

CLIENT NAME

INNISFIL BEACH DEVELOPMENT INC.

PROJECT LOCATION

440 DUNLOP STREET WEST, BARRIE, ONTARIO

FIGURE NAME

CROSS-SECTION A-A'

FIGURE NO.

4A

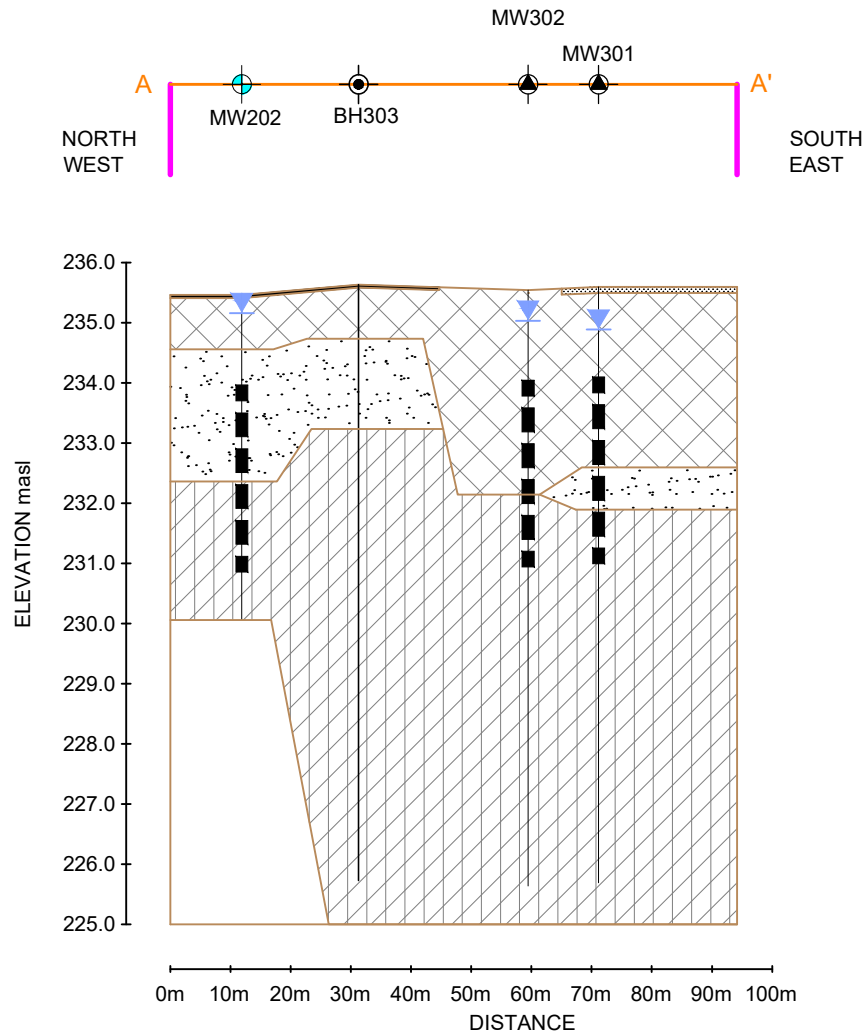
APPROXIMATE SCALE
AS SHOWN

PROJECT NO.
295667.007

DATE
JULY 2023

LEGEND

-  BOREHOLE (PINCHIN, 2021)
-  MONITORING WELL (PINCHIN, 2021)
-  BOREHOLE (PINCHIN, 2023)
-  MONITORING WELL (PINCHIN, 2023)
-  FILL
-  SAND
-  TOPSOIL
-  ASPHALT
-  SILTY CLAY
-  SITE BOUNDARY
-  WELL CASING/BENTONITE
-  MEASURED GROUNDWATER ELEVATION
-  WELL SCREEN



PROJECT NAME

HYDROGEOLOGICAL ASSESSMENT

CLIENT NAME

INNISFIL BEACH DEVELOPMENT INC.

PROJECT LOCATION

440 DUNLOP STREET WEST, BARRIE, ONTARIO

FIGURE NAME

CROSS-SECTION B-B'

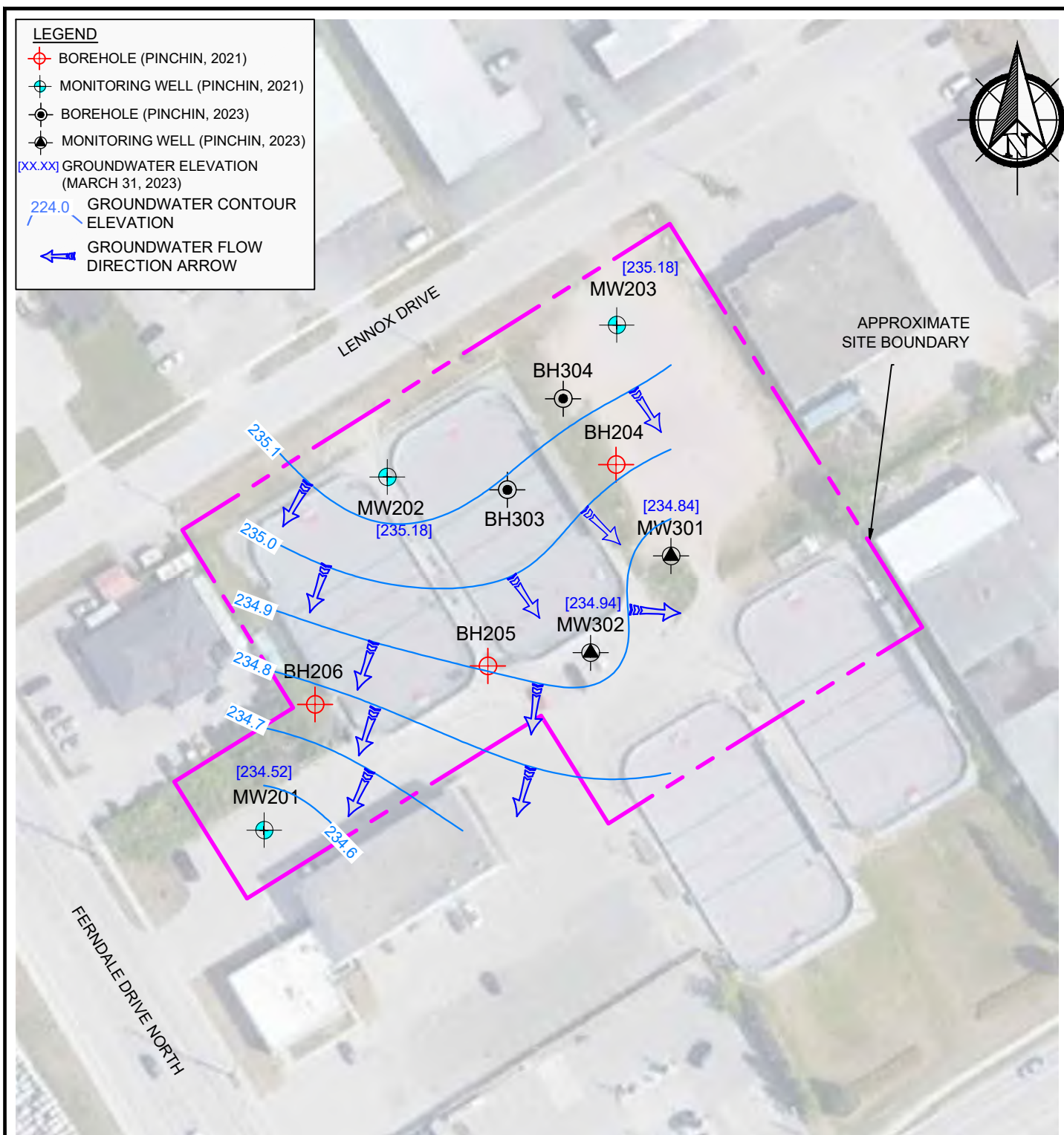
FIGURE NO.

APPROXIMATE SCALE
AS SHOWN

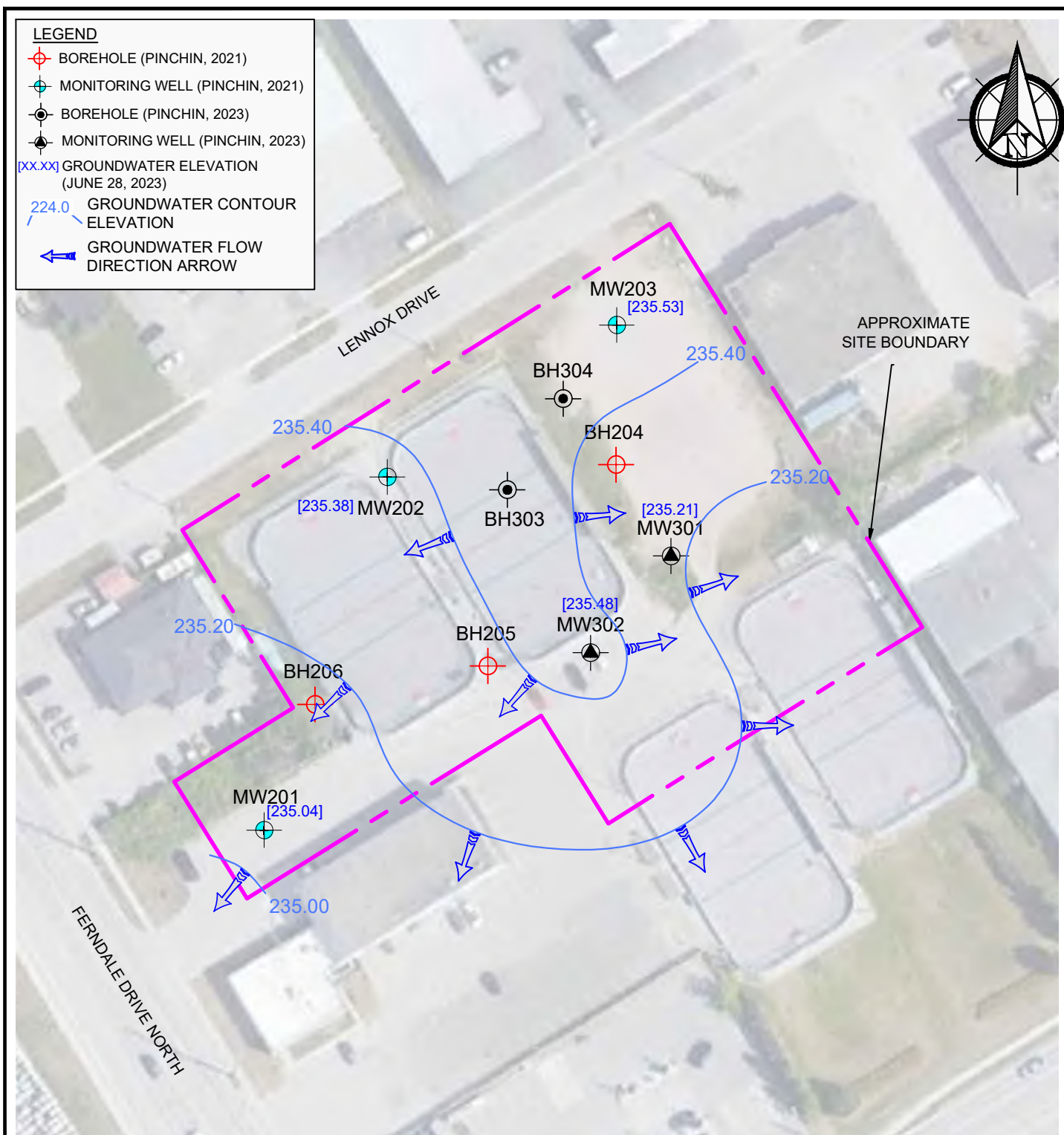
PROJECT NO.
295667.007

DATE
JULY 2023

4B



	PROJECT NAME			FIGURE NO. 5
	HYDROGEOLOGICAL ASSESSMENT			
	CLIENT NAME			
	INNISFIL BEACH DEVELOPMENT INC.			
	PROJECT LOCATION			
	19 LENNOX DRIVE, (FORMERLY 440 DUNLOP STREET WEST), BARRIE, ONTARIO			
FIGURE NAME		GROUNDWATER ELEVATIONS AND INFERRED FLOW DIRECTION (MARCH 31, 2023)		
APPROXIMATE SCALE	PROJECT NO.	DATE		
AS SHOWN	295667.007	JUNE 2024		



	PROJECT NAME			HYDROGEOLOGICAL ASSESSMENT	
	CLIENT NAME			INNISFIL BEACH DEVELOPMENT INC.	
	PROJECT LOCATION			19 LENNOX DRIVE, (FORMERLY 440 DUNLOP STREET WEST), BARRIE, ONTARIO	
	FIGURE NAME			GROUNDWATER ELEVATIONS AND INFERRED FLOW DIRECTION (JUNE 28, 2023)	
	APPROXIMATE SCALE			PROJECT NO.	DATE
	AS SHOWN			295667.007	JUNE 2024
					FIGURE NO.
					6

APPENDIX I
Site Development Plan



SPECIAL INSTRUCTIONS	
◆	TYPICAL FINISHED WALL DEPTH (5" EPS SYSTEM)
◆	2" PROJECTION FROM TYPICAL FINISHED WALL
◆	1" PROJECTION FROM TYPICAL FINISHED WALL
◆	2" RECESSED FROM TYPICAL FINISHED WALL
◆	1" PROJECTION FROM TYPICAL FINISHED WALL
NOTES:	
ALL ELEVATION LINE PATTERN TO BE 3/4" x 3/4" GROOVES.	

EXTERIOR FINISH SCHEDULE	
MATERIAL/FINISH	COLOR
1. PREFABRICATED EPS PANEL, GEMSTONE FINISH (DURABOND OR EQUIVALENT) - 20 1/2" x 48" LINE PATTERN	BLACK MARNE 1000
2. PREFABRICATED EPS PANEL, SANDSTONE FINISH (DURABOND OR EQUIVALENT)	BM 368 FLOWER POWER
3. PREFABRICATED EPS PANEL, SANDSTONE FINISH (DURABOND OR EQUIVALENT)	WALNUT BBGE 400-20
4. PREFABRICATED EPS PANEL, SANDSTONE FINISH (DURABOND OR EQUIVALENT)	CHARCOAL VW002
5. PREFABRICATED EPS PANEL, GEMSTONE FINISH (DURABOND OR EQUIVALENT) - 1" 17" HIGH LINE PATTERN	ATHABASCA LIGHT
6. PREFABRICATED EPS PANEL, MARBLE COAT 1.0 FINISH (DURABOND OR EQUIVALENT)	BM CSR-10
7. ACM PANEL BY CM CLADDING OR EQUIVALENT	TIMBER TEAK BY ALPOLIC
8. ACM PANEL BY CM CLADDING OR EQUIVALENT	S-91 OFF WHITE PPG DURANUR
9. ILLUMINATED SIGNAGE: REFER TO BRAND STANDARDS	

EXTERIOR FINISH SCHEDULE	
MATERIAL/FINISH	COLOR
10. ACCENT EPS BAND, SANDSTONE FINISH	BLACK BM 2133-10
11. CLEAR LAMINATED GLASS HHSB 88% LIGHT TRANSMITTANCE	WHITE (ARCTIC SNOW)
12. CORRUGATED METAL SCREEN	
13. CLEARANCE SIGNAGE: REFER TO BRAND STANDARDS	
14. WALL SIGNAGE	
15. 4'-0" HIGH DECORATIVE FENCE AROUND CONDENSING UNITS REFER TO DETAILS ON LANDSCAPE DRAWINGS	
16. MECHANICAL GRILL & PIPES / SOLID SERVICE DOORS	COLOR TO MATCH ADJACENT FINISH COLOR
17. OVERFLOW SCUPPER	PREFINISHED METAL COLOR TO MATCH ADJACENT FINISH COLOR

Project North:	True North:
Key Plan:	
HOME2 SUITES BY HILTON	

No.	Date	Issue/Revision	By:
2	24/06/06	Issued for SPA Submission	S.P.
1	24/02/26	Issued for Site Plan Application	S.P.
Drawing Issues/Revisions:			

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Architect's Stamp

MATAJ ARCHITECTS
INCORPORATED
204-418 Bessie Street, Suite 101
Barrie, ON L4N 1C2
T 905.881.4444

Project:
BARRIE HOTEL
DEVELOPMENT
440 DUNLOP STREET WEST, BARRIE
ON L4N 1C2

Sheet Title:
WEST ELEVATION
(FRONT)

Design By: A.M. Drawn By: S.F. Approved By: A.M.
Scale: 1/8" = 1'-0" Date: 22.12.21 Project No.: 22-013

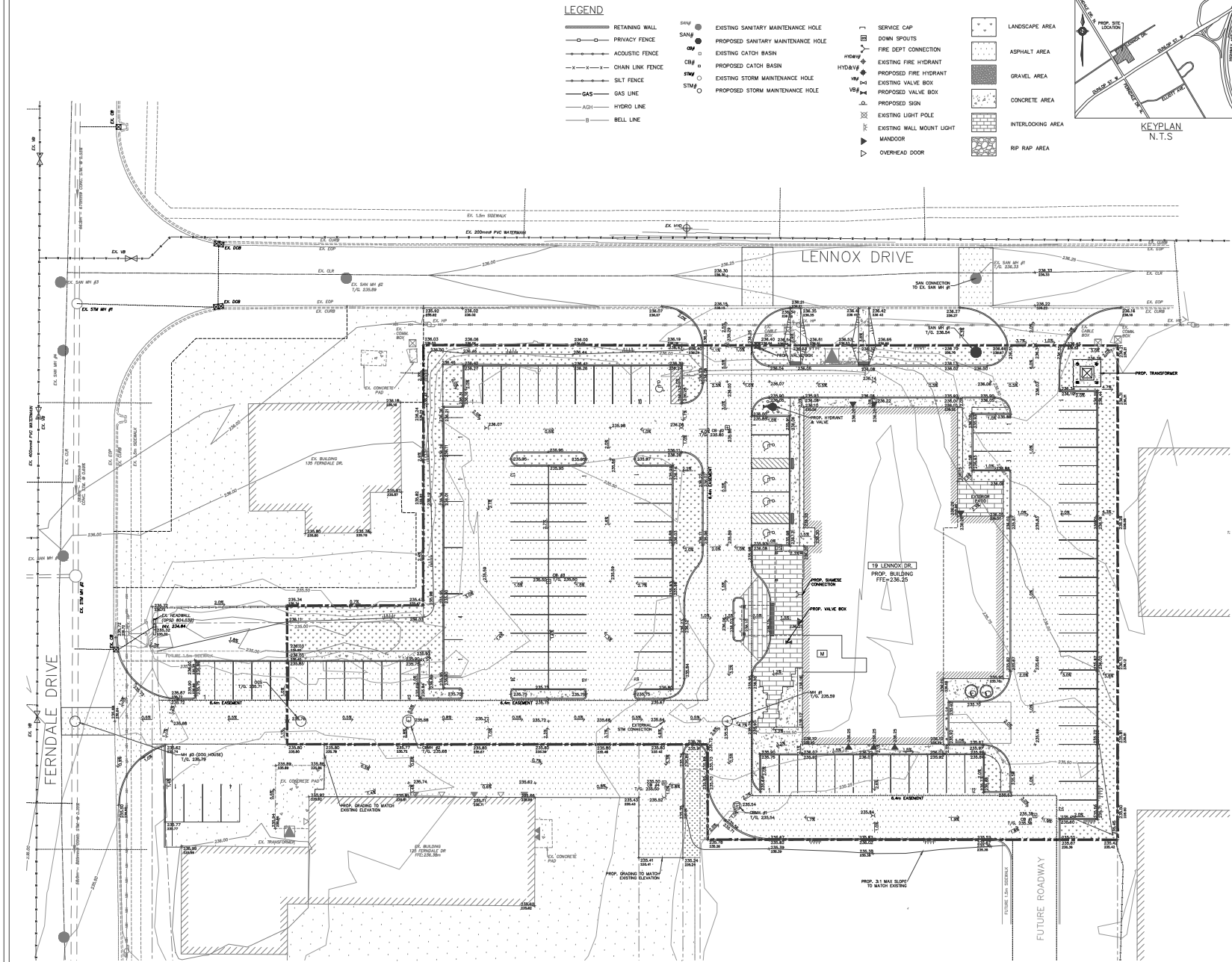
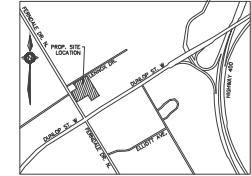
Drawing No.: **A301**

Drawing Set:
ARCHITECTURAL BUILDING PERMIT

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No.	Issuance Description	YYMMDD
1	CLIENT REVIEW	240515
2	SITE PLAN APPROVAL	240517

Issued For:
SITE PLAN APPROVAL

Client:
INNISFIL BEACH DEVELOPMENTS INC.
241 Bradlock Drive, Concord, ON L4K 1K5

Project:
HOME2 SUITES BY HILTON HOTEL
19 Lennox Drive, Barrie, ON L4N 5V5

Drawing:
SITE GRADING PLAN

Project No.: 1614-001-21
Scale: 1:250
Orientation: North

Designed by: RM
Drawn by: RM
Approved by: JCM
Checked by: JCM

Drawing No.: **GR-1**



APPENDIX II
On-Site MECP Water Supply Well Records



APL

WATER RESOURCES
DIVISION

57 No.

4799

ONTARIO WATER
RESOURCES COMMISSION

UTM 17 60 19 65 E

49 1 43 52 N

Elev. 0765

The Ontario Water Resources Commission Act

WATER WELL RECORD

Basin
County or District

Simcoe

Township, Village, Town or City

Barrie

Con.

VT

Lot

24

Date completed

28

(day)

month

year

April 1965

Address

Ferndale (Barrie)

Casing and Screen Record

Inside diameter of casing 6"

Total length of casing 101'

Type of screen

Length of screen

Depth to top of screen

Diameter of finished hole 6"

Pumping Test

Static level 18'

Test-pumping rate 36 G.P.M.

Pumping level 45'

Duration of test pumping 2 hr.

Water clear or cloudy at end of test Clear

Recommended pumping rate up to 50 G.P.M.

with pump setting of 65 feet below ground surface

Well Log

Water Record

Overburden and Bedrock Record

Muddy yellow sand
White gray clay & some stones
sand
Coarse gravelFrom
ft.To
ft.Depth(s) at
which water(s)
foundKind of water
(fresh, salty,
sulphur)

0

18

101'

fresh

18

96

96

100

100

101

For what purpose(s) is the water to be used?

Service Station (COMET)
PLUS TIRE MAKING MACHINES
Is well on upland, in valley, or on hillside? Lowland

Drilling or Boring Firm

Coupland Drilling

Address

Barrie
R.R. #2

Licence Number

1660

Name of Driller or Borer

Merlin Coupland

Address

R.R. #2 Barrie

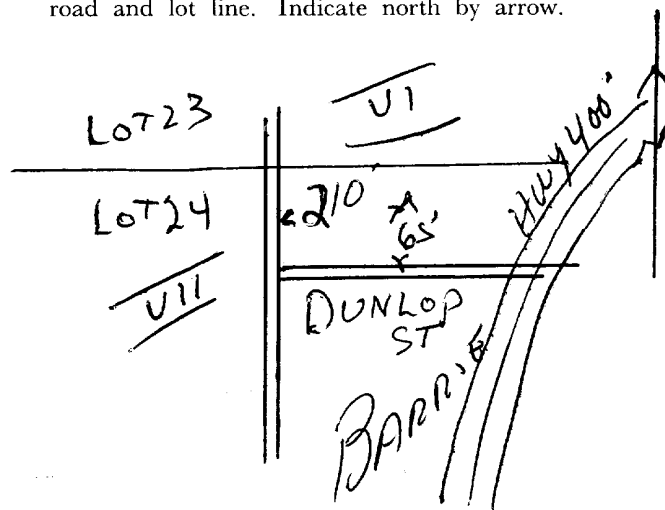
Date

May 18/65

Merlin Coupland

(Signature of Licensed Drilling or Boring Contractor)

Location of Well

In diagram below show distances of well from
road and lot line. Indicate north by arrow.

Form 7 15M-60-4138

OWRC COPY

CSS.S8

A337805

Well Location

Address of Well Location (Street Number/Name) 440 Dunlop St W Township Barrie Lot 1 Concession 1

County/District/Municipality Barrie City/Town/Village Barrie Province Ontario Postal Code L4N 1C8

UTM Coordinates Zone 18 Easting 601955 Northing 49714616 Municipal Plan and Sublot Number Other

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)
Black	Asphalt		Hard	0 0.5
Brown	Sand	Silt cobble	Loose	0.5 5
Grey	Silt	Sand	Rocked	5 15

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0 1	Concrete	0.3
1 4	Bedrock chips	1.4
4 55	well Seal HC	1.8

Results of Well Yield Testing

After test of well yield, water was:

☐ Clear and sand free

☐ Other, specify _____

If pumping discontinued, give reason: _____

Pump intake set at (m/ft) _____

Pumping rate (l/min / GPM) _____

Duration of pumping _____ hrs + _____ min

Final water level end of pumping (m/ft) _____

If flowing give rate (l/min/GPM) _____

Recommended pump depth (m/ft) _____

Recommended pump rate (l/min/GPM) _____

Well production (l/min/GPM) _____

Disinfected? ☐ Yes ☐ No

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fiberglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)
2"	PVC	3/16	0 5

Status of Well

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

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)
2308	PVC	10	5 15

Water Details

Water found at Depth (m/ft) 5 Kind of Water: ☐ Fresh ☒ Untested ☐ Gas ☐ Other, specify _____

Water found at Depth (m/ft) 15 Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify _____

Water found at Depth (m/ft) 15 Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify _____

Well Contractor and Well Technician Information

Business Name of Well Contractor PONTIL DRILLING SERVICES INC. Well Contractor's Licence No. 7644

Business Address (Street Number/Name) 6 ALBERT STREET Municipality MOUNT ALBERT

Province ON Postal Code L0G 1M0 Business E-mail Address info@pontildrilling.com

Bus. Telephone No. (inc. area code) 2893381838 Name of Well Technician (Last Name, First Name) Robbie Connors

Well Technician's Licence No. 3798 Signature of Technician and/or Contractor Robbie Connors Date Submitted 2021/10/10

Map of Well Location

Please provide a map below following instructions on the back.

230 ft

150'

Dunlop

Comments:

Well owner's information package delivered ☒ Yes ☐ No

Date Package Delivered 2021/10/10

Date Work Completed 2021/10/10

Ministry Use Only

Audit No. 2370497

NOV 04 2021

A337808

Well Location

Address of Well Location (Street Number/Name) 440 Dunlop St W Township Lot Concession
 County/District/Municipality City/Town/Village Province Ontario Postal Code L9W1C2
 UTM Coordinates Zone Easting Northing Municipal Plan and Sublot Number Other

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft)
Black	Asphalt		Hard	0 0.5
Brown	Sand	Silt, cobble	loose	0.5 5
Gray	Silt	Sand	rocked	5 15

Annular Space

Depth Set at (m/ft)	Type of Sealant Used (Material and Type)	Volume Placed (m³/in³)
0 1	Concrete	0.3
1 4	Bedrock chips	1.4
4 15	well seal H2	1.8

Results of Well Yield Testing

After test of well yield, water was:	Draw Down	Recovery
☐ Clear and sand free	Time (min)	Time (min)
☐ Other, specify	Water Level (m/ft)	Water Level (m/ft)
If pumping discontinued, give reason:	Static Level	
Pump intake set at (m/ft)	1	1
Pumping rate (l/min / GPM)	2	2
Duration of pumping	3	3
hrs + min	4	4
Final water level end of pumping (m/ft)	5	5
If flowing give rate (l/min/GPM)	10	10
Recommended pump depth (m/ft)	15	15
Recommended pump rate (l/min/GPM)	20	20
Well production (l/min/GPM)	25	25
Disinfected?	30	30
☐ Yes ☐ No	40	40
	50	50
	60	60

Method of Construction

☐ Cable Tool	☐ Diamond	☐ Public	☐ Commercial	☐ Not used
☒ Rotary (Conventional)	☐ Jetting	☐ Domestic	☐ Municipal	☐ Dewatering
☐ Rotary (Reverse)	☐ Driving	☐ Livestock	☒ Test Hole	☐ Monitoring
☐ Boring	☐ Digging	☐ Irrigation	☐ Cooling & Air Conditioning	
☐ Air percussion		☐ Industrial		
☐ Other, specify		☐ Other, specify		

Well Use

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft)
2"	PVC	3/16	0 5

Status of Well

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

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft)
2 3/8	PVC	.10	5 15

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☒ Untested
5	☐ Gas ☐ Other, specify
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested
	☐ Gas ☐ Other, specify
Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested
	☐ Gas ☐ Other, specify

Hole Diameter

Depth (m/ft)	Diameter (cm/in)
0 15	6"

Well Contractor and Well Technician Information

Business Name of Well Contractor: PONTIL DRILLING SERVICES INC. Well Contractor's Licence No.: 7644
 Business Address (Street Number/Name): 6 ALBERT STREET Municipality: MOUNT ALBERT

Province: ON Postal Code: L9W1C2 Business E-mail Address: info@pontildrilling.com
 Bus. Telephone No. (inc. area code): 2893381838 Name of Well Technician (Last Name, First Name): Robbins, Channing
 Well Technician's Licence No.: 398 Signature of Technician and/or Contractor: [Signature] Date Submitted: 2021/10/10

Map of Well Location

Please provide a map below following instructions on the back.

Comments:

Well owner's information

Date Package Delivered: 2021/10/10
 Date Work Completed: 2021/10/10

Ministry Use Only

Audit No.: Z370498
 Received: NOV 04 2021

Measurements recorded in: ☐ Metric ☒ Imperial

Page 1 of 1

A337803

Address of Well Location (Street Number/Name) 440 Dunlop St W Township Lot Concession
 County/District/Municipality City/Town/Village Province Ontario Postal Code L9M1C2
 UTM Coordinates Zone Easting Northing NAD 83 17 601199 747196 96
 Municipal Plan and Sublot Number Other

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From To
Black	Asphalt	—	Hard	0 0.5
Brown	Sand	Silt, cobble	Soft	0.5 5
Grey	Silt	Sand	packed, wet	5 15

Annular Space			Results of Well Yield Testing					
Depth Set at (m/ft)		Type of Sealant Used (Material and Type)	Volume Placed (m ³ /ft ³)	After test of well yield, water was: ☐ Clear and sand free ☐ Other, specify	Draw Down		Recovery	
From	To				Time (min)	Water Level (m/ft)	Time (min)	Water Level (m/ft)
0	1	Concrete	0.3	If pumping discontinued, give reason:	Static Level			
1	4	Bestonik chip	0.7		1	1		
4	15	well Sand #2	1.8		2	2		
				Pump intake set at (m/ft)				

Method of Construction Well Use
☐ Cable Tool ☐ Diamond ☐ Public ☐ Commercial ☐ Not used
☒ Rotary (Conventional) ☐ Jetting ☐ Domestic ☐ Municipal ☐ Dewatering
☐ Rotary (Reverse) ☐ Driving ☐ Livestock ☐ Test Hole ☒ Monitoring
☐ Boring ☐ Digging ☐ Irrigation ☐ Cooling & Air Conditioning
☐ Air percussion ☐ Industrial ☐ Other, specify

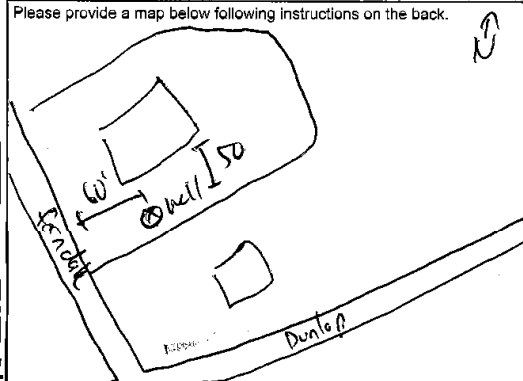
Construction Record - Casing Status of Well
 Inside Diameter (cm/in) Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel) Wall Thickness (cm/in) Depth (m/ft) From To
 2" PVC 3/16 0 5
☐ Water Supply ☐ Replacement Well ☒ Test Hole
☐ Recharge Well ☐ Dewatering Well
☒ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Screen
 Outside Diameter (cm/in) Material (Plastic, Galvanized, Steel) Slot No. Depth (m/ft) From To
 2 3/8 PVC 10 5 15
☐ Other, specify

Water Details Hole Diameter
 Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☒ Untested ☐ Gas ☐ Other, specify
 5 (m/ft) ☐ Gas ☐ Other, specify
 Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify
 (m/ft) ☐ Gas ☐ Other, specify
 Water found at Depth (m/ft) Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, specify
 (m/ft) ☐ Gas ☐ Other, specify

Well Contractor and Well Technician Information
 Business Name of Well Contractor PONTIAC DRILLING SERVICES INC. Well Contractor's Licence No. 7 6 4 4
 Business Address (Street Number/Name) 6 ALBERT STREET Municipality MOUNT ALBERT

Province ON Postal Code L9M1C2 Business E-mail Address info@pontiadrilling.com
 Bus. Telephone No. (Area Code) Name of Well Technician (Last Name, First Name) 2893381838 Robby Chann
 Well Technician's Licence No. Signature of Technician and/or Contractor Date Submitted 3 9 9 8 Gamin Kull 2021 NOV 04 2021

Map of Well Location
 Please provide a map below following instructions on the back.


Comments:
 Well owner's Information package delivered ☐ Yes ☒ No Date Package Delivered Y Y Y M M D D Date Work Completed 20 21 10 8 23
 Ministry Use Only
 Audit No. 2370496
 Received NOV 04 2021

APPENDIX III
Borehole Logs



Log of Borehole: MW301

Project #: 295667

Logged By: CP, JA, MG

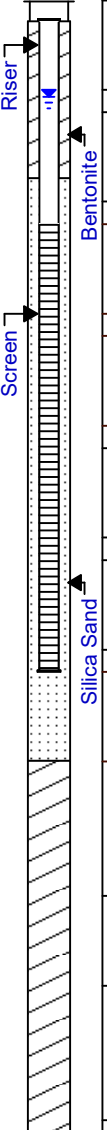
Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 29, 2023

Project Manager: JD

SUBSURFACE PROFILE					SAMPLE															
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value				Shear Strength		Water Content					
									□	20	40	60	□	△	kPa	△	100	200	●	%
0		Ground Surface	235.55																	
		Topsoil Fill 150 mm sandy silt	235.40		SS	1	100	8												
		Fill Brown silty sand, trace gravel, loose, very moist	234.79																	
1		Brown sand, trace silt and gravel, loose, wet	234.03		SS	2	100	5												
		Trace organics																		
2			233.42			SS	3	100	4											
		Grey sand, loose, wet	233.26																	
		Trace silt				SS	4	100	5											
3			232.50																	
		Possible Fill Grey sand, trace silt and organics, loose, wet	231.89			SS	5	100	4											
			231.74																	
4		Clay Grey silty clay, WTPL				SS	6	100	10											
		Grey silty clay, trace sand and gravel, stiff to very stiff, WTPL	230.98																	
5		Stiff to firm				SS	7	100	4											
6			229.45																	
		Firm to soft				SS	8	100	2											
7			227.93																	

Contractor: Strata

Grade Elevation: 235.55

Drilling Method: SPT

Top of Casing Elevation: 236.50

Well Casing Size: 50 mm

Sheet: 1 of 2



Log of Borehole: MW301

Project #: 295667

Logged By: CP, JA, MG

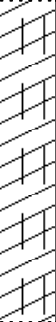
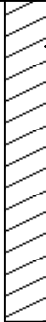
Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 29, 2023

Project Manager: JD

SUBSURFACE PROFILE					SAMPLE						
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value	Shear Strength	Water Content
									□ 20 40 60 □	△ kPa 100 200 △	● % 10 20 30 40 ●
8		Soft	225.80	 Bentonite	SS	9	100	4			
9											
10		End of Borehole Borehole terminated at 9.8 mbgs.			SS	10	100	2			
11											
12		Water levels: 0.71 mbgs on March 31, 2023 0.74 mbgs on April 12, 2023 0.66 mbgs on May 5, 2023									
13											
14											
15											

Contractor: Strata

Grade Elevation: 235.55

Drilling Method: SPT

Top of Casing Elevation: 236.50

Well Casing Size: 50 mm

Sheet: 2 of 2



Log of Borehole: MW302

Project #: 295667

Logged By: MG, CP

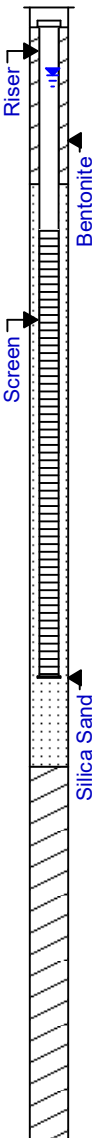
Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 30, 2023

Project Manager: JD

SUBSURFACE PROFILE					SAMPLE												
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value □ 20 40 60 □				Shear Strength △ kPa △ 100 200		Water Content ● % ● 10 20 30 40		
0		Ground Surface	235.45														
		Fill Brown sandy silt, loose, very moist	234.69		SS	1	100	5									
1		Grey sand, nil to trace gravel, compact, wet	233.62		SS	2	100	11									
2		gravel / asphalt seam at 1.8 mbgs	232.05		SS	3	100	11									
3			230.88		SS	4	100	9									
4		Clay Grey silty clay, stiff, WTPL	230.88														
5		Firm to stiff			SS	5	100	8									
6																	
7			227.83			SS	6	100	5								

Contractor: Strata

Grade Elevation: 235.45

Drilling Method: SPT

Top of Casing Elevation: 236.48

Well Casing Size: 50 mm

Sheet: 1 of 2



Log of Borehole: MW302

Project #: 295667

Logged By: MG, CP

Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 30, 2023

Project Manager: JD

SUBSURFACE PROFILE					SAMPLE								
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value	Shear Strength	Water Content		
									□ 20 40 60 □	△ kPa △ 100 200	● % ● 10 20 30 40		
8		Soft			SS	7	100	4					
9													
10		Unsampled DCP testing continued	225.70			SS	8	100	3				
							DCP	NA	NA	6			
							DCP	NA	NA	7			
							DCP	NA	NA	25			
							DCP	NA	NA	25			
							DCP	NA	NA	21			
							DCP	NA	NA	24			
							DCP	NA	NA	17			
							DCP	NA	NA	16			
						DCP	NA	NA	15				
						DCP	NA	NA	28				
						DCP	NA	NA	23				
				DCP	NA	NA	64						
13		221.89											
14		End of Borehole Borehole terminated at 13.6 mbgs.											
15		Water Levels: 0.51 mbgs on March 31, 2023 0.56 mbgs on April 12, 2023 0.47 mbgs on May 5, 2023											

Contractor: Strata

Grade Elevation: 235.45

Drilling Method: SPT

Top of Casing Elevation: 236.48

Well Casing Size: 50 mm

Sheet: 2 of 2



Log of Borehole: BH303

Project #: 295667

Logged By: MG, CP

Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 30, 2023

Project Manager: JD

SUBSURFACE PROFILE					SAMPLE						
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value □ 20 40 60 □	Shear Strength △ kPa 100 200 △	Water Content ● % 10 20 30 40 ●
0		Ground Surface	235.59	No Monitoring Well Installed							
		Pavement Structure 150 mm Asphaltic concrete			SS	1	100	12			
		Granular Fill Brown sand and gravel, some silt, compact moist to wet	234.69								
1					SS	2	100	18			
		Sand Brown/grey sand, trace silt, compact, very moist	234.07								
2		Brown/grey sand, trace gravel and silt, coarse, compact, very moist	233.30								
		Brown/grey coarse sand and gravel, trace silt, compact, moist	233.07		SS	4	100	13			
3		Clay Grey silty clay, very stiff, APL, WTPL at bottom	232.54		SS	5	100	12			
		WTPL									
4					SS	6	100	10			
		very stiff to stiff	231.02								
5					SS	7	100	8			
6											
		Stiff to firm	229.49		SS	8	100	4			
7											
8					SS	9	100	3			
9											

Contractor: Strata

Grade Elevation: 235.59

Drilling Method: SPT

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 2



Log of Borehole: BH303

Project #: 295667

Logged By: MG, CP

Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 30, 2023

Project Manager: JD

SUBSURFACE PROFILE				SAMPLE							
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value □ 20 40 60 □	Shear Strength △ kPa 100 200	Water Content • % 10 20 30 40
10		Unsampled DCP testing continued	225.84		SS	10	100	2			
11					DCP	NA	NA	12			
					DCP	NA	NA	15			
					DCP	NA	NA	17			
					DCP	NA	NA	14			
					DCP	NA	NA	16			
					DCP	NA	NA	14			
					DCP	NA	NA	20			
					DCP	NA	NA	45			
					DCP	NA	NA	24			
					DCP	NA	NA	38			
					DCP	NA	NA	18			
					DCP	NA	NA	52			
					DCP	NA	NA	56			
					DCP	NA	NA	35			
					DCP	NA	NA	46			
					DCP	NA	NA	70			
					DCP	NA	NA	57			
					DCP	NA	NA	45			
					DCP	NA	NA	31			
16		End of Borehole	219.74								
17		Borehole terminated at 15.8 mbgs. At completion, boreholes open to 1.7 mbgs and water level at 0.9 mbgs.									
18											

Contractor: Strata

Grade Elevation: 235.59

Drilling Method: SPT

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 2 of 2



Log of Borehole: BH304

Project #: 295667

Logged By: CP, MG

Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 29, 2023

Project Manager: JD

SUBSURFACE PROFILE					SAMPLE													
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value				Shear Strength		Water Content			
									□	20	40	60	□	Δ	kPa	Δ	•	%
		Ground Surface	236.08	No Monitoring Well Installed														
		Pavement Structure			SS	1	100	9										
		Brown sand and gravel, 50 mm buried asphaltic concrete																
		Fill	235.32															
1		Brown silty sand, trace gravel, loose, moist	235.01		SS	2	100	8										
		Brown/grey occasional topsoil inclusions, loose, moist	234.56															
		Brown sand, trace silt, loose, moist																
2		Brown/grey sand, trace silt and gravel, occasional small topsoil inclusions, compact, wet	233.98		SS	3	100	16										
		Sand			SS	4	100	21										
		Brown/grey sand, compact, wet, gravel seam																
3					SS	5	100	12										
			232.27															
4		Clay			SS	6	100	19										
		Brown silty clay, very stiff , WTPL	231.51															
		Brownish grey silty clay, stiff, WTPL			SS	7	100	14										
5			230.75															
		Grey silty clay, stiff			SS	8	100	4										
6					SS	9	100	4										
7			228.46															

Contractor: Strata

Grade Elevation: 236.08

Drilling Method: SPT

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 2



Log of Borehole: BH304

Project #: 295667

Logged By: CP, MG

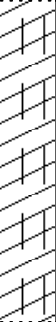
Project: Hydrogeological and Geotechnical Assessments

Client: Innisfil Beach Development Inc.

Location: 440 Dunlop Street West, Barrie

Drill Date: March 29, 2023

Project Manager: JD

SUBSURFACE PROFILE					SAMPLE																						
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value				Shear Strength				Water Content										
									□	20	40	60	□	△	kPa	△	100	200	●	%	●	10	20	30	40		
8		Brownish silty clay, soft, WTPL	226.33		SS	10	100	4																			
9																											
		SS			11	100	3																				
10	End of Borehole																										
	Borehole terminated at 9.8 mbgs. At completion, borehole open to 1.7 mbgs and water level at 1.4 mbgs.																										
11																											
12																											
13																											
14																											
15																											

Contractor: Strata

Grade Elevation: 236.08

Drilling Method: SPT

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 2 of 2



Log of Borehole: MW201

Project #: 295667.001

Logged By: BM

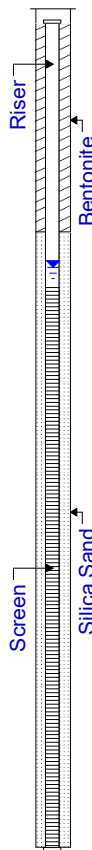
Project: Geotechnical Investigation

Client: Cassandra Projects Inc.

Location: 125 Ferndale Dr. North and 440 Dunlop St. West, Barrie, Ontario

Drill Date: August 24, 2021

Project Manager: KRD

SUBSURFACE PROFILE					SAMPLE											
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value				Shear Strength		Water Content	
									□ 20 40 60 □	△ kPa 100 200 △	● % 10 20 ●					
0		Ground Surface	235.59													
		Asphaltic Concrete (50 mm)			SS	1	50	18								
		Fill Brown sand and gravel, compact, moist	234.83													
1		Loose				SS	2	21	6							
			234.07													
2		Sand Brown sand, trace silt, compact, wet to saturated				SS	3	92	13							
			233.31													
		Trace gravel, saturated				SS	4	83	20							
			232.54													
3		Trace to some gravel				SS	5	100	11							
			231.68													
4		Clay Grey silty clay, trace sand and gravel, soft, WTPL				SS	6	92	3							
			231.02													
5		Firm to stiff				SS	7	67	8							
			230.41													
		End of Borehole Borehole terminated at 5.2 mbgs.														
6																

Contractor: Pontil Drilling

Grade Elevation: 235.59 masl

Drilling Method: Split Spoon / Hollow Stem Auger

Top of Casing Elevation: 235.54 masl

Well Casing Size: 51 mm

Sheet: 1 of 1



Log of Borehole: MW202

Project #: 295667.001

Logged By: BM

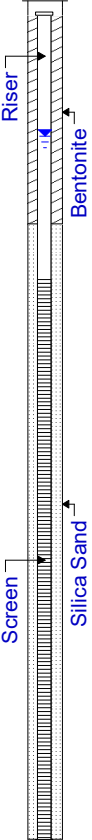
Project: Geotechnical Investigation

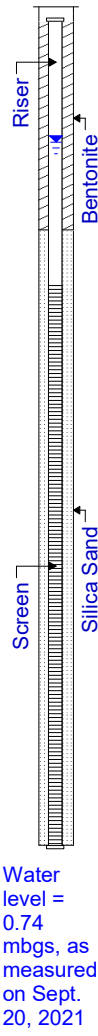
Client: Cassandra Projects Inc.

Location: 125 Ferndale Dr. North and 440 Dunlop St. West, Barrie, Ontario

Drill Date: August 24, 2021

Project Manager: KRD

SUBSURFACE PROFILE					SAMPLE															
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value			Shear Strength		Water Content						
									□	20	40	60	□	△	kPa	△	●	%	●	
															100	200		10	20	
0		Ground Surface	235.48																	
		Asphaltic Concrete (50 mm)			SS	1	58	17												
		Fill Brown sand and gravel, compact, damp	234.72																	
1		Sand Brown sand, trace silt, clay, and and gravel, compact, saturated				SS	2	58	22											
2						SS	3	67	10											
		Loose	233.19																	
					SS	4	24	9												
3			232.43																	
		Clay Grey silty clay, trace sand and gravel, stiff, APL to WTPL			SS	5	75	9												
4					SS	6	100	8												
5			230.30		SS	7	100	11												
		End of Borehole Borehole terminated at 5.2 mbgs.		Water level = 0.74 mbgs, as measured on Sept. 20, 2021																
6																				



Contractor: Pontil Drilling

Grade Elevation: 235.48 masl

Drilling Method: Split Spoon / Hollow Stem Auger

Top of Casing Elevation: 235.39 masl

Well Casing Size: 51 mm

Sheet: 1 of 1



Log of Borehole: MW203

Project #: 295667.001

Logged By: BM

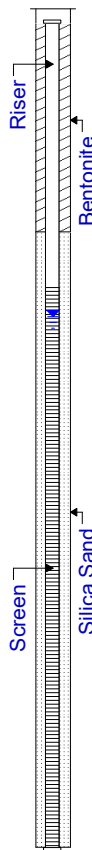
Project: Geotechnical Investigation

Client: Cassandra Projects Inc.

Location: 125 Ferndale Dr. North and 440 Dunlop St. West, Barrie, Ontario

Drill Date: August 24, 2021

Project Manager: KRD

SUBSURFACE PROFILE					SAMPLE										
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value	Shear Strength			Water Content		
									□ 20 40 60 □	△ kPa 100 200 △	● % 10 20 ●				
0		Ground Surface	236.43												
	Fill Brown sand and gravel, compact, moist		235.67		SS	1	8	16							
1		Light brown sand with black staining, some silt, loose			SS	2	33	7							
		Brown to grey with black staining, compact	234.90												
2		Grey sand and gravel, dense, moist	234.14												
3			233.38												
	Sand Brown sand, some silt, compact, saturated		232.62		SS	5	50	20							
4		Clay Grey silty clay, trace sand and gravel, stiff, APL to WTPL													
5			231.25		SS	7	100	12							
		End of Borehole Borehole terminated at 5.2 mbgs.		Water level = 1.68 mbgs, as measured on Sept. 20, 2021											
6															

Contractor: Pontil Drilling

Grade Elevation: 236.43 masl

Drilling Method: Split Spoon / Hollow Stem Auger

Top of Casing Elevation: 236.39 masl

Well Casing Size: 51 mm

Sheet: 1 of 1



Log of Borehole: BH204

Project #: 295667.001

Logged By: BM

Project: Geotechnical Investigation

Client: Cassandra Projects Inc.

Location: 125 Ferndale Dr. North and 440 Dunlop St. West, Barrie, Ontario

Drill Date: August 24, 2021

Project Manager: KRD

SUBSURFACE PROFILE					SAMPLE													
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value				Shear Strength			Water Content		
									□	20	40	60	□	△	kPa	△	●	%
0		Ground Surface	235.57	No Monitoring Well Installed														
		Fill Light brown silty sand (topsoil) Sand and gravel, compact, moist			SS	1	58	12										
		234.81																
1		Very loose			SS	2	46	2										
			234.05															
2		Grey to brown sand, some gravel, wet			SS	3	75	11										
			233.29															
		Sand Brown sand, some gravel, trace silt, compact, wet to saturated			SS	4	100	12										
3			232.22															
		Clay Grey silty clay, trace sand and gravel, stiff, APL			SS	5	100	13										
4			231.00															
		Firm, WTPL			SS	6	71	11										
5			230.39															
		End of Borehole																
6		Borehole terminated at 5.2 mbgs. At drilling completion, the water level was measured at 1.4 mbgs.																

Contractor: Pontil Drilling

Grade Elevation: 235.57 masl

Drilling Method: Split Spoon / Hollow Stem Auger

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1



Log of Borehole: BH205

Project #: 295667.001

Logged By: BM

Project: Geotechnical Investigation

Client: Cassandra Projects Inc.

Location: 125 Ferndale Dr. North and 440 Dunlop St. West, Barrie, Ontario

Drill Date: August 24, 2021

Project Manager: KRD

SUBSURFACE PROFILE					SAMPLE												
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value				Shear Strength		Water Content		
									□	20	40	60	□	△	kPa	△	●
0		Ground Surface	235.41	No Monitoring Well Installed													
		Asphaltic Concrete (50 mm)			SS	1	33	10									
		Fill															
		Brown sand and gravel, compact, moist	234.50														
1		Sand			SS	2	50	27									
		Brown sand, some gravel, compact, damp	233.89														
		Saturated															
2					SS	3	63	15									
					SS	4	25	16									
3			232.36														
		Clay			SS	5	100	14									
		Grey silty clay, trace sand and gravel, stiff, APL	231.60														
		Firm, WTPL			SS	6	100	4									
4																	
5			230.23		SS	7	100	7									
		End of Borehole															
		Borehole terminated at 5.2 mbgs. At drilling completion, a dry cave was measured at 1.0 mbgs.															
6																	

Contractor: Pontil Drilling

Grade Elevation: 235.41 masl

Drilling Method: Split Spoon / Hollow Stem Auger

Top of Casing Elevation: NA

Well Casing Size: NA

Sheet: 1 of 1



Log of Borehole: BH206

Project #: 295667.001

Logged By: BM

Project: Geotechnical Investigation

Client: Cassandra Projects Inc.

Location: 125 Ferndale Dr. North and 440 Dunlop St. West, Barrie, Ontario

Drill Date: August 24, 2021

Project Manager: KRD

SUBSURFACE PROFILE					SAMPLE														
Depth (m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Sample Type	Sampler #	Recovery (%)	SPT N-Value	Standard Penetration N-Value				Shear Strength			Water Content			
									□	20	40	60	□	Δ	kPa	Δ	•	%	•
0		Ground Surface	235.37	No Monitoring Well Installed															
		Fill Dark brown sand, some gravel and rootlets, trace brick fragments, compact, moist	234.61		SS	1	25	12											
1		Sand Brown sand, trace to some gravel and silt, compact, moist	233.44		SS	2	83	21											
			233.08		SS	3	92	16											
2		Clay Grey silty clay, trace sand and gravel, very stiff, APL Stiff	231.56		SS	4	100	10											
					SS	5	92	13											
3					SS	6	100	6											
					SS	7	100	7											
4		Firm, WTPL																	
5			230.19																
		End of Borehole																	
		Borehole terminated at 5.2 mbgs. At drilling completion, the water level was measured at 1.1 mbgs.																	
6																			

Contractor: Pontil Drilling

Grade Elevation: 235.37 masl

Drilling Method: Split Spoon / Hollow Stem Auger

Top of Casing Elevation: NA

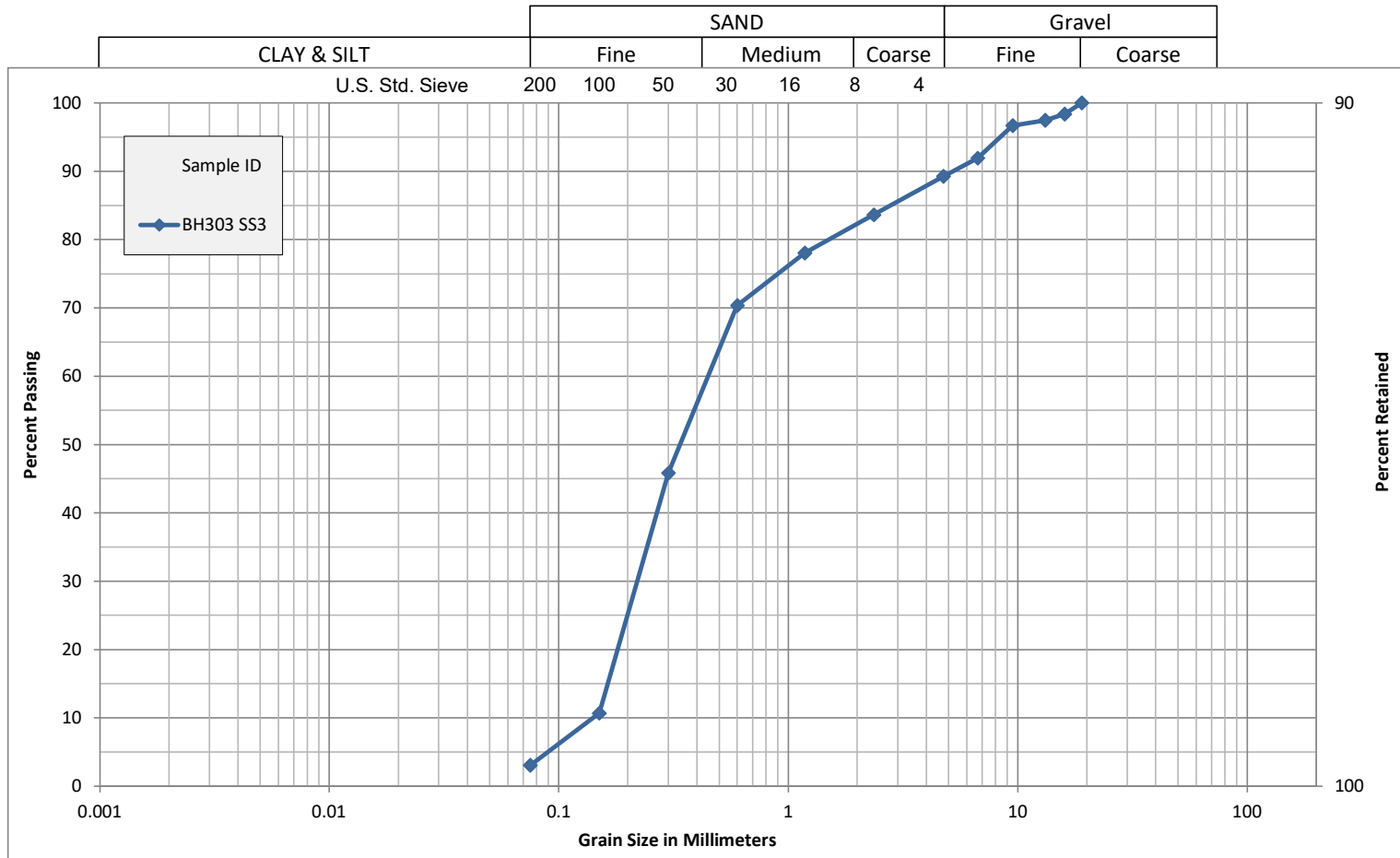
Well Casing Size: NA

Sheet: 1 of 1

APPENDIX IV

Grain Size Distribution Curves

Unified Soil Classification System



Sample ID	Depth (ft)	% Gravel	% Sand	% Silt and Clay
BH303 SS3	5.0-7.0	10.7	86.2	3.1



Pinchin Waterloo - 225 Labrador Drive,
Unit 1, Waterloo, Ontario N2K 4M8

PARTICLE SIZE DISTRIBUTION ANALYSIS

Proposed Hotel Building - 440 Dunlop St West, Barrie, ON
Innisfil Beach Development Inc.

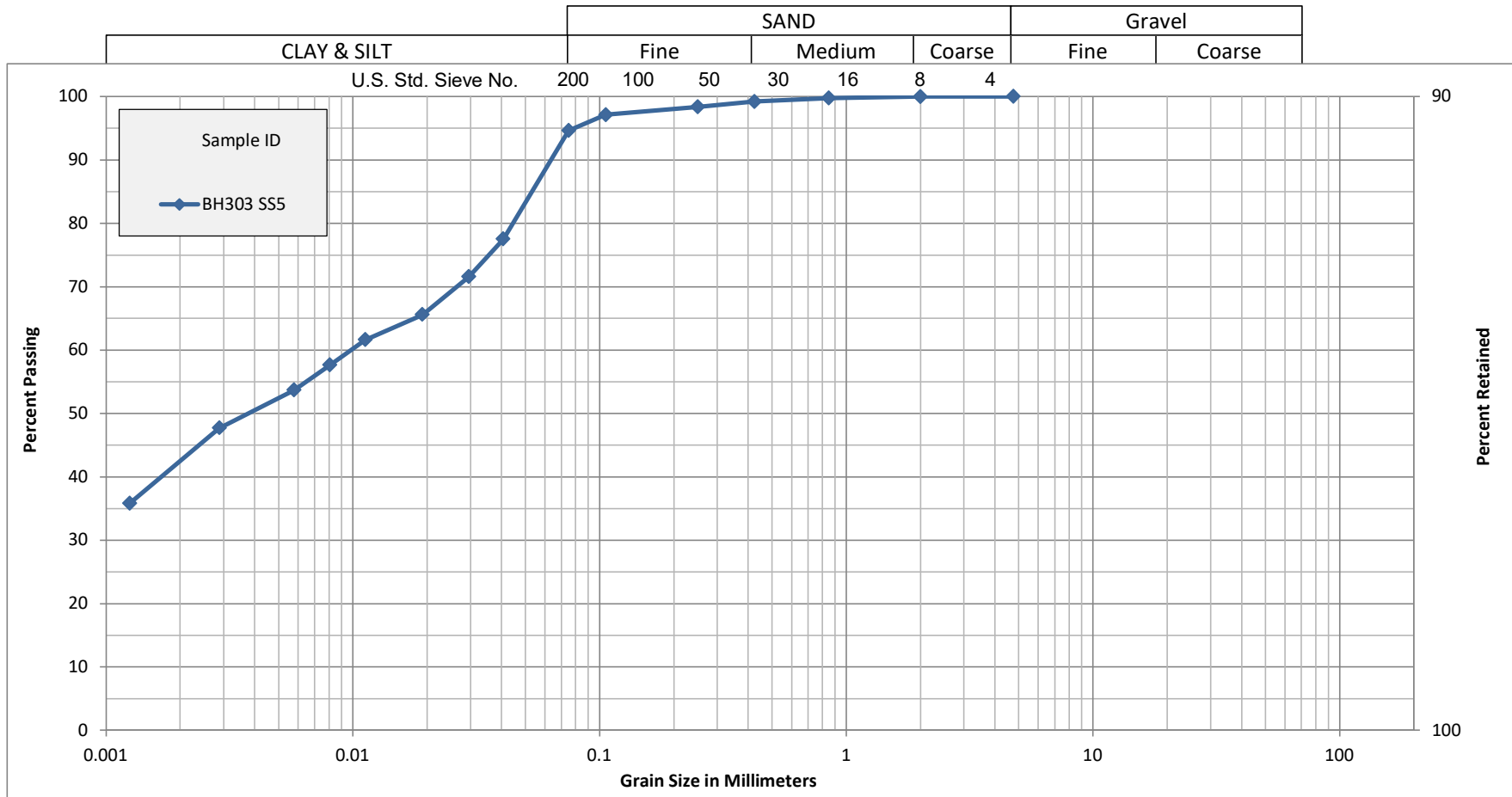
Figure No. 1

295667.007

Reviewed By:

More information available upon request

Unified Soil Classification System



Sample ID	Depth (ft)	% Gravel	% Sand	% Silt	% Clay
BH303 SS5	10.0-12.0	0.0	5.4	53.6	41.0



Pinchin Waterloo - 225 Labrador Drive, Unit 1, Waterloo, Ontario N2K 4M8

PARTICLE SIZE DISTRIBUTION ANALYSIS

Proposed Hotel Building - 440 Dunlop St West, Barrie, ON
Innisfil Beach Development Inc.

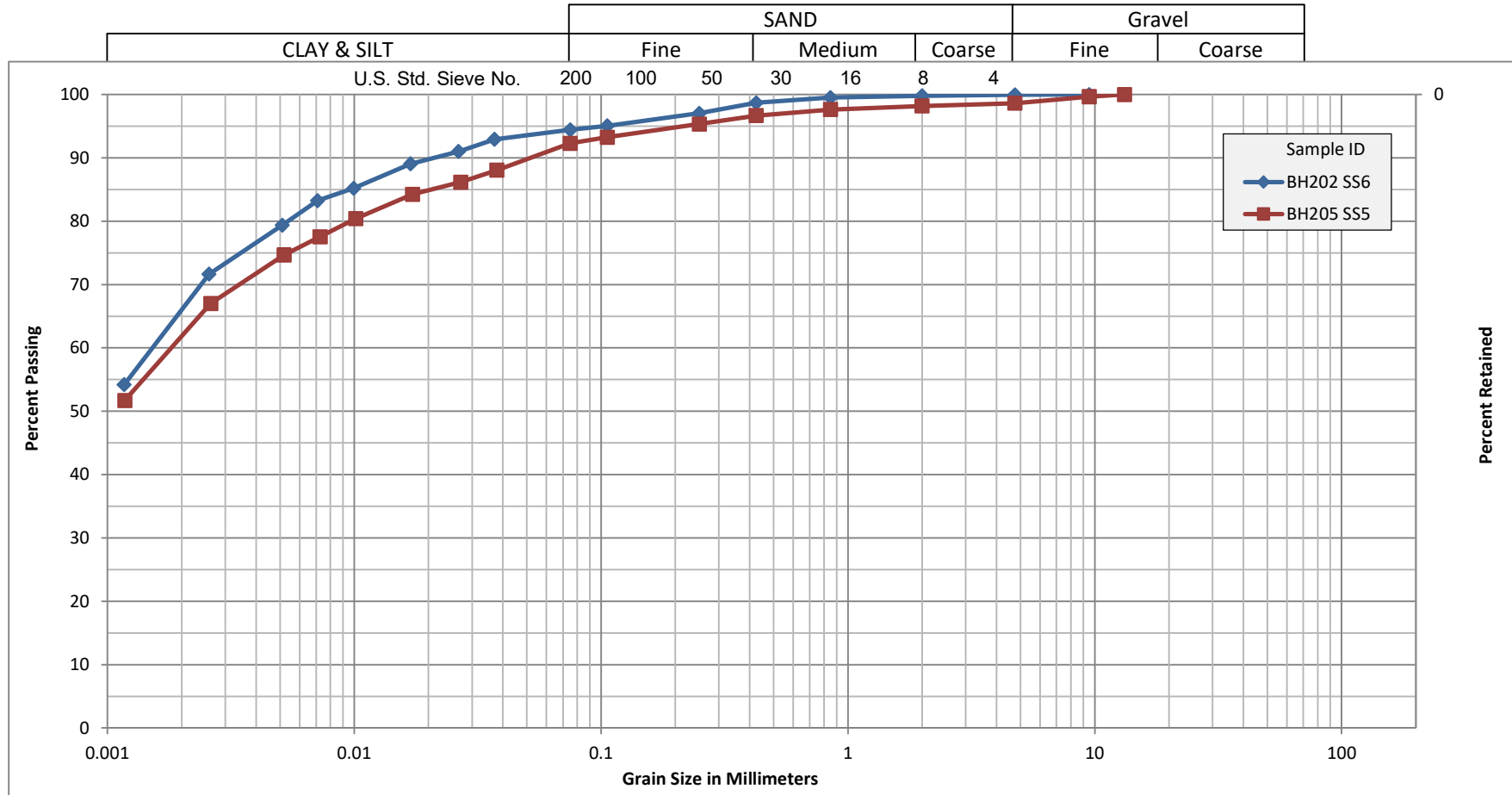
Figure No. 1

295667.007

Reviewed By:

More information available upon request

Unified Soil Classification System



Sample ID	Depth (ft)	% Gravel	% Sand	% Silt	% Clay
BH202 SS6	15.0-17.0	0.0	5.6	30.4	64.0
BH205 SS5	10.0-12.0	1.0	6.7	32.3	60.0



Pinchin Waterloo - 225 Labrador Drive,
Unit 1, Waterloo, Ontario N2K 4M8

PARTICLE SIZE DISTRIBUTION ANALYSIS

Geotech Investigation - 440 Dunlop St W & 125 Ferndale Dr N, Barrie, Ontario
Cassadra Projects Inc.

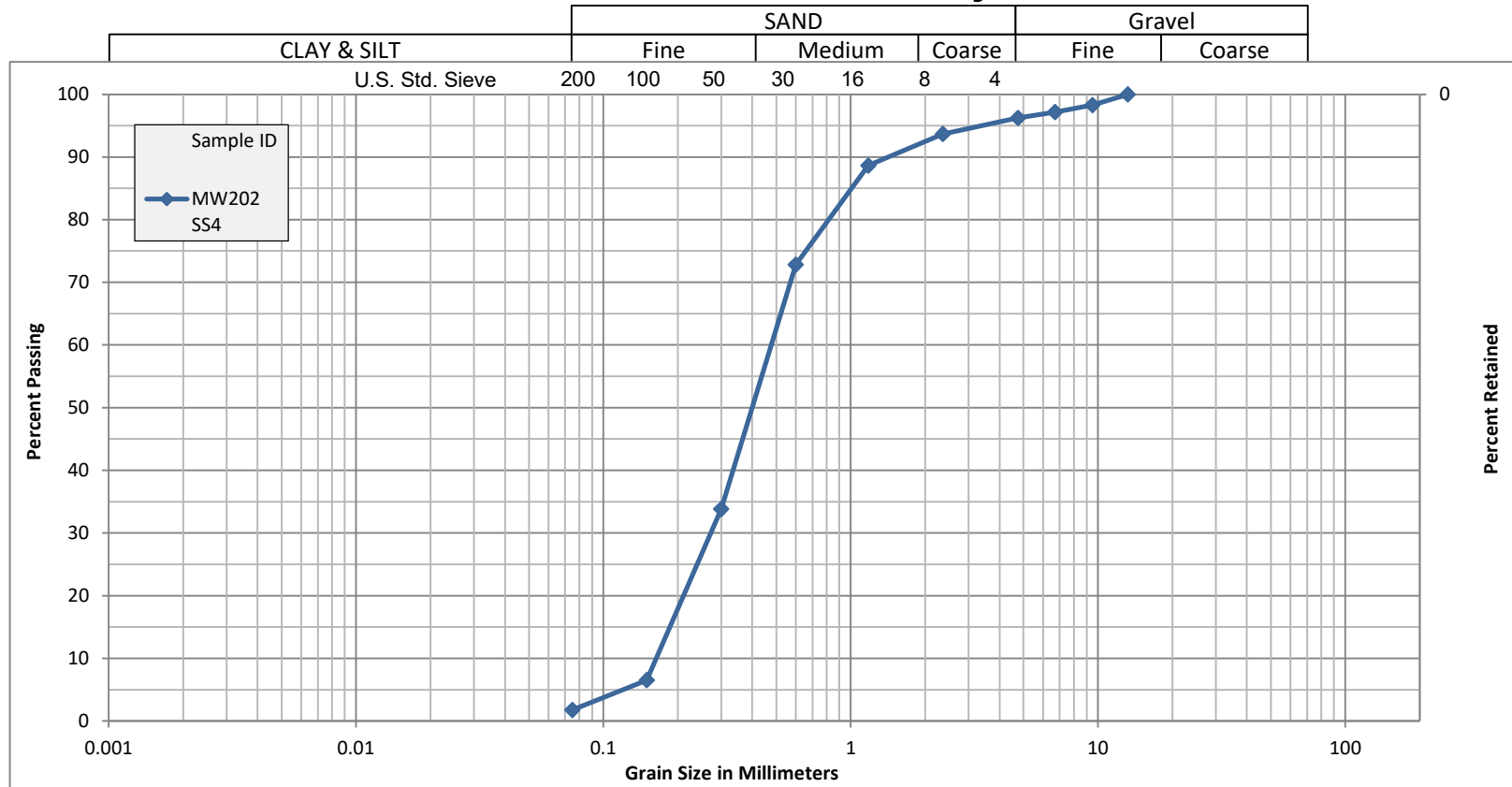
Figure No. 1

295667.001

Reviewed By:

More information available upon request

Unified Soil Classification System



Sample ID	Depth (ft)	% Gravel	% Sand	% Silt and Clay
MW202 SS4	7.5-12.0	3.8	94.5	1.8



Pinchin Waterloo - 225 Labrador Drive,
Unit 1, Waterloo, Ontario N2K 4M8

PARTICLE SIZE DISTRIBUTION ANALYSIS

tech Investigation - 440 Dunlop St W & 125 Ferndale Dr N, Barrie
Cassandra Projects Inc.

Figure No. 1

295667.001

Reviewed By :

More information available upon request

APPENDIX V
Hydraulic Conductivity Test Results

Slug Test: MW301**Project No.: 295667****Project Location: 440 Dunlop Street West, Barrie, Ontario**

Data Source: based on Manual Measurements as per Rising Head Method dated March 31, 2023

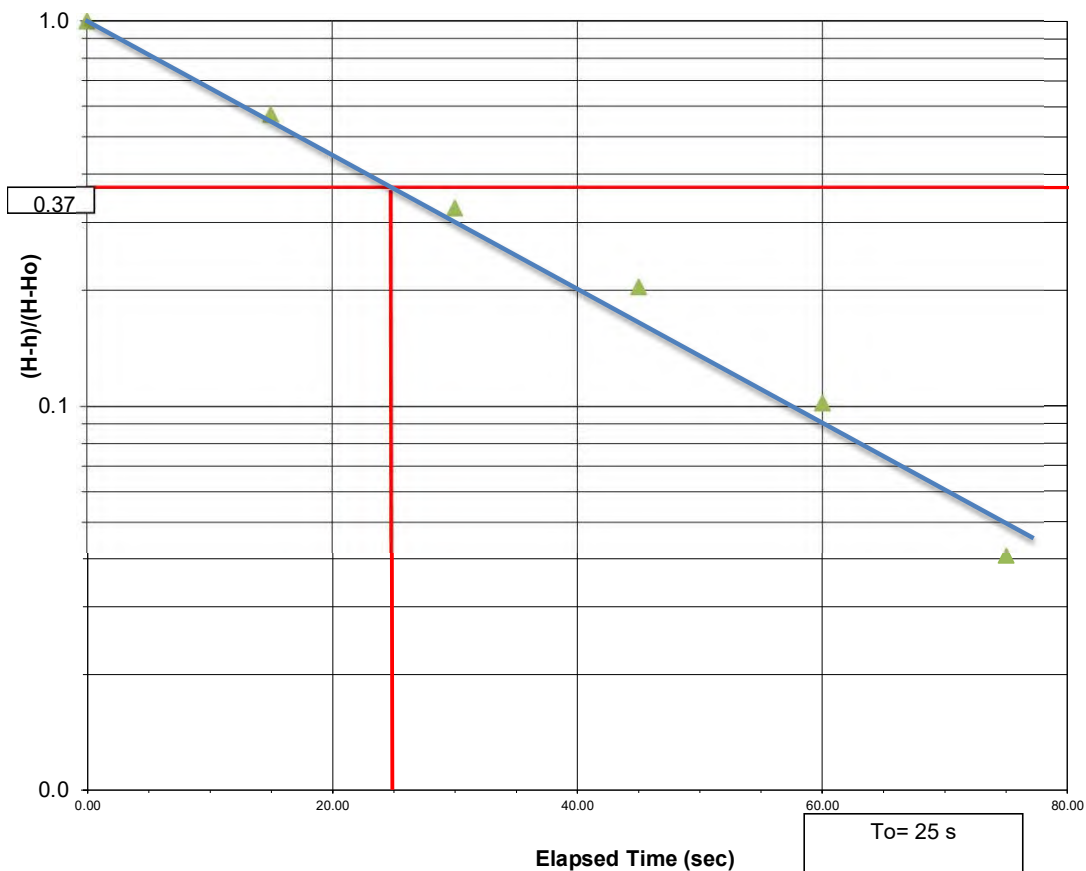
Conducted by: John Perry/Bhoomi

Interpreted by: Bujing Guan $H =$ Initial Water Head prior to testProcessing Date: 4/6/2023 $H_o =$ Water Head at time = 0Screen Depth (mbgs): 1.5 - 4.6 $h =$ Water Head/Level at time t

Screened Soil: Fill (sand); Silty Clay

Well Diameter: 2" $L =$ 305 cmStatic Water Level (mbgs): 0.71 R (6' auger) = 7.62 cmInitial Reading (mTOP) 1.66 $r =$ 2.54 cmTest Start Reading (H_o) (mTOP) 2.15 $T_o =$ 25 secTest End Reading (mTOP) 1.665 $K = r^2 \ln(L/R)/(2LT_o) =$ **1.6E-03** cm/s

Slug Test Result (Hvorslev Method) - MW301
Based on Manual Measurements/Rising Head Method



Slug Test: MW302**Project No.: 295667****Project Location: 440 Dunlop Street West, Barrie, Ontario**

Data Source: based on Manual Measurements as per Rising Head Method dated March 31, 2023

Conducted by: John Perry

Interpreted by: Bujing Guan

H = Initial Water Head prior to test

Processing Date: 4/6/2023

Ho = Water Head at time = 0

Screen Depth (mbgs): 1.5 - 4.6

h = Water Head/Level at time t

Screened Soil: Fill; Silty Clay

Well Diameter: 2"

L = 305 cm

Static Water Level (mbgs): 0.51

R (6' auger) = 7.62 cm

Initial Reading (mTOP) 1.54

r = 2.54 cm

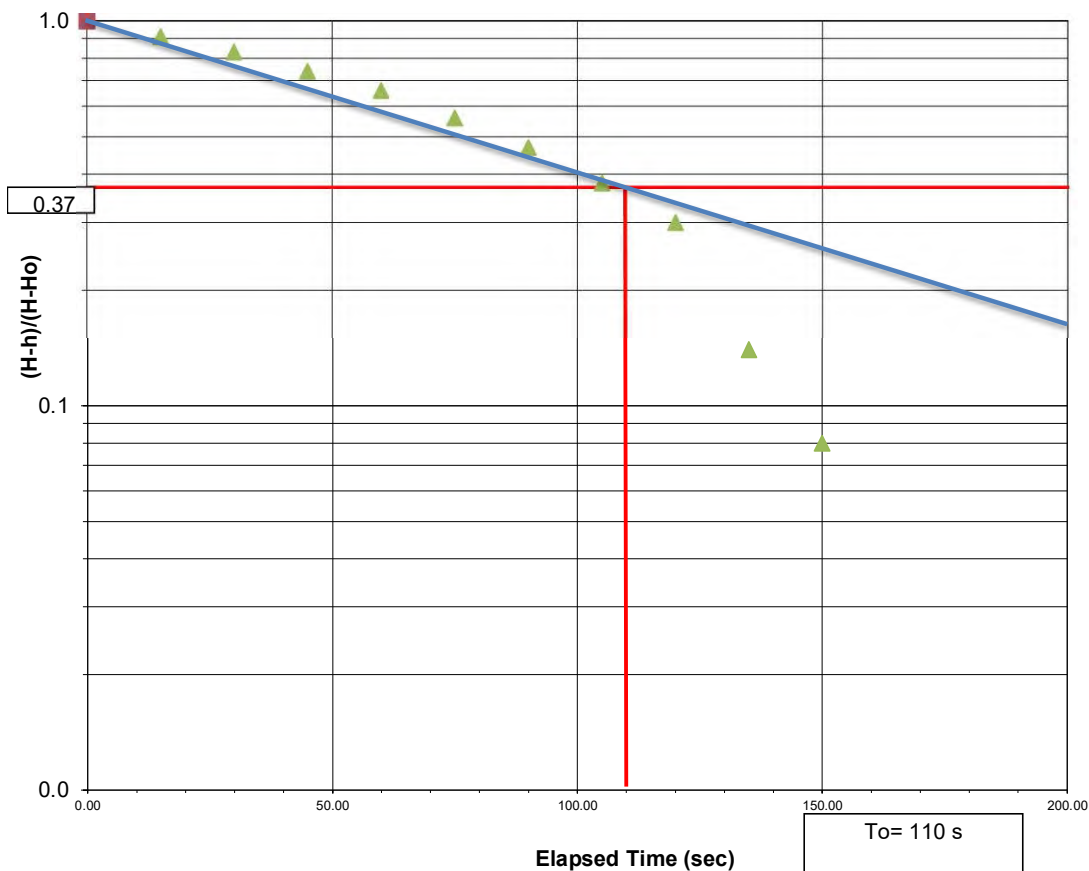
Test Start Reading (Ho) (mTOP) 2.54

To = 110 sec

Test End Reading (mTOP) 1.5

 $K = r^2 \ln(L/R) / (2LTo) = 3.5E-04$ cm/s

Slug Test Result (Hvorslev Method) - MW302
Based on Manual Measurements/Rising Head Method



Slug Test: MW201**Project No.: 295667****Project Location: 440 Dunlop Street West, Barrie, Ontario**

Data Source: based on Manual Measurements as per Rising Head Method dated March 31, 2023

Conducted by: John Perry

Interpreted by: Bujing Guan

H = Initial Water Head prior to test

Processing Date: 4/6/2023

Ho = Water Head at time = 0

Screen Depth (mbgs): 1.5 - 4.6

h = Water Head/Level at time t

Screened Soil: Sand, Silty Clay

Well Diameter: 2"

L = 305 cm

Static Water Level (mbgs): 1.07

R (6' auger) = 7.62 cm

Initial Reading (mTOP) 1.03

r = 2.54 cm

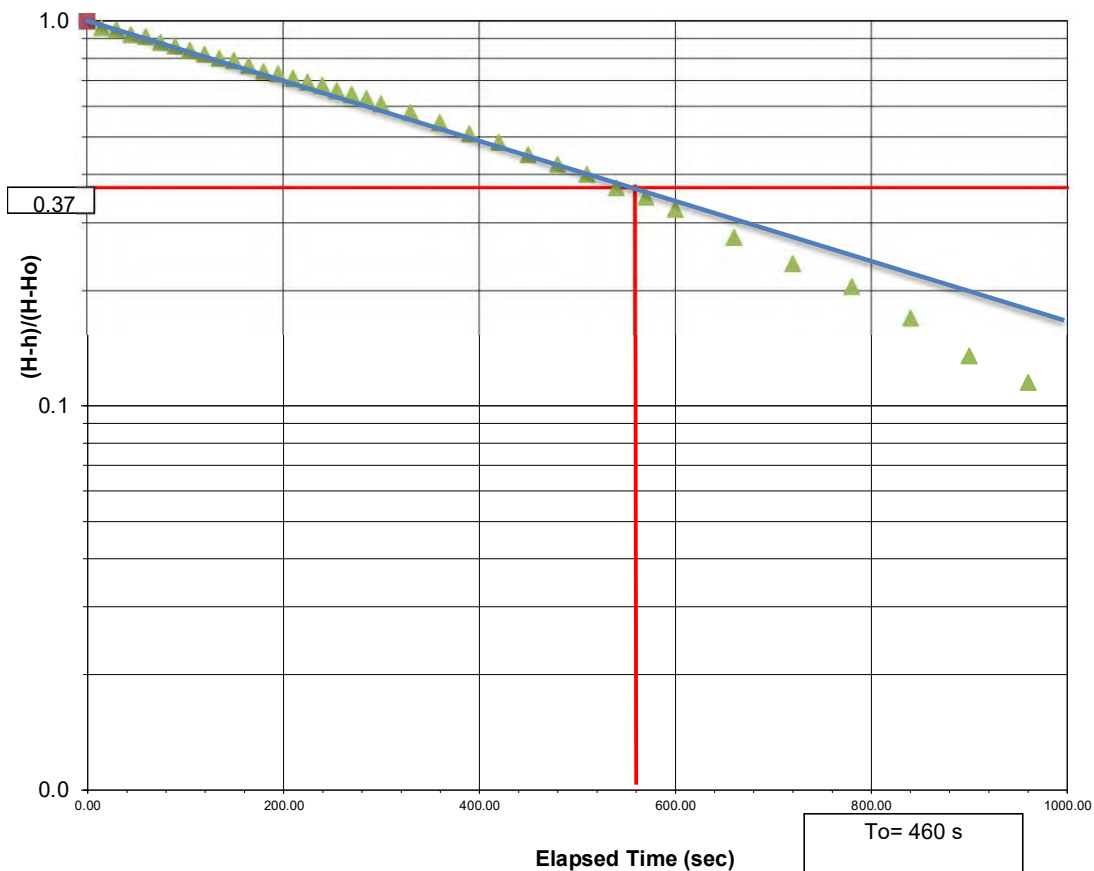
Test Start Reading (Ho) (mbgs) 2.07

To = 460 sec

Test End Reading (mbgs) 1.07

 $K = r^2 \ln(L/R) / (2LT_o) = 8.5E-05$ cm/s

Slug Test Result (Hvorslev Method) - MW201
Based on Manual Measurements/Rising Head Method



Slug Test: MW202**Project No.: 295667****Project Location: 440 Dunlop Street West, Barrie, Ontario**

Data Source: based on Manual Measurements as per Rising Head Method dated March 31, 2023

Conducted by: John Perry

Interpreted by: Bujing Guan

H = Initial Water Head prior to test

Processing Date: 4/6/2023

Ho = Water Head at time = 0

Screen Depth (mbgs): 1.5 - 4.6

h = Water Head/Level at time t

Screened Soil: Sand; Silty Clay

Well Diameter: 2"

L = 305 cm

Static Water Level (mbgs): 0.30

R (6' auger) = 7.62 cm

Initial Reading (mTOP) 0.19

r = 2.54 cm

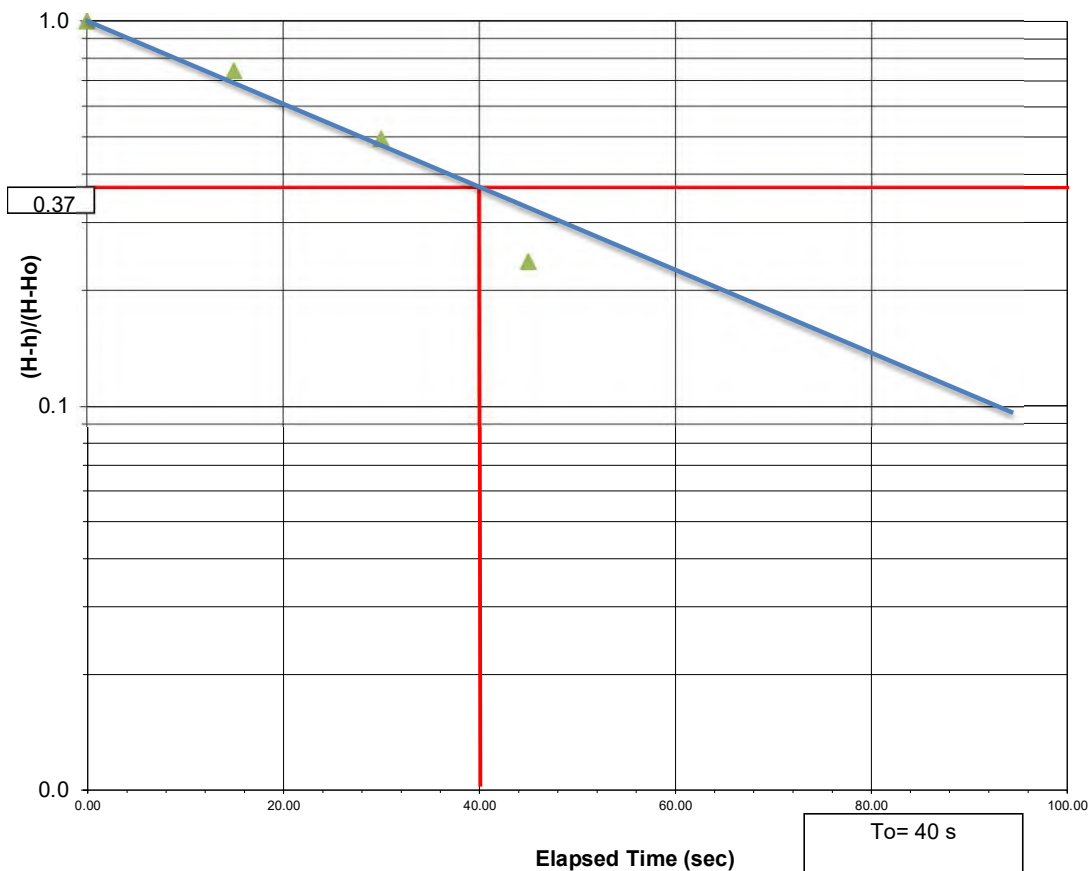
Test Start Reading (Ho) (mbgs) 1.31

To = 40 sec

Test End Reading (mbgs) 0.3

 $K = r^2 \ln(L/R) / (2LT_o) = 9.8E-04$ cm/s

Slug Test Result (Hvorslev Method) - MW202
Based on Manual Measurements/Rising Head Method



Slug Test: MW203**Project No.: 295667****Project Location: 440 Dunlop Street West, Barrie, Ontario**

Data Source: based on Manual Measurements as per Rising Head Method dated March 31, 2023

Conducted by: John Perry

Interpreted by: Bujing Guan

H = Initial Water Head prior to test

Processing Date: 4/6/2023

Ho = Water Head at time = 0

Screen Depth (mbgs): 1.5 - 4.6

h = Water Head/Level at time t

Screened Soil: Fill, Sand, Silty Clay

Well Diameter: 2"

L = 305 cm

Static Water Level (mbgs): 1.25

R (6' auger) = 7.62 cm

Initial Reading (mTOP) 1.20

r = 2.54 cm

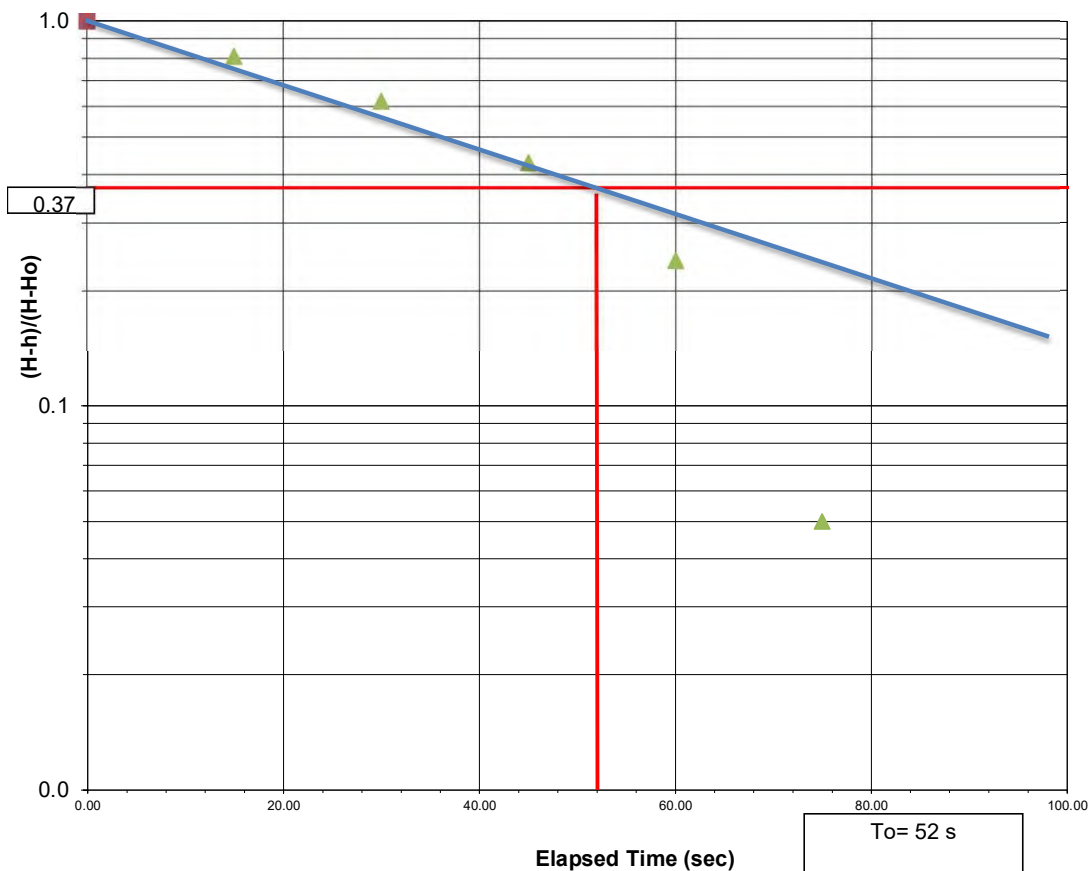
Test Start Reading (Ho) (mbgs) 2.25

To = 52 sec

Test End Reading (mbgs) 1.25

 $K = r^2 \ln(L/R) / (2LTo) = 7.5E-04$ cm/s

Slug Test Result (Hvorslev Method) - MW203
Based on Manual Measurements/Rising Head Method



APPENDIX VI
Laboratory Certificate of Analysis



Your Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Your C.O.C. #: 929029-01-01

Attention: Bujing Guan

Pinchin Ltd
680 Bayview Drive
Unit 5
Barrie, ON
CANADA L4N 9A6

Report Date: 2023/05/10
Report #: R7623354
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3A2766

Received: 2023/04/13, 08:50

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Biochemical Oxygen Demand (BOD)	1	2023/04/14	2023/04/19	CAM SOP-00427	SM 23 5210B m
Chloride by Automated Colourimetry	1	N/A	2023/04/17	CAM SOP-00463	SM 23 4500-Cl E m
Chemical Oxygen Demand	1	N/A	2023/04/14	CAM SOP-00416	SM 23 5220 D m
Total Cyanide	1	2023/04/14	2023/04/14	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2023/04/13	2023/04/14	CAM SOP-00449	SM 23 4500-F C m
Mercury in Water by CVAA	1	2023/04/14	2023/04/14	CAM SOP-00453	EPA 7470A m
Lab Filtered Metals by ICPMS	1	2023/05/09	2023/05/10	CAM SOP-00447	EPA 6020B m
Total Extractable Lanthanides-waters (1, 3)	1	2023/04/18	2023/04/18	STL SOP-00071	MA.200-Mét. 1.2 R5 m
Elements by ICPMS Low Level (total) (2)	1	2023/04/18	2023/04/20	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Animal and Vegetable Oil and Grease	1	N/A	2023/04/19	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2023/04/18	2023/04/19	CAM SOP-00326	EPA1664B m,SM5520B m
OC Pesticides (Selected) & PCB (4)	1	2023/04/17	2023/04/18	CAM SOP-00307	EPA 8081B/ 8082A
PAH Compounds in Water by GC/MS (SIM)	1	2023/04/16	2023/04/17	CAM SOP-00318	EPA 8270E
pH	1	2023/04/13	2023/04/14	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/04/13	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	1	N/A	2023/04/17	CAM SOP-00464	SM 23 4500-SO42- E m
Sulphide	1	N/A	2023/04/17	CAM SOP-00455	SM 23 4500-S G m
Total Kjeldahl Nitrogen in Water	1	2023/04/14	2023/04/18	CAM SOP-00938	OMOE E3516 m
Total PAHs: Barrie/Mississauga Sewer Use (5)	1	N/A	2023/04/18	CAM SOP - 00301	
Mineral/Synthetic O & G (TPH Heavy Oil) (6)	1	2023/04/18	2023/04/19	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2023/04/18	2023/04/18	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2023/04/17	CAM SOP-00228	EPA 8260D

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are



Your Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Your C.O.C. #: 929029-01-01

Attention: Bujing Guan

Pinchin Ltd
680 Bayview Drive
Unit 5
Barrie, ON
CANADA L4N 9A6

Report Date: 2023/05/10
Report #: R7623354
Version: 4 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C3A2766

Received: 2023/04/13, 08:50

reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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) This test was performed by Bureau Veritas Montreal., 889 Montée de Liesse, Ville St-Laurent, QC, H4T 1P5

(2) This test was performed by Bureau Veritas Burnaby, 4606 Canada Way, Burnaby, BC, V5G 1K5

(3) Non-accredited test method

(4) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane

(5) Total PAHs include only those PAHs specified in the sewer use by-law.

(6) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:

Antonella Brasil, Senior Project Manager

Email: Antonella.Brasil@bureauveritas.com

Phone# (905)817-5817

=====

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

BUREAU
VERITAS

Bureau Veritas Job #: C3A2766
Report Date: 2023/05/10

Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

BARRIE SAN. SEWER INCL. RH (2021-002)

Bureau Veritas ID				VNO449			
Sampling Date				2023/04/12 12:00			
COC Number				929029-01-01			
	UNITS	Criteria	Criteria-2	MW 302	MDL	QC Batch	RDL
Total Animal/Vegetable Oil and Grease	mg/L	150	-	<0.50	0.10	8605106	0.50
Total BOD	mg/L	300	15	<2	0.4	8607405	2
Total Chemical Oxygen Demand (COD)	mg/L	600	-	22	3.6	8608158	4.0
Fluoride (F-)	mg/L	10	-	<0.10	0.020	8607106	0.10
Total Kjeldahl Nitrogen (TKN)	mg/L	100	-	1.3	0.12	8608175	0.10
pH	pH	6.0-9.5	6.0-9.5	7.67	N/A	8607104	N/A
Phenols-4AAP	mg/L	0.1	-	0.0049	0.00030	8606952	0.0010
Total Suspended Solids	mg/L	350	15	33	2.0	8613330	10
Dissolved Sulphate (SO ₄)	mg/L	1500	-	18	0.10	8608483	1.0
Sulphide	mg/L	1	-	0.033	0.010	8609108	0.020
Total Cyanide (CN)	mg/L	1.2	-	<0.0050	0.00010	8607526	0.0050
Dissolved Chloride (Cl-)	mg/L	1500	-	330	1.5	8608480	1.0
Total Aluminum (Al)	ug/L	50000	-	30300	N/A	8620422	3.0
Total Antimony (Sb)	ug/L	5000	-	0.15	N/A	8620422	0.020
Total Arsenic (As)	ug/L	1000	-	7.57	N/A	8620422	0.020
Total Barium (Ba)	ug/L	5000	-	531	N/A	8620422	0.020
Total Bismuth (Bi)	ug/L	5000	-	0.149	N/A	8620422	0.0050
Total Cadmium (Cd)	ug/L	700	1	0.408	N/A	8620422	0.0050
Total Chromium (Cr)	ug/L	2000	80	46.8	N/A	8620422	0.10
Total Cobalt (Co)	ug/L	5000	-	20.7	N/A	8620422	0.010
Total Copper (Cu)	ug/L	2000	10	70.8	N/A	8620422	0.10
Total Iron (Fe)	ug/L	50000	-	53700	N/A	8620422	5.0
Total Lead (Pb)	ug/L	700	50	29.1	N/A	8620422	0.020
Total Manganese (Mn)	ug/L	5000	-	1460	N/A	8620422	0.10
Total Molybdenum (Mo)	ug/L	5000	-	0.88	N/A	8620422	0.050
Total Nickel (Ni)	ug/L	2000	50	44.7	N/A	8620422	0.10
Total Phosphorus (P)	ug/L	10000	-	2090	25	8620422	5.0
Total Selenium (Se)	ug/L	1000	-	1.82	N/A	8620422	0.040
Total Silver (Ag)	ug/L	400	-	0.121	N/A	8620422	0.010
Total Tin (Sn)	ug/L	5000	-	1.4	N/A	8620422	0.20
Total Vanadium (V)	ug/L	5000	-	77.4	N/A	8620422	0.20
Total Zinc (Zn)	ug/L	2000	40	125	N/A	8620422	1.0
Total Rhodium (Rh)	ug/L	5000	-	<0.50	N/A	8618613	0.50
QC Batch = Quality Control Batch							
Criteria: The City of Barrie Discharges to Sanitary Sewers By Law 2021-002							
Criteria-2: The City of Barrie Discharges to Storm Sewers By Law 2021-002							
N/A = Not Applicable							

BUREAU
VERITAS

Bureau Veritas Job #: C3A2766
Report Date: 2023/05/10

Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

BARRIE SAN. SEWER INCL. RH (2021-002)

Bureau Veritas ID				VNO449			
Sampling Date				2023/04/12 12:00			
COC Number				929029-01-01			
	UNITS	Criteria	Criteria-2	MW 302	MDL	QC Batch	RDL
Total Gold (Au)	ug/L	5000	-	<0.50	N/A	8620422	0.10
Total Platinum (Pt)	ug/L	5000	-	<0.50	N/A	8620422	0.10
Total Oil & Grease	mg/L	-	-	0.90	0.10	8614788	0.50
Total Oil & Grease Mineral/Synthetic	mg/L	15	-	0.50	0.10	8614790	0.50
Mercury (Hg)	mg/L	0.01	-	<0.00010	0.000050	8607896	0.00010
Total PAHs	ug/L	5	-	<0.20	N/A	8605671	2.0
Acenaphthene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Acenaphthylene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Anthracene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Benzo(a)anthracene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Benzo(a)pyrene	ug/L	-	-	<0.0090	0.0030	8610700	0.0090
Benzo(b/j)fluoranthene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Benzo(g,h,i)perylene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Benzo(k)fluoranthene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Chrysene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Dibenzo(a,h)anthracene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Fluoranthene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Fluorene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Indeno(1,2,3-cd)pyrene	ug/L	-	-	<0.050	0.0030	8610700	0.050
1-Methylnaphthalene	ug/L	-	-	<0.050	0.0030	8610700	0.050
2-Methylnaphthalene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Naphthalene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Phenanthrene	ug/L	-	-	<0.030	0.0030	8610700	0.030
Pyrene	ug/L	-	-	<0.050	0.0030	8610700	0.050
Benzene	ug/L	10	-	<0.20	0.020	8607736	0.20
1,2-Dichlorobenzene	ug/L	50	-	<0.40	0.050	8607736	0.40
1,4-Dichlorobenzene	ug/L	80	-	<0.40	0.050	8607736	0.40
Ethylbenzene	ug/L	60	-	<0.20	0.010	8607736	0.20
Methylene Chloride(Dichloromethane)	ug/L	90	-	<2.0	0.10	8607736	2.0
1,1,2,2-Tetrachloroethane	ug/L	60	-	<0.40	0.050	8607736	0.40
Tetrachloroethylene	ug/L	60	-	<0.20	0.050	8607736	0.20
Toluene	ug/L	20	-	0.38	0.010	8607736	0.20
Trichloroethylene	ug/L	50	-	<0.20	0.050	8607736	0.20
QC Batch = Quality Control Batch							
Criteria: The City of Barrie Discharges to Sanitary Sewers By Law 2021-002							
Criteria-2: The City of Barrie Discharges to Storm Sewers By Law 2021-002							
N/A = Not Applicable							

BUREAU
VERITAS

Bureau Veritas Job #: C3A2766

Report Date: 2023/05/10

Pinchin Ltd

Client Project #: 295667.007

Site Location: 440 Dunlop St. W., Barrie

Sampler Initials: BG

BARRIE SAN. SEWER INCL. RH (2021-002)

Bureau Veritas ID				VNO449			
Sampling Date				2023/04/12 12:00			
COC Number				929029-01-01			
	UNITS	Criteria	Criteria-2	MW 302	MDL	QC Batch	RDL
p+m-Xylene	ug/L	-	-	0.22	0.010	8607736	0.20
o-Xylene	ug/L	-	-	<0.20	0.010	8607736	0.20
Total Xylenes	ug/L	300	-	0.22	0.010	8607736	0.20
Hexachlorobenzene	ug/L	0.1	-	<0.005	0.001	8611006	0.005
Surrogate Recovery (%)							
2,4,5,6-Tetrachloro-m-xylene	%	-	-	74	N/A	8611006	N/A
Decachlorobiphenyl	%	-	-	99	N/A	8611006	N/A
D10-Anthracene	%	-	-	105	N/A	8610700	N/A
D14-Terphenyl (FS)	%	-	-	84	N/A	8610700	N/A
D8-Acenaphthylene	%	-	-	102	N/A	8610700	N/A
4-Bromofluorobenzene	%	-	-	98	N/A	8607736	N/A
D4-1,2-Dichloroethane	%	-	-	114	N/A	8607736	N/A
D8-Toluene	%	-	-	89	N/A	8607736	N/A
QC Batch = Quality Control Batch							
Criteria: The City of Barrie Discharges to Sanitary Sewers By Law 2021-002							
Criteria-2: The City of Barrie Discharges to Storm Sewers By Law 2021-002							
N/A = Not Applicable							



BUREAU
VERITAS

Bureau Veritas Job #: C3A2766
Report Date: 2023/05/10

Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID				VNO449			
Sampling Date				2023/04/12 12:00			
COC Number				929029-01-01			
	UNITS	Criteria	Criteria-2	MW 302	MDL	QC Batch	RDL
Dissolved Copper (Cu)	ug/L	2000	10	6.6	0.90	8654315	0.90
Dissolved Iron (Fe)	ug/L	50000	-	<100	N/A	8654315	100
Dissolved Zinc (Zn)	ug/L	2000	40	<5.0	N/A	8654315	5.0
QC Batch = Quality Control Batch Criteria: The City of Barrie Discharges to Sanitary Sewers By Law 2021-002 Criteria-2: The City of Barrie Discharges to Storm Sewers By Law 2021-002 N/A = Not Applicable							



BUREAU
VERITAS

Bureau Veritas Job #: C3A2766
Report Date: 2023/05/10

Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

GENERAL COMMENTS

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

Package 1	2.7°C
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Revised Report (2023/05/10): Dissolved Fe, Cu and Zn included as per client request.

Results relate only to the items tested.

BUREAU
VERITASBureau Veritas Job #: C3A2766
Report Date: 2023/05/10Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8606952	MKX	Matrix Spike	Phenols-4AAP	2023/04/13		99	%	80 - 120
8606952	MKX	Spiked Blank	Phenols-4AAP	2023/04/13		99	%	80 - 120
8606952	MKX	Method Blank	Phenols-4AAP	2023/04/13	<0.0010		mg/L	
8606952	MKX	RPD	Phenols-4AAP	2023/04/13	NC		%	20
8607104	KIT	Spiked Blank	pH	2023/04/14		102	%	98 - 103
8607104	KIT	RPD	pH	2023/04/14	1.9		%	N/A
8607106	KIT	Matrix Spike	Fluoride (F-)	2023/04/14		101	%	80 - 120
8607106	KIT	Spiked Blank	Fluoride (F-)	2023/04/14		101	%	80 - 120
8607106	KIT	Method Blank	Fluoride (F-)	2023/04/14	<0.10		mg/L	
8607106	KIT	RPD	Fluoride (F-)	2023/04/14	0.47		%	20
8607405	NNA	QC Standard	Total BOD	2023/04/19		93	%	80 - 120
8607405	NNA	Method Blank	Total BOD	2023/04/19	<2		mg/L	
8607405	NNA	RPD	Total BOD	2023/04/19	11		%	30
8607526	KJP	Matrix Spike	Total Cyanide (CN)	2023/04/14		NC	%	80 - 120
8607526	KJP	Spiked Blank	Total Cyanide (CN)	2023/04/14		103	%	80 - 120
8607526	KJP	Method Blank	Total Cyanide (CN)	2023/04/14	<0.0050		mg/L	
8607526	KJP	RPD	Total Cyanide (CN)	2023/04/14	4.6		%	20
8607736	SCG	Matrix Spike	4-Bromofluorobenzene	2023/04/17		99	%	70 - 130
			D4-1,2-Dichloroethane	2023/04/17		107	%	70 - 130
			D8-Toluene	2023/04/17		104	%	70 - 130
			Benzene	2023/04/17		95	%	70 - 130
			1,2-Dichlorobenzene	2023/04/17		94	%	70 - 130
			1,4-Dichlorobenzene	2023/04/17		112	%	70 - 130
			Ethylbenzene	2023/04/17		94	%	70 - 130
			Methylene Chloride(Dichloromethane)	2023/04/17		102	%	70 - 130
			1,1,2,2-Tetrachloroethane	2023/04/17		103	%	70 - 130
			Tetrachloroethylene	2023/04/17		87	%	70 - 130
			Toluene	2023/04/17		90	%	70 - 130
			Trichloroethylene	2023/04/17		98	%	70 - 130
			p+m-Xylene	2023/04/17		110	%	70 - 130
			o-Xylene	2023/04/17		88	%	70 - 130
8607736	SCG	Spiked Blank	4-Bromofluorobenzene	2023/04/17		100	%	70 - 130
			D4-1,2-Dichloroethane	2023/04/17		105	%	70 - 130
			D8-Toluene	2023/04/17		106	%	70 - 130
			Benzene	2023/04/17		86	%	70 - 130
			1,2-Dichlorobenzene	2023/04/17		88	%	70 - 130
			1,4-Dichlorobenzene	2023/04/17		104	%	70 - 130
			Ethylbenzene	2023/04/17		81	%	70 - 130
			Methylene Chloride(Dichloromethane)	2023/04/17		94	%	70 - 130
			1,1,2,2-Tetrachloroethane	2023/04/17		99	%	70 - 130
			Tetrachloroethylene	2023/04/17		80	%	70 - 130
			Toluene	2023/04/17		83	%	70 - 130
			Trichloroethylene	2023/04/17		89	%	70 - 130
			p+m-Xylene	2023/04/17		87	%	70 - 130
			o-Xylene	2023/04/17		84	%	70 - 130
8607736	SCG	Method Blank	4-Bromofluorobenzene	2023/04/17		102	%	70 - 130
			D4-1,2-Dichloroethane	2023/04/17		113	%	70 - 130
			D8-Toluene	2023/04/17		90	%	70 - 130
			Benzene	2023/04/17	<0.20		ug/L	
			1,2-Dichlorobenzene	2023/04/17	<0.40		ug/L	
			1,4-Dichlorobenzene	2023/04/17	<0.40		ug/L	

BUREAU
VERITASBureau Veritas Job #: C3A2766
Report Date: 2023/05/10Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8607736	SCG	RPD	Ethylbenzene	2023/04/17	<0.20		ug/L	
			Methylene Chloride(Dichloromethane)	2023/04/17	<2.0		ug/L	
			1,1,2,2-Tetrachloroethane	2023/04/17	<0.40		ug/L	
			Tetrachloroethylene	2023/04/17	<0.20		ug/L	
			Toluene	2023/04/17	<0.20		ug/L	
			Trichloroethylene	2023/04/17	<0.20		ug/L	
			p+m-Xylene	2023/04/17	<0.20		ug/L	
			o-Xylene	2023/04/17	<0.20		ug/L	
			Total Xylenes	2023/04/17	<0.20		ug/L	
			Benzene	2023/04/17	NC		%	30
			1,2-Dichlorobenzene	2023/04/17	NC		%	30
			1,4-Dichlorobenzene	2023/04/17	NC		%	30
			Ethylbenzene	2023/04/17	1.1		%	30
			Methylene Chloride(Dichloromethane)	2023/04/17	NC		%	30
			1,1,2,2-Tetrachloroethane	2023/04/17	NC		%	30
			Tetrachloroethylene	2023/04/17	NC		%	30
			Toluene	2023/04/17	NC		%	30
			Trichloroethylene	2023/04/17	NC		%	30
			p+m-Xylene	2023/04/17	0.62		%	30
			o-Xylene	2023/04/17	1.6		%	30
			Total Xylenes	2023/04/17	0.48		%	30
8607896	TLG	Matrix Spike	Mercury (Hg)	2023/04/14		103	%	75 - 125
8607896	TLG	Spiked Blank	Mercury (Hg)	2023/04/14		103	%	80 - 120
8607896	TLG	Method Blank	Mercury (Hg)	2023/04/14	<0.00010		mg/L	
8607896	TLG	RPD	Mercury (Hg)	2023/04/14	NC		%	20
			Mercury (Hg)	2023/04/14	NC		%	20
			Mercury (Hg)	2023/04/14	NC		%	20
			Mercury (Hg)	2023/04/14	NC		%	20
8608158	NS3	Matrix Spike	Total Chemical Oxygen Demand (COD)	2023/04/14		88	%	80 - 120
8608158	NS3	Spiked Blank	Total Chemical Oxygen Demand (COD)	2023/04/14		100	%	80 - 120
8608158	NS3	Method Blank	Total Chemical Oxygen Demand (COD)	2023/04/14	<4.0		mg/L	
8608158	NS3	RPD	Total Chemical Oxygen Demand (COD)	2023/04/14	7.3		%	20
8608175	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2023/04/17		NC	%	80 - 120
8608175	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2023/04/17		104	%	80 - 120
8608175	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2023/04/17		100	%	80 - 120
8608175	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2023/04/17	<0.10		mg/L	
8608175	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2023/04/17	7.1		%	20
8608480	ADB	Matrix Spike	Dissolved Chloride (Cl-)	2023/04/17		99	%	80 - 120
8608480	ADB	Spiked Blank	Dissolved Chloride (Cl-)	2023/04/17		97	%	80 - 120
8608480	ADB	Method Blank	Dissolved Chloride (Cl-)	2023/04/17	<1.0		mg/L	
8608480	ADB	RPD	Dissolved Chloride (Cl-)	2023/04/17	NC		%	20
8608483	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2023/04/17		100	%	75 - 125
8608483	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2023/04/17		100	%	80 - 120
8608483	ADB	Method Blank	Dissolved Sulphate (SO4)	2023/04/17	<1.0		mg/L	
8608483	ADB	RPD	Dissolved Sulphate (SO4)	2023/04/17	NC		%	20
8609108	TAK	Matrix Spike	Sulphide	2023/04/17		93	%	80 - 120
8609108	TAK	Spiked Blank	Sulphide	2023/04/17		100	%	80 - 120
8609108	TAK	Method Blank	Sulphide	2023/04/17	<0.020		mg/L	
8609108	TAK	RPD	Sulphide	2023/04/17	NC		%	20
8610700	MKS	Spiked Blank	D10-Anthracene	2023/04/17		108	%	50 - 130
			D14-Terphenyl (FS)	2023/04/17		109	%	50 - 130

BUREAU
VERITASBureau Veritas Job #: C3A2766
Report Date: 2023/05/10Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8610700	MKS	RPD	D8-Acenaphthylene	2023/04/17		103	%	50 - 130
			Acenaphthene	2023/04/17		98	%	50 - 130
			Acenaphthylene	2023/04/17		95	%	50 - 130
			Anthracene	2023/04/17		104	%	50 - 130
			Benzo(a)anthracene	2023/04/17		107	%	50 - 130
			Benzo(a)pyrene	2023/04/17		104	%	50 - 130
			Benzo(b/j)fluoranthene	2023/04/17		108	%	50 - 130
			Benzo(g,h,i)perylene	2023/04/17		114	%	50 - 130
			Benzo(k)fluoranthene	2023/04/17		110	%	50 - 130
			Chrysene	2023/04/17		107	%	50 - 130
			Dibenzo(a,h)anthracene	2023/04/17		105	%	50 - 130
			Fluoranthene	2023/04/17		112	%	50 - 130
			Fluorene	2023/04/17		102	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2023/04/17		108	%	50 - 130
			1-Methylnaphthalene	2023/04/17		93	%	50 - 130
			2-Methylnaphthalene	2023/04/17		84	%	50 - 130
			Naphthalene	2023/04/17		80	%	50 - 130
			Phenanthrene	2023/04/17		103	%	50 - 130
			Pyrene	2023/04/17		108	%	50 - 130
			Acenaphthene	2023/04/17	1.2		%	30
			Acenaphthylene	2023/04/17	2.3		%	30
			Anthracene	2023/04/17	1.7		%	30
			Benzo(a)anthracene	2023/04/17	0.37		%	30
			Benzo(a)pyrene	2023/04/17	0.60		%	30
			Benzo(b/j)fluoranthene	2023/04/17	0.70		%	30
			Benzo(g,h,i)perylene	2023/04/17	0.30		%	30
			Benzo(k)fluoranthene	2023/04/17	0.73		%	30
			Chrysene	2023/04/17	0.54		%	30
			Dibenzo(a,h)anthracene	2023/04/17	1.1		%	30
			Fluoranthene	2023/04/17	2.0		%	30
			Fluorene	2023/04/17	0.38		%	30
			Indeno(1,2,3-cd)pyrene	2023/04/17	0.93		%	30
			1-Methylnaphthalene	2023/04/17	3.9		%	30
			2-Methylnaphthalene	2023/04/17	4.3		%	30
			Naphthalene	2023/04/17	3.7		%	30
			Phenanthrene	2023/04/17	1.5		%	30
			Pyrene	2023/04/17	1.5		%	30
8610700	MKS	Method Blank	D10-Anthracene	2023/04/17		117	%	50 - 130
			D14-Terphenyl (FS)	2023/04/17		117	%	50 - 130
			D8-Acenaphthylene	2023/04/17		113	%	50 - 130
			Acenaphthene	2023/04/17	<0.050		ug/L	
			Acenaphthylene	2023/04/17	<0.050		ug/L	
			Anthracene	2023/04/17	<0.050		ug/L	
			Benzo(a)anthracene	2023/04/17	<0.050		ug/L	
			Benzo(a)pyrene	2023/04/17	<0.0090		ug/L	
			Benzo(b/j)fluoranthene	2023/04/17	<0.050		ug/L	
			Benzo(g,h,i)perylene	2023/04/17	<0.050		ug/L	
			Benzo(k)fluoranthene	2023/04/17	<0.050		ug/L	
			Chrysene	2023/04/17	<0.050		ug/L	
			Dibenzo(a,h)anthracene	2023/04/17	<0.050		ug/L	
			Fluoranthene	2023/04/17	<0.050		ug/L	



BUREAU
VERITAS

Bureau Veritas Job #: C3A2766
Report Date: 2023/05/10

Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Fluorene	2023/04/17	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2023/04/17	<0.050		ug/L	
			1-Methylnaphthalene	2023/04/17	<0.050		ug/L	
			2-Methylnaphthalene	2023/04/17	<0.050		ug/L	
			Naphthalene	2023/04/17	<0.050		ug/L	
			Phenanthrene	2023/04/17	<0.030		ug/L	
			Pyrene	2023/04/17	<0.050		ug/L	
8611006	JZ	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2023/04/18		83	%	50 - 130
			Decachlorobiphenyl	2023/04/18		96	%	50 - 130
			Hexachlorobenzene	2023/04/18		81	%	50 - 130
8611006	JZ	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2023/04/18		83	%	50 - 130
			Decachlorobiphenyl	2023/04/18		92	%	50 - 130
			Hexachlorobenzene	2023/04/18		80	%	50 - 130
8611006	JZ	RPD	Hexachlorobenzene	2023/04/18	0.44		%	30
			Hexachlorobenzene	2023/04/18	NC		%	30
8611006	JZ	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2023/04/18		94	%	50 - 130
			Decachlorobiphenyl	2023/04/18		99	%	50 - 130
			Hexachlorobenzene	2023/04/18	<0.005		ug/L	
8613330	SHD	QC Standard	Total Suspended Solids	2023/04/18		100	%	85 - 115
8613330	SHD	Method Blank	Total Suspended Solids	2023/04/18	<10		mg/L	
8613330	SHD	RPD	Total Suspended Solids	2023/04/18	NC		%	20
8614788	K1P	Spiked Blank	Total Oil & Grease	2023/04/19		99	%	85 - 115
8614788	K1P	RPD	Total Oil & Grease	2023/04/19	0.51		%	25
8614788	K1P	Method Blank	Total Oil & Grease	2023/04/19	<0.50		mg/L	
8614790	K1P	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2023/04/19		97	%	85 - 115
8614790	K1P	RPD	Total Oil & Grease Mineral/Synthetic	2023/04/19	0.52		%	25
8614790	K1P	Method Blank	Total Oil & Grease Mineral/Synthetic	2023/04/19	<0.50		mg/L	
8618613	DMI	Spiked Blank	Total Rhodium (Rh)	2023/04/18		102	%	80 - 120
8618613	DMI	Method Blank	Total Rhodium (Rh)	2023/04/18	<0.50		ug/L	
8620422	éCG	Matrix Spike	Total Aluminum (Al)	2023/04/19		102	%	80 - 120
			Total Antimony (Sb)	2023/04/19		103	%	80 - 120
			Total Arsenic (As)	2023/04/19		103	%	80 - 120
			Total Barium (Ba)	2023/04/19		101	%	80 - 120
			Total Bismuth (Bi)	2023/04/19		98	%	80 - 120
			Total Cadmium (Cd)	2023/04/19		102	%	80 - 120
			Total Chromium (Cr)	2023/04/19		97	%	80 - 120
			Total Cobalt (Co)	2023/04/19		95	%	80 - 120
			Total Copper (Cu)	2023/04/19		93	%	80 - 120
			Total Iron (Fe)	2023/04/19		107	%	80 - 120
			Total Lead (Pb)	2023/04/19		99	%	80 - 120
			Total Manganese (Mn)	2023/04/19		100	%	80 - 120
			Total Molybdenum (Mo)	2023/04/19		106	%	80 - 120
			Total Nickel (Ni)	2023/04/19		97	%	80 - 120
			Total Phosphorus (P)	2023/04/19		102	%	80 - 120
			Total Selenium (Se)	2023/04/19		105	%	80 - 120
			Total Silver (Ag)	2023/04/19		102	%	80 - 120
			Total Tin (Sn)	2023/04/19		100	%	80 - 120
			Total Vanadium (V)	2023/04/19		101	%	80 - 120
			Total Zinc (Zn)	2023/04/19		96	%	80 - 120
			Total Gold (Au)	2023/04/19		65 (1)	%	80 - 120
			Total Platinum (Pt)	2023/04/19		101	%	80 - 120

BUREAU
VERITASBureau Veritas Job #: C3A2766
Report Date: 2023/05/10Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
8620422	éCG	Spiked Blank	Total Aluminum (Al)	2023/04/19		99	%	80 - 120
			Total Antimony (Sb)	2023/04/19		102	%	80 - 120
			Total Arsenic (As)	2023/04/19		100	%	80 - 120
			Total Barium (Ba)	2023/04/19		101	%	80 - 120
			Total Bismuth (Bi)	2023/04/19		99	%	80 - 120
			Total Cadmium (Cd)	2023/04/19		101	%	80 - 120
			Total Chromium (Cr)	2023/04/19		99	%	80 - 120
			Total Cobalt (Co)	2023/04/19		98	%	80 - 120
			Total Copper (Cu)	2023/04/19		97	%	80 - 120
			Total Iron (Fe)	2023/04/19		103	%	80 - 120
			Total Lead (Pb)	2023/04/19		98	%	80 - 120
			Total Manganese (Mn)	2023/04/19		102	%	80 - 120
			Total Molybdenum (Mo)	2023/04/19		103	%	80 - 120
			Total Nickel (Ni)	2023/04/19		101	%	80 - 120
			Total Phosphorus (P)	2023/04/19		100	%	80 - 120
			Total Selenium (Se)	2023/04/19		106	%	80 - 120
			Total Silver (Ag)	2023/04/19		101	%	80 - 120
			Total Tin (Sn)	2023/04/19		102	%	80 - 120
			Total Vanadium (V)	2023/04/19		102	%	80 - 120
			Total Zinc (Zn)	2023/04/19		103	%	80 - 120
8620422	éCG	Method Blank	Total Gold (Au)	2023/04/19		99	%	80 - 120
			Total Platinum (Pt)	2023/04/19		103	%	80 - 120
			Total Aluminum (Al)	2023/04/20	<3.0		ug/L	
			Total Antimony (Sb)	2023/04/20	0.021, RDL=0.020 (2)		ug/L	
			Total Arsenic (As)	2023/04/20	<0.020		ug/L	
			Total Barium (Ba)	2023/04/20	<0.050		ug/L	
			Total Bismuth (Bi)	2023/04/20	<0.010		ug/L	
			Total Cadmium (Cd)	2023/04/20	<0.0050		ug/L	
			Total Chromium (Cr)	2023/04/20	<0.10		ug/L	
			Total Cobalt (Co)	2023/04/20	<0.010		ug/L	
			Total Copper (Cu)	2023/04/20	<0.10		ug/L	
			Total Iron (Fe)	2023/04/20	<5.0		ug/L	
			Total Lead (Pb)	2023/04/20	<0.020		ug/L	
			Total Manganese (Mn)	2023/04/20	<0.10		ug/L	
			Total Molybdenum (Mo)	2023/04/20	<0.050		ug/L	
			Total Nickel (Ni)	2023/04/20	<0.10		ug/L	
			Total Phosphorus (P)	2023/04/20	<5.0		ug/L	
			Total Selenium (Se)	2023/04/20	<0.040		ug/L	
			Total Silver (Ag)	2023/04/20	<0.010		ug/L	
			Total Tin (Sn)	2023/04/20	<0.20		ug/L	
			Total Vanadium (V)	2023/04/20	<0.20		ug/L	
			Total Zinc (Zn)	2023/04/20	<1.0		ug/L	
			Total Gold (Au)	2023/04/20	<0.10		ug/L	
			Total Platinum (Pt)	2023/04/20	<0.10		ug/L	
8620422	éCG	RPD	Total Aluminum (Al)	2023/04/19	8.0		%	20
			Total Antimony (Sb)	2023/04/19	2.7		%	20
			Total Arsenic (As)	2023/04/19	7.6		%	20
			Total Barium (Ba)	2023/04/19	2.5		%	20
			Total Bismuth (Bi)	2023/04/19	NC		%	20
			Total Cadmium (Cd)	2023/04/19	NC		%	20

BUREAU
VERITASBureau Veritas Job #: C3A2766
Report Date: 2023/05/10Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Chromium (Cr)	2023/04/19	0.25		%	20
			Total Cobalt (Co)	2023/04/19	0.62		%	20
			Total Copper (Cu)	2023/04/19	4.0		%	20
			Total Iron (Fe)	2023/04/19	0.80		%	20
			Total Lead (Pb)	2023/04/19	6.2		%	20
			Total Manganese (Mn)	2023/04/19	3.0		%	20
			Total Molybdenum (Mo)	2023/04/19	0.45		%	20
			Total Nickel (Ni)	2023/04/19	1.0		%	20
			Total Phosphorus (P)	2023/04/19	2.8		%	20
			Total Selenium (Se)	2023/04/19	15		%	20
			Total Silver (Ag)	2023/04/19	NC		%	20
			Total Tin (Sn)	2023/04/19	NC		%	20
			Total Vanadium (V)	2023/04/19	6.5		%	20
			Total Zinc (Zn)	2023/04/19	2.1		%	20
			Total Gold (Au)	2023/04/19	NC		%	20
			Total Platinum (Pt)	2023/04/19	NC		%	20
8654315	ADA	Matrix Spike	Dissolved Copper (Cu)	2023/05/10		99	%	80 - 120
			Dissolved Iron (Fe)	2023/05/10		102	%	80 - 120
			Dissolved Zinc (Zn)	2023/05/10		98	%	80 - 120
8654315	ADA	Spiked Blank	Dissolved Copper (Cu)	2023/05/10		98	%	80 - 120
			Dissolved Iron (Fe)	2023/05/10		102	%	80 - 120
			Dissolved Zinc (Zn)	2023/05/10		98	%	80 - 120
8654315	ADA	Method Blank	Dissolved Copper (Cu)	2023/05/10	<0.90		ug/L	
			Dissolved Iron (Fe)	2023/05/10	<100		ug/L	
			Dissolved Zinc (Zn)	2023/05/10	<5.0		ug/L	
8654315	ADA	RPD	Dissolved Copper (Cu)	2023/05/10	NC		%	20
			Dissolved Iron (Fe)	2023/05/10	NC		%	20
			Dissolved Zinc (Zn)	2023/05/10	NC		%	20

N/A = Not Applicable

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

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

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.

(2) Method blank exceeds acceptance limits- 2X RDL acceptable for low level metals determination.



BUREAU
VERITAS

Bureau Veritas Job #: C3A2766
Report Date: 2023/05/10

Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

VALIDATION SIGNATURE PAGE

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

Anastassia Hamanov, Scientific Specialist

Cristina Carriere, Senior Scientific Specialist

David Huang, BBY Scientific Specialist



Mira El Masri, M.Sc. Chemist, Montréal, Analyst II

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by {0}, {1} responsible for {2} {3} laboratory operations.



BUREAU
VERITAS

Bureau Veritas Job #: C3A2766
Report Date: 2023/05/10

Pinchin Ltd
Client Project #: 295667.007
Site Location: 440 Dunlop St. W., Barrie
Sampler Initials: BG

Exceedance Summary Table – Barrie Sanitary Sewer
Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
MW 302	VNO449-07	Total Iron (Fe)	50000	53700	25	ug/L
The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.						

Exceedance Summary Table – Barrie Storm Sewer
Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
MW 302	VNO449-07	Total Copper (Cu)	10	70.8	0.50	ug/L
MW 302	VNO449-04	Total Suspended Solids	15	33	10	mg/L
MW 302	VNO449-07	Total Zinc (Zn)	40	125	5.0	ug/L
The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.						



Your Project #: 295667.002
Your C.O.C. #: C#990482-01-01

Attention: Bujing Guan

Pinchin Ltd
680 Bayview Drive
Unit 5
Barrie, ON
CANADA L4N 9A6

Report Date: 2024/05/27
Report #: R8165132
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4E5158

Received: 2024/05/14, 14:25

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Biochemical Oxygen Demand (BOD)	1	2024/05/16	2024/05/21	CAM SOP-00427	SM 24 5210B m
1,3-Dichloropropene Sum	1	N/A	2024/05/21		EPA 8260C m
Chloride by Automated Colourimetry	1	N/A	2024/05/22	CAM SOP-00463	SM 24 4500-Cl E m
Chemical Oxygen Demand	1	N/A	2024/05/22	CAM SOP-00416	SM 24 5220 D m
Total Cyanide	1	2024/05/16	2024/05/16	CAM SOP-00457	OMOE E3015 5 m
Petroleum Hydrocarbons F2-F4 in Water (3)	1	2024/05/16	2024/05/17	CAM SOP-00316	CCME PHC-CWS m
Fluoride	1	2024/05/16	2024/05/21	CAM SOP-00449	SM 24 4500-F C m
Mercury in Water by CVAA	1	2024/05/21	2024/05/21	CAM SOP-00453	EPA 7470A m
Total Extractable Lanthanides-waters (1, 4)	1	2024/05/22	2024/05/24	STL SOP-00071	MA. 200-Met 1.2 R7 m
Elements by ICPMS Low Level (total) (2)	1	2024/05/22	2024/05/23	BBY7SOP-00003 / BBY7SOP-00002	EPA 6020b R2 m
Total Ammonia-N	1	N/A	2024/05/21	CAM SOP-00441	USGS I-2522-90 m
Animal and Vegetable Oil and Grease	1	N/A	2024/05/17	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2024/05/16	2024/05/17	CAM SOP-00326	EPA1664B m,SM5520B m
OC Pesticides (Selected) & PCB (5)	1	2024/05/21	2024/05/22	CAM SOP-00307	EPA 8081B/ 8082A
PAH Compounds in Water by GC/MS (SIM)	1	2024/05/16	2024/05/17	CAM SOP-00318	EPA 8270E
Phenols (4AAP)	1	N/A	2024/05/17	CAM SOP-00444	OMOE E3179 m
pH	1	2024/05/16	2024/05/21	CAM SOP-00413	SM 24th-4500H+ B
Sulphate by Automated Turbidimetry	1	N/A	2024/05/22	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphide	1	N/A	2024/05/17	CAM SOP-00455	SM 24 4500-S G m
Total Kjeldahl Nitrogen in Water	1	2024/05/16	2024/05/21	CAM SOP-00938	OMOE E3516 m
Total PAHs: Barrie/Mississauga Sewer Use (6)	1	N/A	2024/05/17	CAM SOP - 00301	
Mineral/Synthetic O & G (TPH Heavy Oil) (7)	1	2024/05/16	2024/05/17	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2024/05/17	2024/05/21	CAM SOP-00428	SM 24 2540D m
Volatile Organic Compounds and F1 PHCs	1	N/A	2024/05/17	CAM SOP-00230	EPA 8260C m
Non-Routine Volatile Organic Compounds	1	N/A	2024/05/18	CAM SOP-00226	EPA 8260D 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, EPA, APHA or the Quebec Ministry of Environment.



Your Project #: 295667.002
Your C.O.C. #: C#990482-01-01

Attention: Bujing Guan

Pinchin Ltd
680 Bayview Drive
Unit 5
Barrie, ON
CANADA L4N 9A6

Report Date: 2024/05/27
Report #: R8165132
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4E5158

Received: 2024/05/14, 14:25

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

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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

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

(1) This test was performed by Bureau Veritas Montreal., 889 Montée de Liesse, Ville St-Laurent, QC, H4T 1P5

(2) This test was performed by Bureau Veritas Burnaby, 4606 Canada Way, Burnaby, BC, V5G 1K5

(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

(4) Non-accredited test method

(5) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane

(6) Total PAHs include only those PAHs specified in the sewer use by-by-law.

(7) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease



Your Project #: 295667.002
Your C.O.C. #: C#990482-01-01

Attention: Bujing Guan

Pinchin Ltd
680 Bayview Drive
Unit 5
Barrie, ON
CANADA L4N 9A6

Report Date: 2024/05/27
Report #: R8165132
Version: 3 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C4E5158

Received: 2024/05/14, 14:25

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Antonella Brasil, Senior Project Manager
Email: Antonella.Brasil@bureauveritas.com
Phone# (905)817-5817

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Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

BUREAU
VERITAS

Bureau Veritas Job #: C4E5158

Report Date: 2024/05/27

Pinchin Ltd

Client Project #: 295667.002

Sampler Initials: JP

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZEC456	ZEC456		
Sampling Date		2024/05/13 11:00	2024/05/13 11:00		
COC Number		C#990482-01-01	C#990482-01-01		
	UNITS	MW302	MW302 Lab-Dup	QC Batch	RDL
Total Animal/Vegetable Oil and Grease	mg/L	<0.50	N/A	9394365	0.50
Total Ammonia-N	mg/L	1.4	N/A	9397426	0.050
Total BOD	mg/L	<2	N/A	9396755	2
Total Chemical Oxygen Demand (COD)	mg/L	33	N/A	9398466	4.0
Fluoride (F-)	mg/L	<0.10	<0.10	9399258	0.10
Total Kjeldahl Nitrogen (TKN)	mg/L	2.0	N/A	9398291	0.10
pH	pH	7.87	7.88	9399260	N/A
Phenols-4AAP	mg/L	0.0060	N/A	9400106	0.0010
Total Suspended Solids	mg/L	3200	N/A	9400330	10
Dissolved Sulphate (SO4)	mg/L	13	N/A	9399132	1.0
Sulphide	mg/L	0.49	N/A	9400179	0.020
Total Cyanide (CN)	mg/L	0.013	N/A	9396701	0.0050
Dissolved Chloride (Cl-)	mg/L	300	N/A	9399123	1.0
Total Aluminum (Al)	ug/L	16900	N/A	9412318	3.0
Total Antimony (Sb)	ug/L	0.118	N/A	9412318	0.020
Total Arsenic (As)	ug/L	2.99	N/A	9412318	0.020
Total Barium (Ba)	ug/L	307	N/A	9412318	0.020
Total Bismuth (Bi)	ug/L	0.106	N/A	9412318	0.0050
Total Cadmium (Cd)	ug/L	0.228	N/A	9412318	0.0050
Total Chromium (Cr)	ug/L	25.0	N/A	9412318	0.10
Total Cobalt (Co)	ug/L	10.4	N/A	9412318	0.010
Total Copper (Cu)	ug/L	33.5	N/A	9412318	0.10
Total Iron (Fe)	ug/L	24700	N/A	9412318	5.0
Total Lead (Pb)	ug/L	14.6	N/A	9412318	0.020
Total Manganese (Mn)	ug/L	719	N/A	9412318	0.10
Total Molybdenum (Mo)	ug/L	2.65	N/A	9412318	0.050
Total Nickel (Ni)	ug/L	22.8	N/A	9412318	0.10
Total Phosphorus (P)	ug/L	1020	N/A	9412318	5.0
Total Selenium (Se)	ug/L	1.03	N/A	9412318	0.040
Total Silver (Ag)	ug/L	0.061	N/A	9412318	0.010
Total Tin (Sn)	ug/L	0.76	N/A	9412318	0.20
Total Vanadium (V)	ug/L	43.9	N/A	9412318	0.20
Total Zinc (Zn)	ug/L	62.1	N/A	9412318	1.0
Total Rhodium (Rh)	ug/L	<0.50	N/A	9411053	0.50
Total Gold (Au)	ug/L	<0.20	N/A	9412318	0.10
QC Batch = Quality Control Batch					
Lab-Dup = Laboratory Initiated Duplicate					
N/A = Not Applicable					



BUREAU
VERITAS

Bureau Veritas Job #: C4E5158
Report Date: 2024/05/27

Pinchin Ltd
Client Project #: 295667.002
Sampler Initials: JP

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZEC456	ZEC456		
Sampling Date		2024/05/13 11:00	2024/05/13 11:00		
COC Number		C#990482-01-01	C#990482-01-01		
	UNITS	MW302	MW302 Lab-Dup	QC Batch	RDL
Total Platinum (Pt)	ug/L	<0.20	N/A	9412318	0.10
Total Oil & Grease	mg/L	<0.50	N/A	9398519	0.50
Total Oil & Grease Mineral/Synthetic	mg/L	<0.50	N/A	9398520	0.50
QC Batch = Quality Control Batch Lab-Dup = Laboratory Initiated Duplicate N/A = Not Applicable					



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VERITAS

Bureau Veritas Job #: C4E5158
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Pinchin Ltd
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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ZEC456		
Sampling Date		2024/05/13 11:00		
COC Number		C#990482-01-01		
	UNITS	MW302	QC Batch	RDL
Mercury (Hg)	mg/L	<0.0015	9403731	0.00010
QC Batch = Quality Control Batch				

BUREAU
VERITAS

Bureau Veritas Job #: C4E5158

Report Date: 2024/05/27

Pinchin Ltd

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		ZEC456		
Sampling Date		2024/05/13 11:00		
COC Number		C#990482-01-01		
	UNITS	MW302	QC Batch	RDL
Total PAHs	ug/L	<0.20	9394430	2.0
Acenaphthene	ug/L	<0.050	9397534	0.050
Acenaphthylene	ug/L	<0.050	9397534	0.050
Anthracene	ug/L	<0.050	9397534	0.050
Benzo(a)anthracene	ug/L	<0.050	9397534	0.050
Benzo(a)pyrene	ug/L	<0.0090	9397534	0.0090
Benzo(b/j)fluoranthene	ug/L	<0.050	9397534	0.050
Benzo(g,h,i)perylene	ug/L	<0.050	9397534	0.050
Benzo(k)fluoranthene	ug/L	<0.050	9397534	0.050
Chrysene	ug/L	<0.050	9397534	0.050
Dibenzo(a,h)anthracene	ug/L	<0.050	9397534	0.050
Fluoranthene	ug/L	<0.050	9397534	0.050
Fluorene	ug/L	<0.050	9397534	0.050
Indeno(1,2,3-cd)pyrene	ug/L	<0.050	9397534	0.050
1-Methylnaphthalene	ug/L	<0.050	9397534	0.050
2-Methylnaphthalene	ug/L	<0.050	9397534	0.050
Naphthalene	ug/L	<0.050	9397534	0.050
Phenanthrene	ug/L	<0.030	9397534	0.030
Pyrene	ug/L	<0.050	9397534	0.050
Surrogate Recovery (%)				
D10-Anthracene	%	98	9397534	N/A
D14-Terphenyl (FS)	%	55	9397534	N/A
D8-Acenaphthylene	%	95	9397534	N/A
QC Batch = Quality Control Batch				
N/A = Not Applicable				



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VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		ZEC456		
Sampling Date		2024/05/13 11:00		
COC Number		C#990482-01-01		
	UNITS	MW302	QC Batch	RDL
1,2,4-Trichlorobenzene	ug/L	<0.50	9388705	0.50
1,3,5-Trimethylbenzene	ug/L	<0.20	9388705	0.20
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	97	9388705	N/A
D4-1,2-Dichloroethane	%	112	9388705	N/A
D8-Toluene	%	98	9388705	N/A
QC Batch = Quality Control Batch				
N/A = Not Applicable				



BUREAU
VERITAS

Bureau Veritas Job #: C4E5158
Report Date: 2024/05/27

Pinchin Ltd
Client Project #: 295667.002
Sampler Initials: JP

ORGANOCHLORINATED PESTICIDES BY GC-ECD (WATER)

Bureau Veritas ID		ZEC456		
Sampling Date		2024/05/13 11:00		
COC Number		C#990482-01-01		
	UNITS	MW302	QC Batch	RDL
Hexachlorobenzene	ug/L	<0.05	9403299	0.005
Surrogate Recovery (%)				
2,4,5,6-Tetrachloro-m-xylene	%	70	9403299	N/A
Decachlorobiphenyl	%	104	9403299	N/A
QC Batch = Quality Control Batch				
N/A = Not Applicable				

BUREAU
VERITASBureau Veritas Job #: C4E5158
Report Date: 2024/05/27Pinchin Ltd
Client Project #: 295667.002
Sampler Initials: JP**O.REG 153 VOCs BY HS & F1-F4 (WATER)**

Bureau Veritas ID		ZEC456		
Sampling Date		2024/05/13 11:00		
COC Number		C#990482-01-01		
	UNITS	MW302	QC Batch	RDL
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	9394100	0.28
Acetone (2-Propanone)	ug/L	<10	9396936	10
Benzene	ug/L	<0.17	9396936	0.17
Bromodichloromethane	ug/L	<0.50	9396936	0.50
Bromoform	ug/L	<1.0	9396936	1.0
Bromomethane	ug/L	<0.50	9396936	0.50
Carbon Tetrachloride	ug/L	<0.20	9396936	0.20
Chlorobenzene	ug/L	<0.20	9396936	0.20
Chloroform	ug/L	<0.20	9396936	0.20
Chloromethane	ug/L	<5.0	9396936	5.0
Dibromochloromethane	ug/L	<0.50	9396936	0.50
1,2-Dichlorobenzene	ug/L	<0.50	9396936	0.50
1,3-Dichlorobenzene	ug/L	<0.50	9396936	0.50
1,4-Dichlorobenzene	ug/L	<0.50	9396936	0.50
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	9396936	1.0
1,1-Dichloroethane	ug/L	<0.20	9396936	0.20
1,2-Dichloroethane	ug/L	<0.50	9396936	0.50
1,1-Dichloroethylene	ug/L	<0.20	9396936	0.20
cis-1,2-Dichloroethylene	ug/L	<0.50	9396936	0.50
trans-1,2-Dichloroethylene	ug/L	<0.50	9396936	0.50
1,2-Dichloropropane	ug/L	<0.20	9396936	0.20
cis-1,3-Dichloropropene	ug/L	<0.30	9396936	0.30
trans-1,3-Dichloropropene	ug/L	<0.40	9396936	0.40
Ethylbenzene	ug/L	<0.20	9396936	0.20
Ethylene Dibromide	ug/L	<0.20	9396936	0.20
Hexane	ug/L	<1.0	9396936	1.0
Methylene Chloride(Dichloromethane)	ug/L	<2.0	9396936	2.0
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	9396936	10
Methyl Isobutyl Ketone	ug/L	<5.0	9396936	5.0
Methyl t-butyl ether (MTBE)	ug/L	<0.50	9396936	0.50
Styrene	ug/L	<0.50	9396936	0.50
1,1,1,2-Tetrachloroethane	ug/L	<0.50	9396936	0.50
1,1,2,2-Tetrachloroethane	ug/L	<0.50	9396936	0.50
Tetrachloroethylene	ug/L	<0.20	9396936	0.20
Toluene	ug/L	0.25	9396936	0.20
1,1,1-Trichloroethane	ug/L	<0.20	9396936	0.20
QC Batch = Quality Control Batch				



BUREAU
VERITAS

Bureau Veritas Job #: C4E5158
Report Date: 2024/05/27

Pinchin Ltd
Client Project #: 295667.002
Sampler Initials: JP

O.REG 153 VOCs BY HS & F1-F4 (WATER)

Bureau Veritas ID		ZEC456		
Sampling Date		2024/05/13 11:00		
COC Number		C#990482-01-01		
	UNITS	MW302	QC Batch	RDL
1,1,2-Trichloroethane	ug/L	<0.50	9396936	0.50
Trichloroethylene	ug/L	<0.20	9396936	0.20
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	9396936	0.50
Vinyl Chloride	ug/L	<0.20	9396936	0.20
p+m-Xylene	ug/L	<0.20	9396936	0.20
o-Xylene	ug/L	<0.20	9396936	0.20
Total Xylenes	ug/L	<0.20	9396936	0.20
F1 (C6-C10)	ug/L	<25	9396936	25
F1 (C6-C10) - BTEX	ug/L	<25	9396936	25
F2 (C10-C16 Hydrocarbons)	ug/L	<100	9397536	100
F3 (C16-C34 Hydrocarbons)	ug/L	<200	9397536	200
F4 (C34-C50 Hydrocarbons)	ug/L	<200	9397536	200
Reached Baseline at C50	ug/L	Yes	9397536	N/A
Surrogate Recovery (%)				
o-Terphenyl	%	101	9397536	N/A
4-Bromofluorobenzene	%	93	9396936	N/A
D4-1,2-Dichloroethane	%	104	9396936	N/A
D8-Toluene	%	93	9396936	N/A
QC Batch = Quality Control Batch N/A = Not Applicable				



GENERAL COMMENTS

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

Package 1	9.0°C
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Revised Report (2024/05/27) : Zinc included in the list of reportable metals.

Sample ZEC456 [MW302] : Mercury Analysis: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

OC-Pesticide Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

BUREAU
VERITASBureau Veritas Job #: C4E5158
Report Date: 2024/05/27Pinchin Ltd
Client Project #: 295667.002
Sampler Initials: JP

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9388705	RSC	Matrix Spike	4-Bromofluorobenzene	2024/05/18		100	%	70 - 130
			D4-1,2-Dichloroethane	2024/05/18		102	%	70 - 130
			D8-Toluene	2024/05/18		100	%	70 - 130
			1,2,4-Trichlorobenzene	2024/05/18		105	%	60 - 140
			1,3,5-Trimethylbenzene	2024/05/18		115	%	60 - 140
9388705	RSC	Spiked Blank	4-Bromofluorobenzene	2024/05/18		99	%	70 - 130
			D4-1,2-Dichloroethane	2024/05/18		104	%	70 - 130
			D8-Toluene	2024/05/18		102	%	70 - 130
			1,2,4-Trichlorobenzene	2024/05/18		100	%	60 - 140
			1,3,5-Trimethylbenzene	2024/05/18		104	%	60 - 140
9388705	RSC	Method Blank	4-Bromofluorobenzene	2024/05/18		103	%	70 - 130
			D4-1,2-Dichloroethane	2024/05/18		121	%	70 - 130
			D8-Toluene	2024/05/18		96	%	70 - 130
			1,2,4-Trichlorobenzene	2024/05/18	<0.50		ug/L	
			1,3,5-Trimethylbenzene	2024/05/18	<0.20		ug/L	
9388705	RSC	RPD	1,3,5-Trimethylbenzene	2024/05/18	NC		%	30
9396701	GYA	Matrix Spike	Total Cyanide (CN)	2024/05/16		103	%	80 - 120
9396701	GYA	Spiked Blank	Total Cyanide (CN)	2024/05/16		106	%	80 - 120
9396701	GYA	Method Blank	Total Cyanide (CN)	2024/05/16	<0.0050		mg/L	
9396701	GYA	RPD	Total Cyanide (CN)	2024/05/16	NC		%	20
9396755	A2A	QC Standard	Total BOD	2024/05/21		98	%	80 - 120
9396755	A2A	Method Blank	Total BOD	2024/05/21	<2		mg/L	
9396755	A2A	RPD	Total BOD	2024/05/21	NC		%	30
9396936	XJI	Matrix Spike	4-Bromofluorobenzene	2024/05/17		100	%	70 - 130
			D4-1,2-Dichloroethane	2024/05/17		98	%	70 - 130
			D8-Toluene	2024/05/17		102	%	70 - 130
			Acetone (2-Propanone)	2024/05/17		96	%	60 - 140
			Benzene	2024/05/17		90	%	70 - 130
			Bromodichloromethane	2024/05/17		100	%	70 - 130
			Bromoform	2024/05/17		87	%	70 - 130
			Bromomethane	2024/05/17		83	%	60 - 140
			Carbon Tetrachloride	2024/05/17		88	%	70 - 130
			Chlorobenzene	2024/05/17		101	%	70 - 130
			Chloroform	2024/05/17		98	%	70 - 130
			Chloromethane	2024/05/17		89	%	60 - 140
			Dibromochloromethane	2024/05/17		94	%	70 - 130
			1,2-Dichlorobenzene	2024/05/17		94	%	70 - 130
			1,3-Dichlorobenzene	2024/05/17		97	%	70 - 130
			1,4-Dichlorobenzene	2024/05/17		109	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2024/05/17		68	%	60 - 140
			1,1-Dichloroethane	2024/05/17		96	%	70 - 130
			1,2-Dichloroethane	2024/05/17		91	%	70 - 130
			1,1-Dichloroethylene	2024/05/17		94	%	70 - 130
			cis-1,2-Dichloroethylene	2024/05/17		99	%	70 - 130
			trans-1,2-Dichloroethylene	2024/05/17		93	%	70 - 130
			1,2-Dichloropropane	2024/05/17		95	%	70 - 130
			cis-1,3-Dichloropropene	2024/05/17		99	%	70 - 130
			trans-1,3-Dichloropropene	2024/05/17		102	%	70 - 130
			Ethylbenzene	2024/05/17		87	%	70 - 130
			Ethylene Dibromide	2024/05/17		99	%	70 - 130
			Hexane	2024/05/17		90	%	70 - 130
			Methylene Chloride(Dichloromethane)	2024/05/17		99	%	70 - 130

BUREAU
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Bureau Veritas Job #: C4E5158

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9396936	XII	Spiked Blank	Methyl Ethyl Ketone (2-Butanone)	2024/05/17		105	%	60 - 140
			Methyl Isobutyl Ketone	2024/05/17		96	%	70 - 130
			Methyl t-butyl ether (MTBE)	2024/05/17		97	%	70 - 130
			Styrene	2024/05/17		99	%	70 - 130
			1,1,1,2-Tetrachloroethane	2024/05/17		94	%	70 - 130
			1,1,2,2-Tetrachloroethane	2024/05/17		105	%	70 - 130
			Tetrachloroethylene	2024/05/17		92	%	70 - 130
			Toluene	2024/05/17		89	%	70 - 130
			1,1,1-Trichloroethane	2024/05/17		92	%	70 - 130
			1,1,2-Trichloroethane	2024/05/17		95	%	70 - 130
			Trichloroethylene	2024/05/17		95	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2024/05/17		87	%	70 - 130
			Vinyl Chloride	2024/05/17		82	%	70 - 130
			p+m-Xylene	2024/05/17		91	%	70 - 130
			o-Xylene	2024/05/17		81	%	70 - 130
			F1 (C6-C10)	2024/05/17		90	%	60 - 140
			4-Bromofluorobenzene	2024/05/17		103	%	70 - 130
			D4-1,2-Dichloroethane	2024/05/17		96	%	70 - 130
			D8-Toluene	2024/05/17		102	%	70 - 130
			Acetone (2-Propanone)	2024/05/17		93	%	60 - 140
			Benzene	2024/05/17		89	%	70 - 130
			Bromodichloromethane	2024/05/17		98	%	70 - 130
			Bromoform	2024/05/17		87	%	70 - 130
			Bromomethane	2024/05/17		84	%	60 - 140
			Carbon Tetrachloride	2024/05/17		89	%	70 - 130
			Chlorobenzene	2024/05/17		100	%	70 - 130
			Chloroform	2024/05/17		95	%	70 - 130
			Chloromethane	2024/05/17		85	%	60 - 140
			Dibromochloromethane	2024/05/17		93	%	70 - 130
			1,2-Dichlorobenzene	2024/05/17		94	%	70 - 130
			1,3-Dichlorobenzene	2024/05/17		96	%	70 - 130
			1,4-Dichlorobenzene	2024/05/17		111	%	70 - 130
			Dichlorodifluoromethane (FREON 12)	2024/05/17		70	%	60 - 140
			1,1-Dichloroethane	2024/05/17		96	%	70 - 130
			1,2-Dichloroethane	2024/05/17		89	%	70 - 130
			1,1-Dichloroethylene	2024/05/17		94	%	70 - 130
			cis-1,2-Dichloroethylene	2024/05/17		99	%	70 - 130
			trans-1,2-Dichloroethylene	2024/05/17		93	%	70 - 130
			1,2-Dichloropropane	2024/05/17		94	%	70 - 130
			cis-1,3-Dichloropropene	2024/05/17		95	%	70 - 130
			trans-1,3-Dichloropropene	2024/05/17		95	%	70 - 130
			Ethylbenzene	2024/05/17		90	%	70 - 130
			Ethylene Dibromide	2024/05/17		98	%	70 - 130
			Hexane	2024/05/17		92	%	70 - 130
			Methylene Chloride(Dichloromethane)	2024/05/17		97	%	70 - 130
			Methyl Ethyl Ketone (2-Butanone)	2024/05/17		102	%	60 - 140
			Methyl Isobutyl Ketone	2024/05/17		95	%	70 - 130
			Methyl t-butyl ether (MTBE)	2024/05/17		99	%	70 - 130
			Styrene	2024/05/17		103	%	70 - 130
			1,1,1,2-Tetrachloroethane	2024/05/17		93	%	70 - 130
			1,1,2,2-Tetrachloroethane	2024/05/17		102	%	70 - 130
			Tetrachloroethylene	2024/05/17		92	%	70 - 130

BUREAU
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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9396936	XII	Method Blank	Toluene	2024/05/17		90	%	70 - 130
			1,1,1-Trichloroethane	2024/05/17		92	%	70 - 130
			1,1,2-Trichloroethane	2024/05/17		91	%	70 - 130
			Trichloroethylene	2024/05/17		96	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2024/05/17		84	%	70 - 130
			Vinyl Chloride	2024/05/17		83	%	70 - 130
			p+m-Xylene	2024/05/17		94	%	70 - 130
			o-Xylene	2024/05/17		84	%	70 - 130
			F1 (C6-C10)	2024/05/17		99	%	60 - 140
			4-Bromofluorobenzene	2024/05/17		96	%	70 - 130
			D4-1,2-Dichloroethane	2024/05/17		96	%	70 - 130
			D8-Toluene	2024/05/17		93	%	70 - 130
			Acetone (2-Propanone)	2024/05/17	<10		ug/L	
			Benzene	2024/05/17	<0.17		ug/L	
			Bromodichloromethane	2024/05/17	<0.50		ug/L	
			Bromoform	2024/05/17	<1.0		ug/L	
			Bromomethane	2024/05/17	<0.50		ug/L	
			Carbon Tetrachloride	2024/05/17	<0.20		ug/L	
			Chlorobenzene	2024/05/17	<0.20		ug/L	
			Chloroform	2024/05/17	<0.20		ug/L	
			Chloromethane	2024/05/17	<5.0		ug/L	
			Dibromochloromethane	2024/05/17	<0.50		ug/L	
			1,2-Dichlorobenzene	2024/05/17	<0.50		ug/L	
			1,3-Dichlorobenzene	2024/05/17	<0.50		ug/L	
			1,4-Dichlorobenzene	2024/05/17	<0.50		ug/L	
			Dichlorodifluoromethane (FREON 12)	2024/05/17	<1.0		ug/L	
			1,1-Dichloroethane	2024/05/17	<0.20		ug/L	
			1,2-Dichloroethane	2024/05/17	<0.50		ug/L	
			1,1-Dichloroethylene	2024/05/17	<0.20		ug/L	
			cis-1,2-Dichloroethylene	2024/05/17	<0.50		ug/L	
			trans-1,2-Dichloroethylene	2024/05/17	<0.50		ug/L	
			1,2-Dichloropropane	2024/05/17	<0.20		ug/L	
			cis-1,3-Dichloropropene	2024/05/17	<0.30		ug/L	
			trans-1,3-Dichloropropene	2024/05/17	<0.40		ug/L	
			Ethylbenzene	2024/05/17	<0.20		ug/L	
			Ethylene Dibromide	2024/05/17	<0.20		ug/L	
			Hexane	2024/05/17	<1.0		ug/L	
			Methylene Chloride(Dichloromethane)	2024/05/17	<2.0		ug/L	
			Methyl Ethyl Ketone (2-Butanone)	2024/05/17	<10		ug/L	
			Methyl Isobutyl Ketone	2024/05/17	<5.0		ug/L	
			Methyl t-butyl ether (MTBE)	2024/05/17	<0.50		ug/L	
			Styrene	2024/05/17	<0.50		ug/L	
			1,1,1,2-Tetrachloroethane	2024/05/17	<0.50		ug/L	
			1,1,2,2-Tetrachloroethane	2024/05/17	<0.50		ug/L	
			Tetrachloroethylene	2024/05/17	<0.20		ug/L	
			Toluene	2024/05/17	<0.20		ug/L	
			1,1,1-Trichloroethane	2024/05/17	<0.20		ug/L	
			1,1,2-Trichloroethane	2024/05/17	<0.50		ug/L	
			Trichloroethylene	2024/05/17	<0.20		ug/L	
			Trichlorofluoromethane (FREON 11)	2024/05/17	<0.50		ug/L	
			Vinyl Chloride	2024/05/17	<0.20		ug/L	
			p+m-Xylene	2024/05/17	<0.20		ug/L	

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9396936	XJI	RPD	o-Xylene	2024/05/17	<0.20		ug/L	
			Total Xylenes	2024/05/17	<0.20		ug/L	
			F1 (C6-C10)	2024/05/17	<25		ug/L	
			F1 (C6-C10) - BTEX	2024/05/17	<25		ug/L	
			Benzene	2024/05/17	NC		%	30
			1,2-Dichloroethane	2024/05/17	NC		%	30
			Ethylbenzene	2024/05/17	NC		%	30
			Ethylene Dibromide	2024/05/17	NC		%	30
			Hexane	2024/05/17	NC		%	30
			Methyl t-butyl ether (MTBE)	2024/05/17	1.7		%	30
			Toluene	2024/05/17	NC		%	30
			p+m-Xylene	2024/05/17	NC		%	30
			o-Xylene	2024/05/17	NC		%	30
			Total Xylenes	2024/05/17	NC		%	30
			F1 (C6-C10)	2024/05/17	NC		%	30
			F1 (C6-C10) - BTEX	2024/05/17	NC		%	30
9397426	MJ1	Matrix Spike	Total Ammonia-N	2024/05/21		95	%	75 - 125
9397426	MJ1	Spiked Blank	Total Ammonia-N	2024/05/21		100	%	80 - 120
9397426	MJ1	Method Blank	Total Ammonia-N	2024/05/21	<0.050		mg/L	
9397426	MJ1	RPD	Total Ammonia-N	2024/05/21	3.3		%	20
9397534	JYO	Matrix Spike	D10-Anthracene	2024/05/17		101	%	50 - 130
			D14-Terphenyl (FS)	2024/05/17		88	%	50 - 130
			D8-Acenaphthylene	2024/05/17		96	%	50 - 130
			Acenaphthene	2024/05/17		113	%	50 - 130
			Acenaphthylene	2024/05/17		112	%	50 - 130
			Anthracene	2024/05/17		108	%	50 - 130
			Benzo(a)anthracene	2024/05/17		103	%	50 - 130
			Benzo(a)pyrene	2024/05/17		95	%	50 - 130
			Benzo(b/j)fluoranthene	2024/05/17		103	%	50 - 130
			Benzo(g,h,i)perylene	2024/05/17		91	%	50 - 130
			Benzo(k)fluoranthene	2024/05/17		92	%	50 - 130
			Chrysene	2024/05/17		99	%	50 - 130
			Dibenzo(a,h)anthracene	2024/05/17		77	%	50 - 130
			Fluoranthene	2024/05/17		108	%	50 - 130
			Fluorene	2024/05/17		105	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2024/05/17		91	%	50 - 130
			1-Methylnaphthalene	2024/05/17		99	%	50 - 130
			2-Methylnaphthalene	2024/05/17		100	%	50 - 130
			Naphthalene	2024/05/17		103	%	50 - 130
			Phenanthrene	2024/05/17		112	%	50 - 130
			Pyrene	2024/05/17		106	%	50 - 130
	JYO	Spiked Blank	D10-Anthracene	2024/05/16		98	%	50 - 130
			D14-Terphenyl (FS)	2024/05/16		86	%	50 - 130
			D8-Acenaphthylene	2024/05/16		92	%	50 - 130
			Acenaphthene	2024/05/16		107	%	50 - 130
			Acenaphthylene	2024/05/16		108	%	50 - 130
			Anthracene	2024/05/16		107	%	50 - 130
			Benzo(a)anthracene	2024/05/16		107	%	50 - 130
			Benzo(a)pyrene	2024/05/16		102	%	50 - 130
			Benzo(b/j)fluoranthene	2024/05/16		109	%	50 - 130
			Benzo(g,h,i)perylene	2024/05/16		99	%	50 - 130
			Benzo(k)fluoranthene	2024/05/16		105	%	50 - 130

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9397534	JYO	Method Blank	Chrysene	2024/05/16		104	%	50 - 130
			Dibenzo(a,h)anthracene	2024/05/16		82	%	50 - 130
			Fluoranthene	2024/05/16		108	%	50 - 130
			Fluorene	2024/05/16		102	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2024/05/16		101	%	50 - 130
			1-Methylnaphthalene	2024/05/16		96	%	50 - 130
			2-Methylnaphthalene	2024/05/16		97	%	50 - 130
			Naphthalene	2024/05/16		102	%	50 - 130
			Phenanthrene	2024/05/16		110	%	50 - 130
			Pyrene	2024/05/16		107	%	50 - 130
			D10-Anthracene	2024/05/16		106	%	50 - 130
			D14-Terphenyl (FS)	2024/05/16		92	%	50 - 130
			D8-Acenaphthylene	2024/05/16		92	%	50 - 130
			Acenaphthene	2024/05/16	<0.050		ug/L	
			Acenaphthylene	2024/05/16	<0.050		ug/L	
			Anthracene	2024/05/16	<0.050		ug/L	
			Benzo(a)anthracene	2024/05/16	<0.050		ug/L	
			Benzo(a)pyrene	2024/05/16	<0.0090		ug/L	
			Benzo(b/j)fluoranthene	2024/05/16	<0.050		ug/L	
			Benzo(g,h,i)perylene	2024/05/16	<0.050		ug/L	
			Benzo(k)fluoranthene	2024/05/16	<0.050		ug/L	
			Chrysene	2024/05/16	<0.050		ug/L	
			Dibenzo(a,h)anthracene	2024/05/16	<0.050		ug/L	
			Fluoranthene	2024/05/16	<0.050		ug/L	
			Fluorene	2024/05/16	<0.050		ug/L	
			Indeno(1,2,3-cd)pyrene	2024/05/16	<0.050		ug/L	
			1-Methylnaphthalene	2024/05/16	<0.050		ug/L	
			2-Methylnaphthalene	2024/05/16	<0.050		ug/L	
			Naphthalene	2024/05/16	<0.050		ug/L	
			Phenanthrene	2024/05/16	<0.030		ug/L	
			Pyrene	2024/05/16	<0.050		ug/L	
9397534	JYO	RPD	Acenaphthene	2024/05/16	4.9		%	30
			Acenaphthylene	2024/05/16	NC		%	30
			Anthracene	2024/05/16	NC		%	30
			Benzo(a)anthracene	2024/05/16	NC		%	30
			Benzo(a)pyrene	2024/05/16	19		%	30
			Benzo(b/j)fluoranthene	2024/05/16	NC		%	30
			Benzo(g,h,i)perylene	2024/05/16	NC		%	30
			Benzo(k)fluoranthene	2024/05/16	NC		%	30
			Chrysene	2024/05/16	NC		%	30
			Dibenzo(a,h)anthracene	2024/05/16	NC		%	30
			Fluoranthene	2024/05/16	NC		%	30
			Fluorene	2024/05/16	22		%	30
			Indeno(1,2,3-cd)pyrene	2024/05/16	NC		%	30
			1-Methylnaphthalene	2024/05/16	1.3		%	30
			2-Methylnaphthalene	2024/05/16	NC		%	30
			Naphthalene	2024/05/16	NC		%	30
			Phenanthrene	2024/05/16	NC		%	30
			Pyrene	2024/05/16	3.4		%	30
9397536	MSZ	Matrix Spike	o-Terphenyl	2024/05/16		102	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2024/05/16		94	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2024/05/16		105	%	60 - 140

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9397536	MSZ	Spiked Blank	F4 (C34-C50 Hydrocarbons)	2024/05/16		95	%	60 - 140
			o-Terphenyl	2024/05/16		105	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2024/05/16		98	%	60 - 140
			F3 (C16-C34 Hydrocarbons)	2024/05/16		110	%	60 - 140
9397536	MSZ	Method Blank	F4 (C34-C50 Hydrocarbons)	2024/05/16		93	%	60 - 140
			o-Terphenyl	2024/05/16		104	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2024/05/16	<100		ug/L	
			F3 (C16-C34 Hydrocarbons)	2024/05/16	<200		ug/L	
9397536	MSZ	RPD	F4 (C34-C50 Hydrocarbons)	2024/05/16	<200		ug/L	
			F2 (C10-C16 Hydrocarbons)	2024/05/17	NC		%	30
			F3 (C16-C34 Hydrocarbons)	2024/05/17	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2024/05/17	NC		%	30
9398291	RTY	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2024/05/17		105	%	80 - 120
9398291	RTY	QC Standard	Total Kjeldahl Nitrogen (TKN)	2024/05/17		108	%	80 - 120
9398291	RTY	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2024/05/17		106	%	80 - 120
9398291	RTY	Method Blank	Total Kjeldahl Nitrogen (TKN)	2024/05/17	<0.10		mg/L	
9398291	RTY	RPD	Total Kjeldahl Nitrogen (TKN)	2024/05/17	6.3		%	20
9398466	AJT	Matrix Spike	Total Chemical Oxygen Demand (COD)	2024/05/22		99	%	80 - 120
9398466	AJT	Spiked Blank	Total Chemical Oxygen Demand (COD)	2024/05/22		100	%	80 - 120
9398466	AJT	Method Blank	Total Chemical Oxygen Demand (COD)	2024/05/22	<4.0		mg/L	
9398466	AJT	RPD	Total Chemical Oxygen Demand (COD)	2024/05/22	0		%	20
9398519	AW5	Spiked Blank	Total Oil & Grease	2024/05/17		99	%	80 - 110
9398519	AW5	RPD	Total Oil & Grease	2024/05/17	0.25		%	25
9398519	AW5	Method Blank	Total Oil & Grease	2024/05/17	<0.50		mg/L	
9398520	AW5	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2024/05/17		97	%	65 - 130
9398520	AW5	RPD	Total Oil & Grease Mineral/Synthetic	2024/05/17	0.52		%	25
9398520	AW5	Method Blank	Total Oil & Grease Mineral/Synthetic	2024/05/17	<0.50		mg/L	
9399123	ADB	Matrix Spike	Dissolved Chloride (Cl-)	2024/05/22		95	%	80 - 120
9399123	ADB	Spiked Blank	Dissolved Chloride (Cl-)	2024/05/22		97	%	80 - 120
9399123	ADB	Method Blank	Dissolved Chloride (Cl-)	2024/05/22	<1.0		mg/L	
9399123	ADB	RPD	Dissolved Chloride (Cl-)	2024/05/22	NC		%	20
9399132	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2024/05/22		98	%	75 - 125
9399132	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2024/05/22		97	%	80 - 120
9399132	ADB	Method Blank	Dissolved Sulphate (SO4)	2024/05/22	<1.0		mg/L	
9399132	ADB	RPD	Dissolved Sulphate (SO4)	2024/05/22	NC		%	20
9399258	NGI	Matrix Spike [ZEC456-03]	Fluoride (F-)	2024/05/21		90	%	80 - 120
9399258	NGI	Spiked Blank	Fluoride (F-)	2024/05/21		94	%	80 - 120
9399258	NGI	Method Blank	Fluoride (F-)	2024/05/21	<0.10		mg/L	
9399258	NGI	RPD [ZEC456-03]	Fluoride (F-)	2024/05/21	NC		%	20
9399260	NGI	Spiked Blank	pH	2024/05/21		102	%	98 - 103
9399260	NGI	RPD [ZEC456-03]	pH	2024/05/21	0.14		%	N/A
9400106	C_N	Matrix Spike	Phenols-4AAP	2024/05/17		102	%	80 - 120
9400106	C_N	Spiked Blank	Phenols-4AAP	2024/05/17		98	%	80 - 120
9400106	C_N	Method Blank	Phenols-4AAP	2024/05/17	<0.0010		mg/L	
9400106	C_N	RPD	Phenols-4AAP	2024/05/17	NC		%	20
9400179	TAK	Matrix Spike	Sulphide	2024/05/17		92	%	80 - 120
9400179	TAK	Spiked Blank	Sulphide	2024/05/17		96	%	80 - 120
9400179	TAK	Method Blank	Sulphide	2024/05/17	<0.020		mg/L	
9400179	TAK	RPD	Sulphide	2024/05/17	NC		%	20
9400330	TTE	Spiked Blank	Total Suspended Solids	2024/05/21		101	%	80 - 120
9400330	TTE	Method Blank	Total Suspended Solids	2024/05/21	<10		mg/L	
9400330	TTE	RPD	Total Suspended Solids	2024/05/21	NC		%	20

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9403299	AP1	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2024/05/22		92	%	50 - 130
			Decachlorobiphenyl	2024/05/22		118	%	50 - 130
			Hexachlorobenzene	2024/05/22		83	%	50 - 130
9403299	AP1	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2024/05/22		78	%	50 - 130
			Decachlorobiphenyl	2024/05/22		103	%	50 - 130
			Hexachlorobenzene	2024/05/22		81	%	50 - 130
9403299	AP1	RPD	Hexachlorobenzene	2024/05/22	5.8		%	30
			Hexachlorobenzene	2024/05/22	NC		%	30
9403299	AP1	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2024/05/22		80	%	50 - 130
			Decachlorobiphenyl	2024/05/22		101	%	50 - 130
			Hexachlorobenzene	2024/05/22	<0.005		ug/L	
9403731	GR1	Matrix Spike	Mercury (Hg)	2024/05/21		93	%	75 - 125
9403731	GR1	Spiked Blank	Mercury (Hg)	2024/05/21		98	%	80 - 120
9403731	GR1	Method Blank	Mercury (Hg)	2024/05/21	<0.00010		mg/L	
9403731	GR1	RPD	Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
			Mercury (Hg)	2024/05/21	NC		%	20
9411053	DMI	Spiked Blank	Total Rhodium (Rh)	2024/05/24		99	%	80 - 120
9411053	DMI	Method Blank	Total Rhodium (Rh)	2024/05/24	<0.50		ug/L	
9412318	éCG	Matrix Spike	Total Aluminum (Al)	2024/05/23		123 (1)	%	80 - 120
			Total Antimony (Sb)	2024/05/23		104	%	80 - 120
			Total Arsenic (As)	2024/05/23		103	%	80 - 120
			Total Barium (Ba)	2024/05/23		NC	%	80 - 120
			Total Bismuth (Bi)	2024/05/23		98	%	80 - 120
			Total Cadmium (Cd)	2024/05/23		98	%	80 - 120
			Total Chromium (Cr)	2024/05/23		99	%	80 - 120
			Total Cobalt (Co)	2024/05/23		93	%	80 - 120
			Total Copper (Cu)	2024/05/23		95	%	80 - 120
			Total Iron (Fe)	2024/05/23		106	%	80 - 120
			Total Lead (Pb)	2024/05/23		94	%	80 - 120
			Total Manganese (Mn)	2024/05/23		99	%	80 - 120
			Total Molybdenum (Mo)	2024/05/23		NC	%	80 - 120
			Total Nickel (Ni)	2024/05/23		95	%	80 - 120
			Total Phosphorus (P)	2024/05/23		101	%	80 - 120
			Total Selenium (Se)	2024/05/23		98	%	80 - 120
			Total Silver (Ag)	2024/05/23		96	%	80 - 120
			Total Tin (Sn)	2024/05/23		105	%	80 - 120
			Total Vanadium (V)	2024/05/23		104	%	80 - 120
			Total Zinc (Zn)	2024/05/23		95	%	80 - 120
			Total Gold (Au)	2024/05/23		11 (1)	%	80 - 120
			Total Platinum (Pt)	2024/05/23		90	%	80 - 120
9412318	éCG	Spiked Blank	Total Aluminum (Al)	2024/05/23		104	%	80 - 120
			Total Antimony (Sb)	2024/05/23		103	%	80 - 120
			Total Arsenic (As)	2024/05/23		102	%	80 - 120
			Total Barium (Ba)	2024/05/23		102	%	80 - 120
			Total Bismuth (Bi)	2024/05/23		102	%	80 - 120
			Total Cadmium (Cd)	2024/05/23		101	%	80 - 120



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9412318	éCG	Method Blank	Total Chromium (Cr)	2024/05/23		101	%	80 - 120
			Total Cobalt (Co)	2024/05/23		96	%	80 - 120
			Total Copper (Cu)	2024/05/23		100	%	80 - 120
			Total Iron (Fe)	2024/05/23		102	%	80 - 120
			Total Lead (Pb)	2024/05/23		101	%	80 - 120
			Total Manganese (Mn)	2024/05/23		102	%	80 - 120
			Total Molybdenum (Mo)	2024/05/23		103	%	80 - 120
			Total Nickel (Ni)	2024/05/23		100	%	80 - 120
			Total Phosphorus (P)	2024/05/23		99	%	80 - 120
			Total Selenium (Se)	2024/05/23		100	%	80 - 120
			Total Silver (Ag)	2024/05/23		100	%	80 - 120
			Total Tin (Sn)	2024/05/23		102	%	80 - 120
			Total Vanadium (V)	2024/05/23		102	%	80 - 120
			Total Zinc (Zn)	2024/05/23		101	%	80 - 120
			Total Gold (Au)	2024/05/23		78 (2)	%	80 - 120
			Total Platinum (Pt)	2024/05/23		102	%	80 - 120
			Total Aluminum (Al)	2024/05/23	<3.0		ug/L	
			Total Antimony (Sb)	2024/05/23	<0.020		ug/L	
			Total Arsenic (As)	2024/05/23	<0.020		ug/L	
			Total Barium (Ba)	2024/05/23	<0.050		ug/L	
			Total Bismuth (Bi)	2024/05/23	<0.010		ug/L	
			Total Cadmium (Cd)	2024/05/23	<0.0050		ug/L	
			Total Chromium (Cr)	2024/05/23	<0.10		ug/L	
			Total Cobalt (Co)	2024/05/23	<0.010		ug/L	
			Total Copper (Cu)	2024/05/23	<0.10		ug/L	
			Total Iron (Fe)	2024/05/23	<5.0		ug/L	
			Total Lead (Pb)	2024/05/23	<0.020		ug/L	
			Total Manganese (Mn)	2024/05/23	<0.10		ug/L	
			Total Molybdenum (Mo)	2024/05/23	<0.050		ug/L	
			Total Nickel (Ni)	2024/05/23	<0.10		ug/L	
			Total Phosphorus (P)	2024/05/23	<5.0		ug/L	
			Total Selenium (Se)	2024/05/23	<0.040		ug/L	
			Total Silver (Ag)	2024/05/23	<0.010		ug/L	
			Total Tin (Sn)	2024/05/23	<0.20		ug/L	
			Total Vanadium (V)	2024/05/23	<0.20		ug/L	
			Total Zinc (Zn)	2024/05/23	<1.0		ug/L	
			Total Gold (Au)	2024/05/23	<0.10		ug/L	



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QA/QC	Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
				Total Platinum (Pt)	2024/05/23	<0.10		ug/L	
N/A = Not Applicable Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement. Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference. QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy. Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy. Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination. Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency. NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration) NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference $\leq 2 \times$ RDL). (1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria. (2) Blank Spike outside acceptance criteria (10% of analytes failure allowed).									



BUREAU
VERITAS

Bureau Veritas Job #: C4E5158
Report Date: 2024/05/27

Pinchin Ltd
Client Project #: 295667.002
Sampler Initials: JP

VALIDATION SIGNATURE PAGE

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

Anastassia Hamanov, Scientific Specialist

Cristina Carriere, Senior Scientific Specialist

David Huang, BBY Scientific Specialist



Jonathan Fauvel, B.Sc. Chimiste, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.



Bureau Veritas
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14-May-24 14:25

Page of

Antonella Brasil



C4E5158

Bottle Order #:



990657

Antonella Brasil

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#35084 Pinchin Ltd	Company Name:		Quotation #:	C42299
Attention:	Bujing Guan	Attention:		P.O. #:	
Address:	680 Bayview Drive Unit 5 Barrie ON L4N 9A6	Address:		Project:	29567.007
Tel:	(705) 812-1601	Tel:		Project Name:	
Email:	bguan@pinchin.com	Email:		Site #:	
				Sampled By:	

VIY

ENV-636

COC #:



C#990657-01-01

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)			Other Regulations			Special Instructions		
☐ Table 1	☐ Res/Park	☐ Medium/Fine	☐ CCME	☒ Sanitary Sewer Bylaw				
☐ Table 2	☐ Ind/Comm	☐ Coarse	☐ Reg 558	☒ Storm Sewer Bylaw				
☐ Table 3	☐ Agri/Other	☐ For RSC	☐ MISA	Municipality <u>Barrie</u>				
☐ Table			☐ PWQO	☐ Reg 406 Table				
☐ Other								

Include Criteria on Certificate of Analysis (Y/N)?					
Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	
1	MW302	05/13/24	12:00		
2	MW802	05/13/24	12:20		
3	MW302	05/13/24			
4	MW802	05/13/24	12:05		
5					
6					
7					
8					
9					
10					

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)									
Field Filtered (please circle):	Metals / Hg / Cr / V	Petroleum Hydro CCME F1 & BTEX in Water	Petroleum Hydrocarbons F2-F4 in Water	Total Ammonia-N	Volatile Organic Compounds in Water				

Turnaround Time (TAT) Required:	
Regular (Standard) TAT:	☒
(will be applied if Rush TAT is not specified):	
Standard TAT = 5-7 Working days for most tests.	
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.	
Job Specific Rush TAT (if applies to entire submission)	
Date Required:	Time Required:
Rush Confirmation Number: (call lab for #)	

# of Bottles	Comments
3	
2	
2	
3	

* RELINQUISHED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)		Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only				
John Perry		24/05/13		[Signature]		20/05/14	1425		Time Sensitive	Temperature (°C) on Receipt	Custody Seal Present	Yes	No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

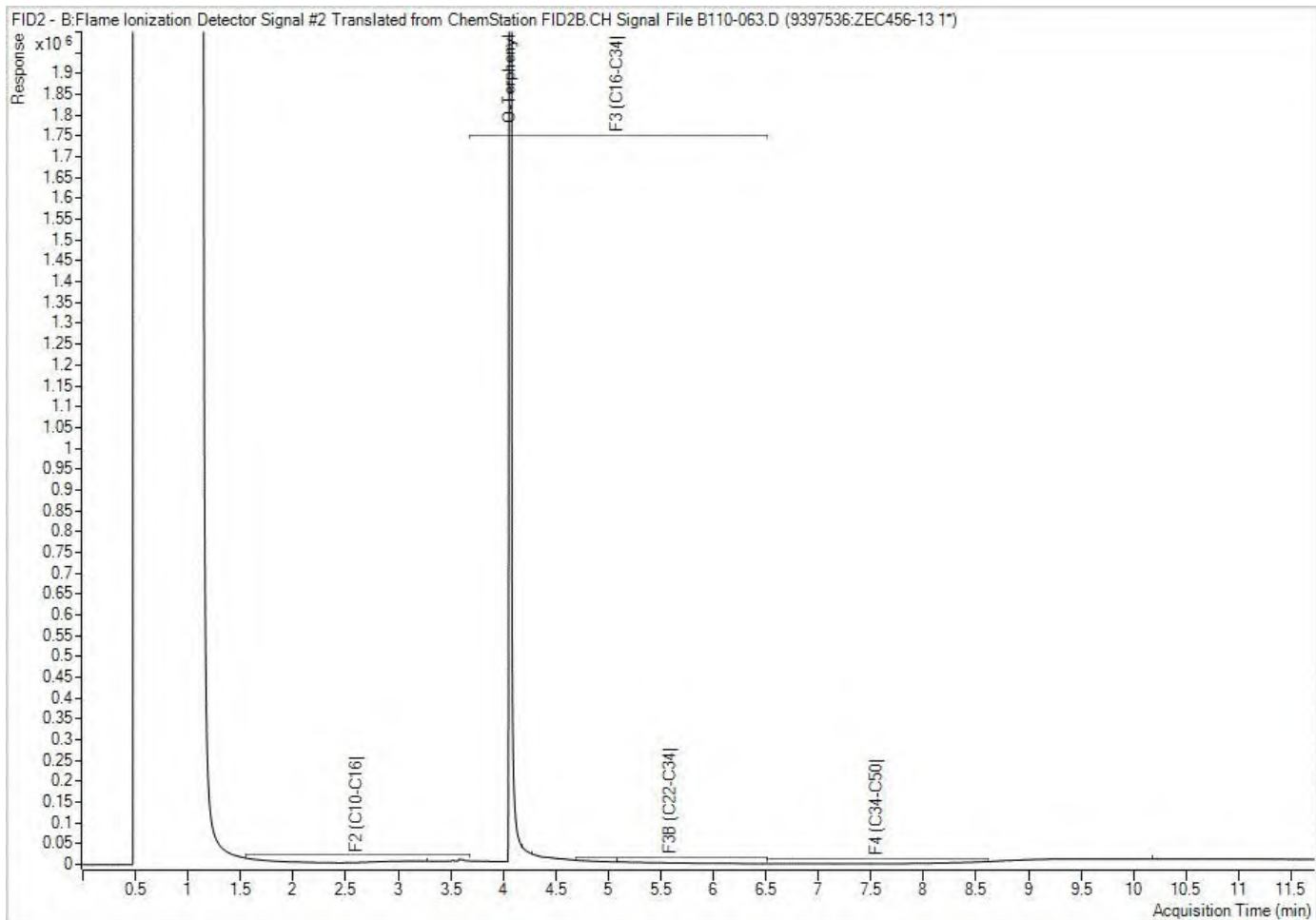
** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/CHAIN-CUSTODY-FORMS-COCS.

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

White: Bureau Veritas Yellow: Client

857053

Petroleum Hydrocarbons F2-F4 in Water Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

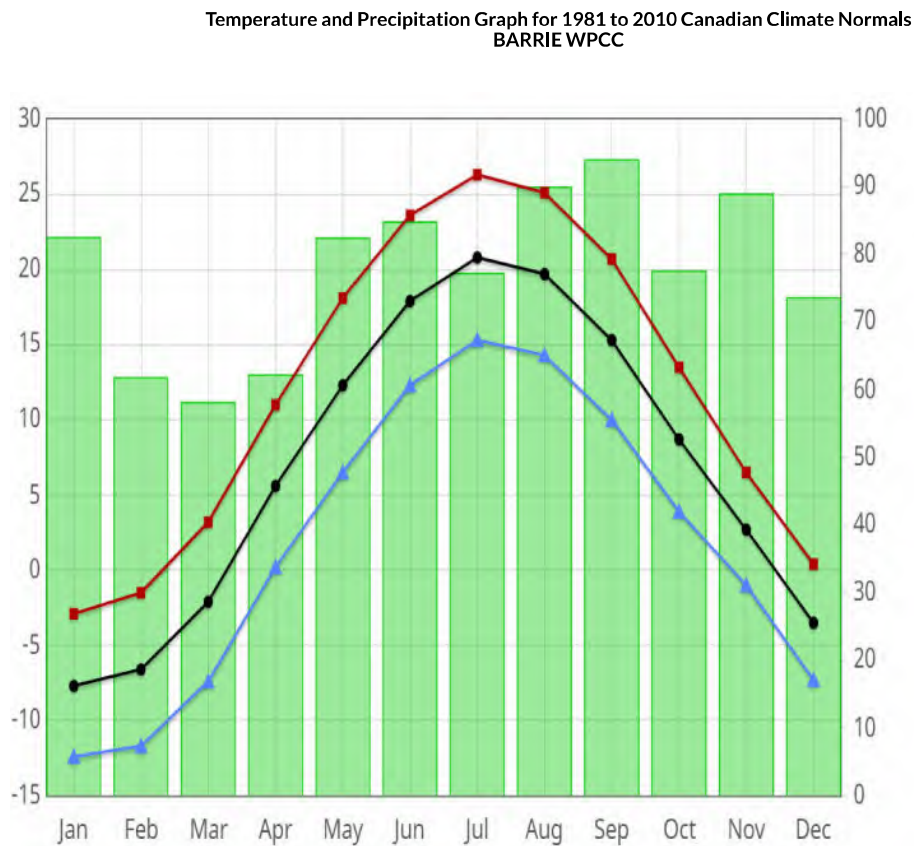
APPENDIX VII
1981 to 2010 Canadian Climatic Normals



► Notices

Canadian Climate Normals 1981-2010 Station Data

▼ Temperature and Precipitation Graph



	Daily Maximum Temperature (°C)
	Daily Average Temperature (°C)
	Daily Minimum Temperature (°C)
	Precipitation (mm)

▼ Normals Data

The minimum number of years used to calculate these Normals is indicated by a code for each element. A "+" beside an extreme date indicates that this date is the first occurrence of the extreme value. Values and dates in bold indicate all-time extremes for the location.

Data used in the calculation of these Normals may be subject to further quality assurance checks. This may result in minor changes to some values presented here.

BARRIE WPCC **ONTARIO**

Latitude: 44°22'33.012" N **Longitude:** 79°41'23.010" W **Elevation:** 221.00 m
Climate ID: 6110557 **WMO ID:** **TC ID:**

▼ Temperature

Temperature														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Daily Average (°C)	-7.7	-6.6	-2.1	5.6	12.3	17.9	20.8	19.7	15.3	8.7	2.7	-3.5	6.9	Ⓒ
Standard Deviation	3.4	2.6	2.2	1.6	1.9	1.4	1.3	1.5	1.4	1.2	1.6	3.0	1.4	Ⓒ
Daily Maximum (°C)	-2.9	-1.5	3.2	11.0	18.1	23.6	26.3	25.1	20.7	13.5	6.5	0.4	12.0	Ⓒ
Daily Minimum (°C)	-12.4	-11.7	-7.4	0.2	6.5	12.3	15.3	14.3	10.0	3.9	-1.0	-7.3	1.9	Ⓒ
Extreme Maximum (°C)	14.0	14.0	24.0	30.5	35.0	35.0	36.0	36.5	34.5	30.0	21.5	19.5		
Date (yyyy/dd)	1995/ 14	1984/ 23	1998/ 30	2002/ 16	2006/ 30	1994/ 17	1988/ 06	2006/ 01	2002/ 09	2005/ 05	1978/ 05	1982/ 03		
Extreme Minimum (°C)	-35.0	-33.0	-30.5	-15.0	-4.0	1.0	6.0	0.0	-1.5	-6.5	-19.5	-33.0		
Date (yyyy/dd)	1981/ 04	1979/ 18	1984/ 08	2003/ 07	2006/ 07	1980/ 09	1984/ 08	2004/ 22	1993/ 30	1988/ 31	1989/ 29	2004/ 20		

▼ Precipitation

Precipitation														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Rainfall (mm)	16.6	16.0	29.2	56.6	82.3	84.8	77.2	89.9	94.0	75.2	66.0	22.2	709.9	Ⓒ
Snowfall (cm)	65.9	45.9	29.0	5.7	0.1	0.0	0.0	0.0	0.0	2.3	22.8	51.4	223.0	Ⓒ
Precipitation (mm)	82.5	61.8	58.1	62.2	82.4	84.8	77.2	89.9	94.0	77.5	88.9	73.6	932.9	Ⓒ
Average Snow Depth (cm)	16	17	8	1	0	0	0	0	0	0	2	9	4	Ⓓ
Median Snow Depth (cm)	17	17	8	0	0	0	0	0	0	0	1	8	4	Ⓓ
Snow Depth at Month-end (cm)	17	15	1	0	0	0	0	0	0	0	4	11	4	Ⓒ
Extreme Daily Rainfall (mm)	27.0	35.0	43.0	40.0	54.4	96.0	75.0	79.0	80.0	48.8	50.0	28.6		
Date (yyyy/dd)	1998/ 05	1997/ 21	1990/ 11	1995/ 21	2004/ 23	1995/ 02	1980/ 20	1995/ 31	1986/ 11	1995/ 05	1999/ 02	1979/ 24		
Extreme Daily Snowfall (cm)	65.0	32.4	22.0	17.0	2.0	0.0	0.0	0.0	0.0	12.0	27.0	44.0		
Date (yyyy/dd)	1978/ 09	1984/ 29	1984/ 10	1979/ 04	1989/ 07	1978/ 01	1978/ 01	1978/ 01	1977/ 01	1997/ 26	2000/ 21	1995/ 10		
Extreme Daily Precipitation (mm)	65.0	35.0	43.0	40.0	54.4	96.0	75.0	79.0	80.0	48.8	52.0	44.0		
Date (yyyy/dd)	1978/ 09	1997/ 21	1990/ 11	1995/ 21	2004/ 23	1995/ 02	1980/ 20	1995/ 31	1986/ 11	1995/ 05	1999/ 02	1995/ 10		
Extreme Snow Depth (cm)	57	59	50	21	0	0	0	0	0	8	29	54		
Date (yyyy/dd)	1981/ 07	2001/ 09	2003/ 05	1987/ 01	1981/ 01	1981/ 01	1981/ 01	1981/ 01	1981/ 01	1997/ 27	1995/ 28	1995/ 11		

▼ Days with Maximum Temperature

<u>Days with Maximum Temperature</u>														
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>	<u>Code</u>
<= 0 °C	21.0	16.6	10.0	0.92	0.0	0.0	0.0	0.0	0.0	0.0	3.5	14.6	66.6	☐
> 0 °C	10.0	11.6	21.0	29.1	31.0	30.0	31.0	31.0	30.0	31.0	26.5	16.4	298.6	☐
> 10 °C	0.36	0.48	3.8	14.9	28.2	29.9	31.0	31.0	29.5	21.8	6.4	1.0	198.2	☐
> 20 °C	0.0	0.0	0.54	3.1	10.6	22.6	29.1	27.3	15.6	3.6	0.08	0.0	112.5	☐
> 30 °C	0.0	0.0	0.0	0.04	0.40	2.5	4.4	2.4	0.63	0.0	0.0	0.0	10.4	☐
> 35 °C	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.04	0.0	0.0	0.0	0.0	0.08	☐

▼ Days with Minimum Temperature

<u>Days with Minimum Temperature</u>														
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>	<u>Code</u>
> 0 °C	0.84	1.0	2.9	13.9	29.0	30.0	31.0	31.0	29.8	24.8	10.6	3.0	207.8	☐
<= 2 °C	30.9	28.1	30.2	21.7	5.2	0.12	0.0	0.09	0.96	12.3	23.7	29.9	183.0	☐
<= 0 °C	30.2	27.2	28.1	16.1	2.0	0.0	0.0	0.04	0.21	6.3	19.4	28.0	157.5	☐
< -2 °C	27.0	24.6	22.9	7.1	0.12	0.0	0.0	0.0	0.0	0.92	10.6	22.6	115.8	☐
< -10 °C	17.0	15.6	9.1	0.52	0.0	0.0	0.0	0.0	0.0	0.0	0.79	9.6	52.6	☐
< -20 °C	6.0	3.9	0.96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	12.2	☐
< -30 °C	0.56	0.13	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.77	☐

▼ Days with Rainfall

<u>Days with Rainfall</u>														
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>	<u>Code</u>
>= 0.2 mm	2.8	3.0	5.4	11.3	12.9	11.4	11.1	11.8	13.3	15.5	11.3	4.6	114.4	☐
>= 5 mm	1.0	1.2	2.2	3.9	5.8	4.4	4.7	5.1	5.4	5.5	4.6	1.9	45.5	☐
>= 10 mm	0.64	0.58	0.88	1.6	2.7	2.9	2.5	3.4	3.0	1.9	2.2	0.46	22.8	☐
>= 25 mm	0.04	0.08	0.04	0.27	0.36	0.73	0.62	0.81	0.73	0.15	0.28	0.04	4.2	☐

▼ Days With Snowfall

<u>Days With Snowfall</u>														
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>	<u>Code</u>
>= 0.2 cm	12.4	10.0	6.8	1.5	0.04	0.0	0.0	0.0	0.0	0.54	4.5	9.6	45.5	☐
>= 5 cm	5.0	3.4	2.2	0.35	0.0	0.0	0.0	0.0	0.0	0.19	1.6	3.8	16.5	☐
>= 10 cm	1.8	1.0	0.64	0.12	0.0	0.0	0.0	0.0	0.0	0.04	0.46	1.6	5.7	☐
>= 25 cm	0.08	0.15	0.0	0.04	0.0	0.0	0.0	0.0	0.0	0.0	0.08	0.08	0.43	☐

▼ Days with Precipitation

<u>Days with Precipitation</u>														
	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Year</u>	<u>Code</u>
>= 0.2 mm	14.9	12.3	11.6	12.2	12.9	11.4	11.1	11.8	13.3	15.6	15.4	13.8	156.1	☐

Days with Precipitation														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
>= 5 mm	6.0	4.5	4.3	4.2	5.8	4.4	4.7	5.1	5.4	5.7	6.2	5.8	62.0	☐
>= 10 mm	2.4	1.8	1.6	1.7	2.7	2.9	2.5	3.4	3.0	2.0	2.7	2.1	28.9	☐
>= 25 mm	0.12	0.23	0.04	0.31	0.36	0.73	0.62	0.81	0.73	0.19	0.44	0.13	4.7	☐

▼ Degree Days

Degree Days														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Above 24 °C	0	0	0	0	0.1	2.5	8.3	4.2	0.4	0	0	0	15.5	☐
Above 18 °C	0	0	0	0.8	8	45.5	95.8	71.4	19.6	1	0	0	242	☐
Above 15 °C	0	0	0	3.4	25.6	103.1	180.5	149.2	56.1	5.1	0	0	523	☐
Above 10 °C	0	0	1.5	16.8	97.6	239.8	334.6	301.4	165.9	36.1	2.2	0.3	1196.3	☐
Above 5 °C	0.4	0.5	10.1	66.1	227.7	389.2	489.6	456.3	310.6	126.9	26.1	3.9	2107.4	☐
Above 0 °C	7.7	10.1	44.4	176.1	381.7	539.2	644.6	611.3	460.5	272.9	101.1	25.4	3274.9	☐
Below 0 °C	245.7	194.9	110	7.9	0	0	0	0	0	0	21.7	132.5	712.8	☐
Below 5 °C	393.4	326.4	230.8	47.9	1.1	0	0	0	0.1	9.1	96.6	266	1371.3	☐
Below 10 °C	548	466.9	377.1	148.6	25.9	0.6	0	0.1	5.4	73.2	222.8	417.4	2286.2	☐
Below 15 °C	703	608	530.7	285.3	108.9	14	0.9	2.8	45.6	197.2	370.6	572.1	3439.1	☐
Below 18 °C	796	692.6	623.7	372.6	184.3	46.3	9.1	18	99	286.2	460.6	665.1	4253.7	☐

▼ Frost-Free

1981 to 2010 Canadian Climate Normals station data

Frost-Free		
	Date/Days	Code
Average Date of Last Spring Frost	May 07	☐
Average Date of First Fall Frost	Oct 09	☐
Average Length of Frost-Free Period	153 Days	☐

1981 to 2010 Canadian Climate Normals station data

Frost-Free							
Probability of last temperature in spring of 0 °C or lower on or after indicated dates	10%	25%	33%	50%	66%	75%	90%
Date	May 19	May 16	May 12	May 05	May 03	Apr 30	Apr 27
Probability of first temperature in fall of 0 °C or lower on or before indicated dates	10%	25%	33%	50%	66%	75%	90%
Date	Sep 20	Oct 02	Oct 07	Oct 10	Oct 14	Oct 18	Oct 23
Probability of frost-free period equal to or less than indicated period (Days)	10%	25%	33%	50%	66%	75%	90%
Days	126	147	154	156	159	161	169

APPENDIX VIII
Preliminary Water Balance Calculations

WATER BALANCE TABLE A - CLIMATIC DATA

Barrie WPCC Weather Station (Class "C")

Latitude: 44°22'33.012" N

Longitude: 79°41'23.010" W

Elevation: 221.00 m

Temperature:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average (°C)	-7.7	-6.6	-2.1	5.6	12.3	17.9	20.8	19.7	15.3	8.7	2.7	-3.5	6.9
Precipitation													
Rainfall (mm)	16.6	16.0	29.2	56.6	82.3	84.8	77.2	89.9	94.0	75.2	66.0	22.2	709.9
Snowfall (cm)	65.9	45.9	29.0	5.7	0.1	0.0	0.0	0.0	0.0	2.3	22.8	51.4	223.0
Precipitation (mm)	82.5	61.8	58.1	62.2	82.4	84.8	77.2	89.9	94.0	77.5	88.9	73.6	932.9

Note:

WMO Standards for "CLIMATE NORMALS" - Class "C": No more than 3 consecutive or 5 total missing years between 1981 to 2010 for at least 20 years.

This station meets WMO standards for temperature and precipitation

WATER BALANCE SUMMARY TABLE B - WATER SURPLUS

WATER SURPLUS

Climate data from Barrie WPCC Weather Station (1981 - 2010)

Potential Evapotranspiration Calculation	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Average Temperature (Degree C)	-7.70	-6.60	-2.10	5.60	12.30	17.90	20.80	19.70	15.30	8.70	2.70	-3.50	6.90
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.19	3.91	6.90	8.66	7.97	5.44	2.31	0.39	0.00	36.8
$a = 0.000000675 * T^3 - 0.0000771 * T^2 + 0.01792 * T + 0.49239$	1.08												
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.00	25.21	59.00	88.49	104.08	98.15	74.69	40.58	11.46	0.00	501.7
Adjusting Factor for U (Latitude 44°N)*	0.81	0.81	1.02	1.13	1.27	1.28	1.30	1.20	1.04	0.94	0.80	0.76	
Adjusted Potential Evapotranspiration PET (mm)	0.0	0.0	0.0	28.4	75.0	113.5	135.5	118.2	77.7	38.3	9.1	0.0	595.7
PRE-DEVELOPMENT WATER BALANCE (PERVIOUS AREA)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Precipitation (P)	82.5	61.8	58.1	62.2	82.4	84.8	77.2	89.9	94.0	77.5	88.9	73.6	932.9
Potential Evapotranspiration (PET)	0.0	0.0	0.0	28.4	75.0	113.5	135.5	118.2	77.7	38.3	9.1	0.0	595.7
P - PET	82.5	61.8	58.1	33.8	7.4	-28.7	-58.3	-28.3	16.3	39.2	79.8	73.6	337.2
Surplus - available for infiltration or runoff (mm)	82.5	61.8	58.1	33.8	7.4	0.0	0.0	0.0	16.3	39.2	79.8	73.6	452.4
Potential Infiltration (based on MOE methodology) (mm)	53.6	40.2	37.8	22.0	4.8	0.0	0.0	0.0	10.6	25.5	51.8	47.8	294.1
Potential Surface Water Runoff (mm)	28.9	21.6	20.3	11.8	2.6	0.0	0.0	0.0	5.7	13.7	27.9	25.8	158.3
PRE-DEVELOPMENT WATER BALANCE (IMPERVIOUS AREA)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Precipitation (P)	82.5	61.8	58.1	62.2	82.4	84.8	77.2	89.9	94.0	77.5	88.9	73.6	932.9
Evaporation (20% of Precipitation)	16.5	12.4	11.6	12.4	16.5	17.0	15.4	18.0	18.8	15.5	17.8	14.7	186.6
Surplus - to be runoff in impervious area(mm)	66.0	49.4	46.5	49.8	65.9	67.8	61.8	71.9	75.2	62.0	71.1	58.9	746.3

* the Site is at Latitude of 44°22'39.22" N.

20% of precipitation will evaporate in impervious area.

Site Condition

*MOE SWM infiltration factor calculation		average slope: approximately 1 m/km native soils of sand and clay Cultivated land
topography - Rolling Land to Flat Land	0.25	
soils - open sandy loam with clay	0.3	
cover - cultivated land	0.1	
Infiltration Factor	0.65	

WATER BALANCE SUMMARY TABLE C - PRE-DEVELOPMENT													
Pre-Development Water Balance Components													
Climate data from Barrie WPCC Weather Station (1981 - 2010)													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Land Area (m ²)	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	
Pervious Area (m ²)	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	3,050.0	
Impervious Area (m ²)	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	4,034.0	
- Building/roof Area (m ²)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
PRECIPITATION													
Precipitation (mm)	82.5	61.8	58.1	62.2	82.4	84.8	77.2	89.9	94.0	77.5	88.9	73.6	932.9
Precipitation in Entire Site (m ³ /month)	584.4	437.8	411.6	440.6	583.7	600.7	546.9	636.9	665.9	549.0	629.8	521.4	6,608.7
Precipitation in Pervious Area (m ³ /month)	251.6	188.5	177.2	189.7	251.3	258.6	235.5	274.2	286.7	236.4	271.1	224.5	2,845.3
Precipitation in Impervious Area (m ³ /month)	332.8	249.3	234.4	250.9	332.4	342.1	311.4	362.7	379.2	312.6	358.6	296.9	3,763.3
WATER SURPLUS													
Water Surplus in Pervious Area (mm)	82.5	61.8	58.1	33.8	7.4	0.0	0.0	0.0	16.3	39.2	79.8	73.6	452.4
Water Surplus in Pervious Area (m ³ /month)	251.6	188.5	177.2	103.1	22.4	0.0	0.0	0.0	49.8	119.5	243.2	224.5	1,379.9
Water Surplus ⁽¹⁾ in Impervious Area (m ³ /month)	266.2	199.4	187.5	200.7	265.9	273.7	249.1	290.1	303.4	250.1	286.9	237.5	3,010.7
Water Surplus in Entire Site (m ³ /month)	517.9	387.9	364.7	303.9	288.3	273.7	249.1	290.1	353.1	369.6	530.1	462.0	4,390.6
INFILTRATION													
Infiltration Factor	0.00	0.00	0.00	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.00	
Infiltration ⁽²⁾ in Pervious Area (m ³ /month)	0.0	0.0	0.0	67.0	14.6	0.0	0.0	0.0	32.4	77.7	158.1	0.0	349.8
RUNOFF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Runoff Volume (m ³ /month)	517.9	387.9	364.7	236.8	273.8	273.7	249.1	290.1	320.8	291.9	372.0	462.0	4,040.8

Notes:

(1) 20% of precipitation will evaporate in impervious area.

(2) No infiltration occurs in winter season between December and March and/or in impervious area

WATER BALANCE SUMMARY TABLE D - POST-DEVELOPMENT WITHOUT MITIGATIVE MEASURES													
Post-Development Water Balance Components													
Climate data from Barrie WPCC Weather Station (1981 - 2010)													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Land Area (m ²)	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	7,084.0	
Pervious Area (m ²)	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	1,061.0	
Impervious Area (m ²)	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	6,023.0	
Building/roof Area	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	1,195.0	
PRECIPITATION													
Precipitation (mm)	82.5	61.8	58.1	62.2	82.4	84.8	77.2	89.9	94.0	77.5	88.9	73.6	932.9
Precipitation Entire Site (m ³ /month)	584.4	437.8	411.6	440.6	583.7	600.7	546.9	636.9	665.9	549.0	629.8	521.4	6,608.7
Precipitation in Pervious Area (m ³ /month)	87.5	65.6	61.6	66.0	87.4	90.0	81.9	95.4	99.7	82.2	94.3	78.1	989.8
Precipitation in Impervious Area (m ³ /month)	496.9	372.2	349.9	374.6	496.3	510.8	465.0	541.5	566.2	466.8	535.4	443.3	5,618.9
WATER SURPLUS													
Water Surplus in pervious area (mm)	82.5	61.8	58.1	33.8	7.4	0.0	0.0	0.0	16.3	39.2	79.8	73.6	452.4
Water Surplus in Pervious Area (m ³ /month)	87.5	65.6	61.6	35.9	7.8	0.0	0.0	0.0	17.3	41.6	84.6	78.1	480.0
Water Surplus ⁽¹⁾ in Impervious Area (m ³ /month)	397.5	297.8	279.9	299.7	397.0	408.6	372.0	433.2	452.9	373.4	428.4	354.6	4,495.1
Water Surplus Entire Site (m ³ /month)	485.1	363.3	341.6	335.6	404.8	408.6	372.0	433.2	470.2	415.0	513.0	432.7	4,975.1
Water Surplus ⁽¹⁾ on Building Roof (m ³ /month)	78.9	59.1	55.5	59.5	78.8	81.1	73.8	85.9	89.9	74.1	85.0	70.4	891.9
INFILTRATION (NO MITIGATIVE MEASURES)													
Infiltration Factor ⁽²⁾	0.00	0.00	0.00	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.00	
Infiltration in Pervious Area (m ³ /month)	0.0	0.0	0.0	23.3	5.1	0.0	0.0	0.0	11.3	27.0	55.0	0.0	121.7
RUNOFF (NO MITIGATIVE MEASURES)													
Runoff Volume (m ³ /month)	485.1	363.3	341.6	312.3	399.8	408.6	372.0	433.2	459.0	388.0	458.0	432.7	4,853.4

Notes:

(1) 20% of precipitation will evaporate in impervious area.

(2) No infiltration occurs in winter season between December and March and/or in impervious area

WATER BALANCE SUMMARY TABLE E - Pre-/Post-Development Water Balance Without Mitigations/LID Strategies						
Land Use Description		Land Area (m ²)	Total Precipitation (m ³ /year)	Water Surplus (m ³ /year)	Infiltration Volume (m ³ /year)	Runoff Volume (m ³ /year)
Pre-Development Analysis (Existing Conditions)						
Pervious	Unpaved/Landscape Area	3050	2845	1380	350	1030
Impervious	Paved Area	4034	3763	3011	0	3011
TOTAL PRE-DEVELOPMENT		7084	6609	4391	350	4041
Post-Development Analysis (No Mitigation)						
Pervious	Unpaved/Landscape Area	1061	990	480	122	358
Impervious	Paved Area	6023	5619	4495	0	4495
TOTAL POST-DEVELOPMENT		7084	6609	4975	122	4853
Change in Volume Due to development (m ³ /year)		0	0	585	-228	813
Change in % Due to development (m ³ /year)		0%	0%	13%	-65%	20%
The required infiltration volume to balance pre- to post development conditions (m ³ /year)					228	
The water available from roof/building area at post development condition (m ³ /year)					892	