City of Mississauga

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

Weston Consulting.

3016-3032 Kirwin Ave & 3031 Little John Lane

November 07, 2023

21111

REVISION HISTORY

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1 INTRODUCTION

1.1 SCOPE OF THE SWM AND SERVICING BRIEF

LEA Consulting Ltd has been retained by Weston Consulting. to prepare a Functional Servicing and Stormwater Management Report for the proposed residential development project in the City of Mississauga. This Servicing and stormwater management report shall:

- Examine the potential water quality and quantity impacts of the proposed 8-storey apartment development and summarize how each will be addressed in accordance with the City of Mississauga and Credit Valley Conservation (CVC) stormwater management requirements.
- Review the existing water supply, storm, sanitary services, and propose a site servicing plan.

1.2 SITE LOCATION

The proposed development site is located at the southwest quadrant of Kirwin Avenue and Dundas Street East, contributory to Cooksville Creek watershed, and under the jurisdiction of Credit Valley Conservation (CVC). The site is approximately 0.64 ha in area.

1.3 STORMWATER MANAGEMENT PLAN OBJECTIVES

The objectives of the stormwater management plan are to review the stormwater eknvironment impact by the proposed residential development and address the City's requirements for stormwater quantity control and quality control as required;

1.4 SWM DESIGN CRITERIA – CREDIT VALLEY CONSERVATION AUTHORITY

Since the Project Site is located within the City of Mississauga and the Cooksville Creek watershed, which is under jurisdiction of the Credit Valley Conservation (CVC), the following SWM criteria and guidelines were referenced during SWM analysis and design to provide direction on how to manage rainfall and runoff inside CVC and City's jurisdiction:

- City of Mississauga Development Requirements Manual, Section 8, City of Mississauga, November 2020;
- Credit Valley Conservation (CVC), Stormwater Management Criteria, August 2012;

A summary of the stormwater management criteria applied for this project is provided below:

- Storm Water Quality Control: Cooksville Creek is classified as requiring an Enhanced level of protection (80% TSS removal) by CVC quality control criteria.
- Water Quantity Control: all storm events up to 100-year post-development peak flow shall be controlled to the 2-year pre-development flow with a maximum runoff coefficient of 0.5 as required by CVC and the City of Mississauga within the Cooksville Creek Sub-watershed.
- Water Balance: The minimum on-site runoff retention will require the site to retain all runoff from a 5mm storm event through infiltration, evapotranspiration or rainwater reuse.
- Erosion Control: On-site retention of 5mm for small infill/redevelopment sites < 2.0 ha within the Cooksville Creek sub-watershed.

2 EXISTING CONDITIONS

2.1 GENERAL

The existing site is located between Kirwin Avenue and Little john Lane and consists of four single-family houses and 0.53 ha of lawn and treed area.

During rainfall events, surface rainfall-runoff of houses flows to Kirwin Avenue and runoff of the rest of the site drains to the Cooksville Creek. The total drainage area is approximately 0.64 ha.

For the purpose of SWM analysis, the development site catchment divided into the following two sub-catchment areas based on the existing drainage pattern.

- EC1 – Exiting houses drains to Kirwin Ave.;
- EC2 – The green area which drains to Cooksville Creek.

The composite runoff coefficients of two sub-catchment areas are, as estimated in Appendix A and B, listed in Table 1.

Table 1: Pre-Development Runoff Coefficient

Sub-catchment No	Catchment Description	Catchment Area (ha)	Runoff Coefficient
EC1	Existing Houses	0.195	0.62*
EC2	Existing green area	0.444	0.25

* As per City of Mississauga Design Requirements, maximum runoff coefficient of 0.5 has been considered in storm flow calculations under existing condition.

The current site does not accept any external drainage. Overland flow routes, grading and land use details under existing conditions are illustrated in Figure 1, Appendix G.

Based on our review of the topographic survey, there is no on-site stormwater management facility under the existing condition.

2.2 RAINFALL INFORMATION

The rainfall intensity for the site was calculated using the following equation:

$$I = A / (T_c + B)^{0.78}$$

Where; I = rainfall intensity in mm/hr,

T_c = time of concentration in minutes,

A, B = constant parameters (see below)

The parameters (A and B) recommended for use in the City of Mississauga are defined in City Standard Drawing No. 2111.010 and are summarized in Table 2.

Table 2: Rainfall Parameters

Return Period (Year)	2 - Yr	5 - Yr	10 - Yr	25 - Yr	50 - Yr	100 - Yr
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9

The initial time of concentration, TC, of 15 minutes is recommended in the City's Development Requirements Manual.

2.3 PEAK FLOW RATES UNDER EXISTING CONDITION

Based on the existing site condition and rainfall parameters, the Rational Method is adopted to calculate peak flows at different design storm events.

The calculated peak flow rates for each sub-catchment under pre-development condition are calculated and summarized below in Table 3. Detailed calculations are provided in Appendix A.

Table 3: Pre-Development Peak Flow Rates (L/s)

Sub-catchment ID	Sub-Catchment Description	2 - Yr	5 - Yr	10 - Yr	25 - Yr	50 - Yr	100 - Yr
EC1	Existing Houses	16.21	21.80	26.85	30.83	34.42	38.09
EC2	Existing green area	18.45	24.80	30.54	35.08	39.16	43.33

Maximum runoff coefficient of 0.5 has been considered in pre-development peak flow calculation of sub-catchment EC1.

2.4 Allowable Release Rate

Based on the City's record drawings, storm drainage area plan design sheets, under the existing condition, the flow from the proposed site to the Kirwin Avenue includes only the rainfall runoff from the existing houses.

In order to maintain the existing drainage condition of Kirwin Avenue, the allowable discharge flow rate from the proposed site to the existing municipal sewer on Kirwin Avenue under the proposed condition will be 16.21 l/s which is equal to the 2-yr existing flow from sub-catchment EC1 with a maximum runoff coefficient of 0.5.

3 POST-DEVELOPMENT CONDITIONS

3.1 GENERAL

The proposed development consists of construction of an 8-storey residential building with 2 underground parking levels on the northern part of the site. The proposed storm drainage condition is as follows:

Sub-catchment OC1:

This sub-catchment includes the entire development area except building frontage along the Kirwin Avenue. During rainfall events, surface storm runoff of the site will be captured by building's roof and terrace drains and proposed at-grade area drains, conveyed through internal storm piping within the underground parking to the proposed concrete storm tank and outlet to the existing municipal storm sewer on Kirwin Avenue.

Minimal landscape areas at the south and northwest side of the site will drain to the dedicated parkland. Since the land use of these small areas will remain as-is and with regard to the grading constraints, the runoff from these small areas will not be controlled.

Sub-catchment PC2:

This sub-catchment consists of the lands to be dedicated for parkland and a small portion of the development area at the west of the proposed building which will remain as-is. The existing drainage pattern will not be changed, and all storm runoff will convey and discharge to Cooksville Creek under the proposed condition

Refer to Figure 2 in Appendix G for the proposed sub-catchments, overland flow route and drainage condition.

The relevant drainage parameters of the post-development drainage areas are provided in Table 5. Refer to Appendices A and B for details. As per City's requirement, the runoff coefficient of 0.9 and was considered in the required storm storage calculation for catchment area PC1.

Sub-catchment UC1:

This sub-catchment is located North of the proposed building. Since this area is graded towards Kirwin Avenue and the flow pattern remains the runoff will not be controlled.

Table 5: Post-Development Input Parameter

Sub-Catchment No.	Drainage Area (ha)	C	Tc (min.)
OC1	0.330	0.76 (Considered 0.9 in Storm Calculations)	15
PC2 (Parkland area)	0.295	0.25	15
UC1	0.013	0.88	15

3.2 PEAK FLOW RATES UNDER PROPOSED CONDITION

Based on the proposed site condition and rainfall parameters, the Rational Method is adopted to calculate peak flows at different design storm events.

According to the City of Mississauga Development Requirements Manual, 2016, in order to account for the increase in runoff due to saturation of the catchment surface, for storms having a return period of more than 10 years, runoff coefficients shall be increased by the adjustment factors, up to a maximum coefficient of 1.0. Table 6 illustrate the proposed adjustment factors.Table 6: Runoff Coefficient Adjustment Factors

Return Period (Year)	Adjustment Factor
10yr	1.00
25yr	1.10
50yr	1.20
100yr	1.25

The calculated peak flow rates for sub-catchment PC1 and PC2 under the post-development condition are summarized below in Table 7. Detailed calculations are provided in Appendices A and B.

Table 7: Post-Development Peak Flow Rates (L/s)

Sub-catchment ID	Sub-Catchment Description	2 - Yr	5 - Yr	10 - Yr	25 - Yr	50 - Yr	100 - Yr
OC1	Overcontrolled Development area	49.42	66.44	81.83	103.38 *	116.57 *	129.00 *
PC2	Parkland	12.28	16.51	20.34	23.36	26.07	28.85
UC1	Uncontrolled area	1.91	2.57	3.17	3.64	4.06	4.50

The adjusted runoff coefficients are used to calculate 25-yr to 100-yr flow.

3.3 OVERCONTROL TO MEET ALLOWABLE RELEASE RATE

As mentioned in Section 1.4, the proposed site is located within Cooksville Creek sub-watershed and required to control 100-year post-development flow to 2-year pre-development flow with a maximum runoff coefficient of 0.5.

Based on the City's record drawings, storm drainage area plan design sheets, under the existing condition, the flow from the proposed site to the Kirwin Avenue includes only the rainfall runoff from the existing houses.

In order to maintain the existing drainage condition of Kirwin Avenue, the allowable discharge flow rate from the proposed site to the existing municipal sewer on Kirwin Avenue under the proposed condition will be the 2-year existing flow from sub-catchment OC1.

Furthermore, as mentioned in Section 3.1, under post-development condition it is not feasible to implement discharge control for sub-catchment UC1. Therefore, the discharge from proposed residential development (sub-catchment OC1) will be overcontrolled to satisfy the City's quantity control criteria.

As a result, the allowable flow rate from proposed residential development or sub-catchment OC1 is estimated at 11.72 L/s. Detailed calculations are provided on page A-04 of Appendix A.

3.4 IMPACT ON WATER ENVIRONMENT

Based on the review and analysis for existing and proposed site conditions, Table 8 summarizes the key hydrologic parameters of the site under the proposed condition.

Table 9: Key Hydrologic Parameters

Sub-Catchment ID	Area (ha)		Imperviousness (%)		Runoff Coefficient		100-year Peak Flow Rate (L/s)	
	Pre-Dev	Post-Dev	Pre-Dev	Post-Dev	Pre-Dev	Post-Dev	Pre-Dev	Post-Dev
EC1 & PC1(OC1+UC1)	0.195	0.343	57.4	77.1	0.62 *	0.76 **	38.09	133.50 ***
EC2 & PC2	0.444	0.295	0	0	0.25	0.25	43.33	28.85

*As per City's criteria, Maximum runoff coefficient of 0.5 has been considered in pre-development peak flow calculation.

**As per City's comment, the overall runoff coefficient of 0.90 has been considered for sub-catchment OC1.

***The adjusted runoff coefficient is used to calculate 100-yr flow.

The hydrologic parameters show the changes before and after the proposed development. Mitigation measures are required for sub-catchment OC1 in accordance with the CVC's design criteria. Since the land-use of the sub-catchment PC2 will not be changed and storm flow rates to the Cooksville Creek will be decreased under post development condition, no mitigation measures are required for sub-catchment PC2.

With regards to the abovementioned, the stormwater management plan is provided only for sub-catchment OC1.

4 PROPOSED SWM PLAN

4.1 WATER BALANCE REQUIREMENT

Based on the water balance criteria of the City of Mississauga, the minimum on-site runoff retention requires retaining all runoff of the first 5mm from each rainfall through infiltration, evapotranspiration or rainwater reuse.

For the required on-site retention volume from a 5mm rainfall event, the total required water balance volume for the catchment OC1 is 13.2m^3 based on the proposed impervious area of the site (green roof and landscape areas are excluded). This retention volume will be collected into the proposed underground storage tank. Refer to page A03 of Appendix A for detailed calculation.

The Low Impact Development (LID) methods to address the retention criteria are outlined as follows:

- Irrigation: Based on the monthly irrigation estimate provided by the design team landscape architect, the average 72-hour irrigation water use is 14.49 m^3. Detailed calculations are provided in Appendix A.
- Bio-retention swale: 500 mm of 50 mm washed clear stone below the bio-retention area will provide approximately 1.2 m^3 of retention volume. Details and drawdown calculations for the bio-retention

swales are provided in page A15 of Appendix A.

- Extensive green roof: The proposed 466m^2 green roof reduces runoff but, does not provide retention capacity beyond the first 5mm of each storm event.

Based on the provided information, a total of 15.69 m^3 of water retention c be re-used through irrigation and infiltration. Therefore, it is satisfactory to City's water balance requirement.

The total stormwater volume of 14.5 m^3 will be retained within the proposed concrete tank in the P1 parking level. The retained water will be pumped to the appropriate locations for irrigation. The pump is to be designed by the mechanical engineer in the next design stage.

In addition to the above, a water balance calculation is provided in the Hydrogeological Report. The report identified that the subject site would have a groundwater recharge deficit of 450 m^3/year without any mitigation measures. The yearly irrigation demand of the subject site is 709.72 m^3/year. As such, it is expected that the yearly runoff exceedance will be balanced with the irrigation of the subject site. As such, the entire water balance deficit will be covered by irrigation during the summer months.

4.2 WATER QUANTITY CONTROL REQUIREMENT

According to the CVC's stormwater quantity control criteria, all rainwater shall be collected by area drains, conveyed to a concrete cistern at underground parking level P1, and discharged to City's storm sewers at a 2-year pre-development flow rate with a maximum runoff coefficient of 0.5 for all storms up to and including 100-year storm.

A concrete cistern will be provided to accommodate the required stormwater storage at underground parking level P1. The location and size of the proposed cistern is shown on Architectural drawings and Dwg. C-02. A section of cistern is provided on Dwg. C-05. The detained stormwater will be discharged to Kirwin Avenue storm sewer at an overcontrolled flow rate of 11.72 L/s through a flow control device. The required orifice size to achieve the target flow would be smaller than the minimum 75mm requirement by Ministry of the Environment Conservation, and Parks (MECP). Therefore, a Contech Vortex Valve Model FA1416 will be installed at the outlet of tank to control the discharge flow refer to [age A-16 in Appendix A for Vortex Valve sizing details.

The tank drawdown time calculation shows the 100-year storm storage will be discharged in 5.67 hours. Refer to page A-13 and A-14 of Appendix A for the calculation details.

Detail of the Vortex control device is provided in Appendix A and Dwg. C-05.

The required and provided on-site stormwater storage volumes as well as the total flow from the proposed site are calculated as shown in Appendix A and summarized in Table 10 below.

Table 10: Post Development Quantity Control as Per City's Requirement

Storm Event	Allowable Discharge Flow (L/s)	Required 5mm on-site Retention (m^3)	Total Detention Storage Required (m^3)	Underground Storage Provided (m^3)
2-Year	11.72	15.4	36.17	170.00
5-Year			56.00	
10-Year			75.45	
25-Year			104.62	
50-Year			123.97	
100-Year			143.56	

4.3 WATER QUALITY CONTROL REQUIREMENT

In order to achieve the long-term average removal of 80% of Total Suspended Solids (TSS) on an annual basis from all runoff leaving the site, the following quality control measures will be provided:

Sub-catchment UC1: Based on the SWM design criteria, the residential building's rooftop area is not subject to vehicular traffic, and the application of sand and de-icing salt constituents, petroleum hydrocarbons and heavy metals. As such, runoff from the roof surface is generally considered to be clean. Table 11 provides a preliminary estimate of the TSS removal level of stormwater leaving the site.

Table 11: TTS Removal Assessment Sub-Catchment OC1

Land Use	Area (m^2)	TSS Removal Efficiency (%)	Composite TSS Removal Efficiency (%)
Roof and Terraces	1300	80	31.4
Driveway and surface parking	1312	0	0
Green roof	403.0	80	9.7
Landscape	300.0	80	7.2
Jellyfish	1312.0	80	80.0
Total	3315.0	-	>80.0

To achieve a TSS removal of 80%, a stormwater quality treatment facility (StormFilter SFPD0806 or approved equivalent) is proposed to treat the flow from the proposed driveway and surface parking areas. Refer to Appendix A and page A-17 for the sizing details and page A-06 for the flow calculation to the Jellyfish unit.

This quality treatment unit will be installed at the inlet of the storage tank at the southeast corner of the site and outside of the underground parking footprint and will receive the flow from driveway and surface parking areas only through internal storm piping. The exact location of the unit and proper internal piping will be determined in coordination with the project team's mechanical engineer and architect in the next design stage.

4.4 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

During site construction, it is recommended that all erosion and sediment control Best Management Practices (BMPs) shall be constructed and maintained in accordance with the Toronto and Region Conservation Authority (TRCA) Erosion & Sediment Control Guidelines for Urban Construction (dated 2019). In brief, the measures below are proposed to be provided on-site during the entire period of construction:

- Siltation control fence along the perimeter of the construction site before commencement of construction;
- Sediment control measures to prevent silt entry at all the existing catch basins;
- Granular mud-mats at all construction egress locations (see mud-mat details);
- An inspection and monitoring program following the *Erosion & Sediment Control Guideline for Urban Construction* (dated 2019).

An erosion and sediment control plan during construction is provided for the proposed development. Refer to Dwg. C-04 Erosion and Sediment Control Plan.

5 FLOODPLAIN REVIEW SUMMARY

The Cooksville Creek watershed is located within the City of Mississauga, east of the Credit River, that drains an area of approximately 33.9 Km2 (3,390 ha) and outlets to Lake Ontario.

The Cooksville Creek has been modelled by R.V. Anderson Ltd. in February 1996, subsequently updated and completed by Credit Valley Conservation (CVC). The most updated floodplain map was received from CVC on September 16th, 2020 which includes the proposed development.

It should be noted that the City of Mississauga and Credit Valley Conservation approved and executed a Site Plan Agreement to permit the development of Hotel Mississauga Royale on November 27, 2012, for the proposed site. This previous approval, designed by MSAI Architects, included a northern 22-storey tower (Tower B), a southern 40-storey tower (Tower A) and a 2-story building as a connection between towers.

The previously approved regulatory floodlines, prepared by AMEC, dated February 11, 2011, and the most updated floodplain by CVC are delineated on the grading and servicing plans which are presented in Appendix G. The original floodlines drawing is provided in Appendix F.

6 GROUNDWATER DISCHARGE

In order to obtain information about the subsurface condition, assess any potential subsurface environmental impacts, and investigate the requirement for groundwater discharge from the development site, Azure Group Incorporated (Azure Group) is retained by Weston Consulting to provide a geotechnical investigation and hydrogeological assessment. A map of the borehole & monitoring well investigations from the the hydrogeological assessment report prepared by Azure Group dated October 24, 2022, is provided in Appendix H.

As per the hydrogeological report, ten (10) boreholes were drilled to a maximum depth of 9.0 meters below grade and five of them were completed as groundwater monitoring wells. The hydrogeological assessment provided the following condition with respect to sub-surface soil groundwater conditions:

- The site is underlain by a thin layer (10cm) overtop of fill mixture consisting of sand, silt and clay of different compositional percentages to a depth of around 3.5 mbgs (meter below ground surface). Below this level the boreholes intersect a native silty-clay layer to the upper contact of the underlain watershed shale bedrock which was encountered in five of the advance boreholes below 7 mbgs. The inclusion of the fragments indicate that the bedrock interface is very close to this depth.
- Groundwater depths at installed monitoring wells ranged from 4.21 to 5.29 meters below ground surface as measured on May 11th, 2022. The corresponding geodetic groundwater elevations range from approximate elevations of 107.27 and 109.10 meters above sea level (masl);
- One groundwater sample was collected from monitoring well BH-3 on May 11th, 2022. Groundwater quality analysis of the unfiltered sample was checked against the most stringent objectives of potential discharge points (i.e., Provincial Water Quality Objectives (PWQO), 1994). It is indicated that the only exceedance was with the Total Phosphorous for discharge to storm sewer or natural environment. To confirm the effluent discharge into the storm sewer system, a secondary sample meeting all of the requirements of the City By-Law would need to be collected, which can be confirmed ahead of any potential construction dewatering.

Based on the design of the proposed development, the total depth of the underground structure will extend to a maximum depth of approximately 6.7 meters below the ground surface (mbgs) (107.45 masl). Since the proposed construction will be below the groundwater table, groundwater will be encountered during the excavation. As such, management of groundwater will be required for both construction dewatering and long-term conditions for the proposed development site.

6.1 CONSTRUCTION DEWATERING

According to the Hydrogeology Assessment from Azure, a maximum rate of discharge of 83,160 L/day (0.96 L/s) will be expected from the site with a safety factor of 3, See Appendix G for more details. It is therefore anticipated that there will be groundwater discharge in excess of 50m^3/day. As such, the submission of an Environmental Activity and Sector Registration (EASR) to the MECP will be required for construction dewatering. Additional dewatering would be required to manage stormwater capture during construction. However, this is expected to not trigger the need for a Permit to Take Water (PTTW) during rainfall events less than the 5-year return period. If the site experiences a 5-year storm event (56mm across 24 hours) during the excavation, an additional 289 m3 must be discharged from the site. In this event, pumping could continue under the registered ESAR. Storm events above the 5-year return period can be discharged over multiple days to avoid the need for a PTTW.

During construction, the groundwater will discharge from the excavation site to the existing 250mm sanitary sewer along Kirwin Avenue or the existing 400mm storm sewer along Kirwin Avenue. The water quality of the groundwater sample indicated only an exceedance of Total Phosphorous based on the PWQO requirements. As such, the groundwater will require Total Phosphorous treatment prior to discharge.

6.2 LONG-TERM DEWATERING

The building is currently proposed to be constructed to watertight standards as identified in a letter signed by the Owner. The planned watertight foundation will limit potential concerns with respect to groundwater at

the site with regards to permanent dewatering of the site. The signed letter from the Owner has been provided in Appendix H.

7 SITE SERVICING

The purpose of this site servicing study is to review the site servicing requirement of the proposed new 8-storey apartment development and recommend a site servicing plan, including water supply, sanitary and storm services. Refer to Drawing C-02 in Appendix G -Site Servicing Plan for details of the proposed site service connections.

7.1 EXISTING MUNICIPAL SERVICES

The proposed development will require new service connections to the existing municipal storm sewers, sanitary sewers, and watermain located on Kirwin Avenue adjacent to the site. Existing underground municipal services/utilities on Kirwin Avenue are summarized below:

a) 400mm dia. concrete storm sewer;

b) 250mm dia. concrete sanitary sewer;

c) 300mm dia. ductile iron watermain on the Northside of Kirwin Ave.;

7.2 PROPOSED SITE SERVICE CONNECTIONS

The sanitary demands have been assessed by determining the total population, sanitary generation rates, and peaking factors as outlined in the Region of Peel Criteria and the 2020 Peel Region DC Background Study. Based on the 2020 Peel Region DC Background study, the population to be considered for units less than 750 sq.ft. (69.7m^2) in size and greater than 750 sq.ft. (69.7m^2) in size shall be 1.6 and 3.0 respectively. As such, the total population on the subject site is 297. Using the Region of Peel standard rates and the Harmon Peaking Factor, this would result in a total domestic demand of 4.25 L/s. However, based on the total Region of Peel STD.DWG 2-5-2, the total domestic flow for populations less than 1000 should be considered as 13 L/s. Therefore, after accounting for infiltration, the total sanitary flow is 13.08 L/s.

Water demands have been calculated based on the same population estimate determined for the sanitary servicing of 297 persons. This population estimate was used in conjunction with the demand rates and factors provided by the Region of Peel to determine the maximum day demand of 0.96 L/s and the Peak Hour demand of 2.89 L/s. Using the Fire Underwriters Survey (2020) to calculate the fire demand yields a fire flow demand of 166.67 L/s. As such, the fire flow plus maximum day demand is 168.59 L/s.

Based on the project statistics of the proposed development provided by the architect, and design criteria of City and Region, sanitary flow and water demand are estimated in Appendix C and summarized in Table 13. The site storm flow discharge rate has been provided in the previous section of this report. A Single-Use Demand Table has been provided in Appendix C for use by the Region of Peel.

Table 13: Site Servicing Requirement

Site	Storm Discharge Rate (L/s)	Sanitary Discharge Rate (L/s)	Water Demand (L/s)
8-storey apartment	11.72	13.08	168.59

Through discussion with the design team, the locations and sizes of the proposed site service connections have been determined to satisfy the requirements of the City of Mississauga, Region of Peel and the Ontario Building Code (OBC). In summary:

1. Sanitary Service: A 150mm dia. sanitary service connection will be installed to service the proposed 8-storey apartment building and discharge to proposed manhole No. MH1B on the exiting 250mm concrete sanitary sewer on Kirwin Avenue.
2. Storm Service: A 200mm dia. storm service connection will be installed to drain the 8-storey apartment building area to the proposed manhole No. MH1A on the existing 400mm storm sewer on Kirwin Avenue.
3. Water service:
   - Domestic Water Service: A 100mm dia. domestic water service connection will be installed to service the proposed 8-storey apartment building and connected to the proposed 150mm dia. fire protection water service with a cut-in Tee.
   - Fire Protection Service: A 150mm fire protection PVC water service will be provided.

The existing 300mm diameter watermain on Kirwin Avenue will be utilized to service the proposed development site.

Based on the proposed underground parking P2 elevation of 107.45 m, sanitary flow from this floor will not be able to discharge to the City's sanitary sewer (Inv. 109.23m) by gravity. Therefore, pumps will be required. Pumps, piping and backflow preventers will be designed by a mechanical engineer in the next design phase.

Refer to Drawing C-02 in Appendix G for details of proposed service connections.

7.3 ADEQUACY OF EXISTING MUNICIPAL SERVICES

Sanitary

The subject development is anticipated to have a population of 297 people based on the latest architectural plans and the rates provided in the 2020 DC background study. When considering the per person sanitary demand and the Harmon peaking factor, and infiltration, the actual design flow is expected to be 4.33 L/s. However, based on the Region of Peel STD. DWG. 2-5-2 (Region of Peel, Sanitary Sewer Design Criteria, 2009), total domestic flow for areas with less than 1000 persons shall be considered to have a design flow of 13 L/s. Thus, the design flow after considering infiltration is 13.08 L/s. Refer to Appendix C for detailed calculations on the sanitary demands.

The Region of Peel will perform a capacity assessment of the downstream sanitary sewers for the subject development based on the above calculations.

Storm

Based on the City's design criteria, drainage area plan, record drawings, and CCTV investigation, an assessment of the existing storm sewers from the site in Kirwin Ave to the existing culvert in Dundas Street East are reviewed below:

The existing 400mm storm sewer in Kirwin Ave (identified and confirmed through the CCTV inspection), as shown on the storm drainage areas plan, is designed based on a 10-year design storm and a runoff coefficient of C=0.45. The review of the drainage plan shows that the existing plaza (157 Dundas St. E.) at the northeast quadrant of Kirwin Ave and Dundas Street East has been developed later. The CCTV inspection identified the location of area drains and storm sewers within the development at the northeast quadrant of Kirwin Avenue and Dundas Street East. The drainage area plan for the downstream capacity analysis has been updated based on the location and extent of the storm management system in the property in the northeast quadrant of Kirwin Avenue and Dundas Street East.

Based on the above assumption, the runoff coefficient is updated according to the existing land use. The flow is calculated and summarized in Table 14.

Table 14: Downstream Sewer Capacity – Proposed Condition

Street	Manhole To-From	Accumulative Drainage Area (ha)*	Q 10-yr Flow (L/S)	Q_{full} Full Capacity (L/S)	Q_{full}/Q
Kirwin Avenue	MH31 to 5	1.019	156	233	0.67
Kirwin Avenue	5 to 4 (MH30)	1.285	218	233	0.94
Dundas Street East	4 (MH30) to 3	36.925	4013	4431	0.91
Dundas Street East	3 to 2	37.285	4013	4416	0.91
Dundas Street East	2 to 1 (culvert)	37.465	3985	4507	0.88

*Accumulative Drainage Area in this table includes the area from the Subject Site in post-development conditions.

Under post-development conditions, the discharge storm flows from the site will be controlled to 2-yr pre-development or 16.21 L/s which is less than the 10-yr flow rate of 33.29 L/s under the existing condition. As described in Section 4, the site is overcontrolled to account for the 100-year uncontrolled release to Kirwin Avenue. In the downstream sewer analysis, this flow is accounted for as the 10-year flow. Therefore, the total flow to the existing storm sewer in Kirwin Avenue will be decreased from 240 L/s to 218 L/s which is less than the existing 400mm storm sewer capacity. The flow calculation and updated runoff coefficient and design sheets are provided in Appendix D. It should be noted that only a small portion of the 400mm sewer on Kirwin Avenue experiences a Q/Q_{full} ratio of 0.94. This occurs downstream of the location where the catch basins in the intersection of Kirwin and Dundas connect into the sewer. Refer to Figure 3 in Appendix D for details on the location of this connection point. As such, the majority of the 400mm sewer on Kirwin Avenue experiences a Q/Q_{full} ratio of 0.67 in post-development conditions.

Since the proposed conditions do not demonstrate a surcharge condition within the downstream sewers, it is not expected that any upgrades will be required within the downstream storm sewer network.

Watermain

The design water demand is estimated as 168.59 L/s (1879.68 US GPM) based on the project statistics. In order to evaluate the adequacy of the 300mm watermain located on Kirwin Avenue, a hydrant flow test was conducted on June 15, 2017, by Focus Fire Protection. Test results are included in Appendix E.

As shown by the test readings, the available water pressure ranges from 74 psi with a flow of 1521 US GPM to 76 psi with a flow of 1000 US GPM during the flow test with a static pressure of 80 psi. At the design water demand of 168.59 L/s (2672.18 US GPM) generated from the development, the flow test results show a residual pressure of 57.4 psi, which is greater than the minimum requirement of 20 psi (150 kPa). Therefore, adequate water supply and pressure are available to serve the proposed development.

It should be noted that the design and location of the building does not allow for all portions of the building faces to be less than 90m from the nearest hydrant. As such, a private hydrant is proposed on the site at the northern limit of the site. This private hydrant will provide the required coverage of all portions of all faces of the building. Please refer to Drawing C-02 for details on the location of the private hydrant.

8 CONCLUSIONS

Stormwater Management Plan

- Under the existing condition, there are no existing on-site stormwater management facilities.
- An on-site storage volume of approximately 15.40 m^3 will be provided by the underground cistern and bio-swale for retaining the first 5mm of rainfall runoff as required to achieve the water balance target. This portion of water will be re-used on-site for irrigation during 72 hours and a small portion will infiltrate into soil through bio-swale.
- An on-site storage tank with approximately 170 m^3 in volume will be provided in order to control the post-development 100-year stormwater flows to 2-year pre-development level.
- To satisfy the City's 80% TSS removal, a stormwater quality treatment facility (StormFilter SFPD0806 or approved equivalent) is proposed for Sub-Catchment Area OC1.
- Sub-catchment C2 includes the land to be dedicated to the parkland and to remain as the existing condition. Therefore, no stormwater management plan is required.

Temporary Erosion & Sediment Control Measures

- Temporary erosion and sediment control measures will be provided before construction and maintained during construction in accordance with CVC CA's "Stormwater Management Criteria"

Groundwater Discharge

- According to the Hydrogeology Assessment from Azure, a maximum rate of discharge of 83,160 L/day (0.96 L/s) of groundwater will be expected from the site with a safety factor of 3 and 289,000 L/day stormwater based on the 5-year storm event. The submission of an Environmental Activity and Sector Registration (EASR) to the MECP will be required for construction dewatering.

- The building is currently proposed to be constructed to watertight standards. Therefore, no ling-term groundwater discharge is expected.

Site Servicing

Proposed site service connections for the proposed development site:

- Storm service: 200mm dia. PVC pipes
- Sanitary service: 150mm dia. PVC pipes
- Water service:
    - 100mm dia. PVC pipe for domestic water supply
    - 150mm dia. PVC pipe for fire water supply

Prepared By:
LEA Consulting Ltd.

Farshid Morshedi, P.Eng.
Water Resources Engineer

Pavel Recnik, EIT
Hydraulic Modelling Lead

APPENDIX A

Stormwater Peak Flow and Storage Calculation and SWM Details for Sub-Catchment Area EC1, OC1 and UC1

LEA Consulting Ltd. Consulting Engineers and Planners	Land Use			
	Prepared:	P.R.	Page No.	A-01
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Pre-Development CONDITION

Sub-Catchment EC1

Existing Land Use	Area (m^2)
Building	360.0
Asphalt	759.0
Lawn & Tree	830.0
Sum. Area:	**1949.0**

Post-Development Ccondition:

Sub-Catchment OC1

Proposed Land Use	Area (m^2)
Building (without green roof)	1421.5
Paved Area	1096.6
Green Roof	466.0
Landscaped Area	316.4
Sum. Area:	**3300.5**

Sub-Catchment UC1

Proposed Land Use	Area (m^2)
Paved Area	126.7
Landscaped Area	3.9
Sum. Area:	**130.6**

LEA Consulting Ltd. Consulting Engineers and Planners	Composite "C" Calculation			
	Prepared:	P.R.	Page No.	A-02
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Pre-Development Composite Runoff Coefficient "C"

Sub-Catchment EC1

Existing Land Use	Area (ha)	C	Composite "C"	
Building	0.036	0.90		
Asphalt	0.076	0.90		
Lawn & Tree	0.083	0.25		
Sum. Area:	**0.195**		**0.62**	
			0.50	As per City's Criteria
Imperviousness Percent:	**57.4**			

Post-Development Composite Runoff Coefficient "C"

Sub-Catchment OC1

Proposed Land Use	Area (ha)	C	Composite "C"	
Building (without green roof)	0.142	0.90		
Paved Area	0.110	0.90		
Green Roof	0.047	0.25		
Landscaped Area	0.032	0.4		
Sum. Area:	**0.330**		**0.76**	
			0.90	As per City's request
Imperviousness Percent:	**76.3**			

Sub-Catchment UC1

Proposed Land Use	Area (ha)	C	Composite "C"
Paved Area	0.013	0.90	
Landscaped Area	0.0004	0.25	
Sum. Area:	**0.013**		**0.88**
Imperviousness Percent:	**97.0**		

Total Site Area:	**0.343**
Composite runoff coefficient for entire site:	**0.76**
Total impervious percent:	**77.1**

LEA Consulting Ltd. Consulting Engineers and Planners	5mm Rainfall Retention Volume (Water Balance)			
	Prepared:	P.R.	Page No.	A-03
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

According to the CVC Guidelines, in order to achieve the water balance target, it is required to retain all runoff from a small event - typically 5mm (in Toronto, storms with 24 hour volumes of 5mm or less contribute about 50% of the total average annual rainfall volume) through infiltration, evapotranspiration & rainwater reuse.

Site Area:	0.343	ha
Total Site Impervious Area:	0.264	ha

Runoff volume from 5mm rainfall event on site:

$V = 0.264 \times 10 \times 5 = 13.2 \ m^3$

Required on-site retention volume for 5mm rainfall event: 13.2 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	Pre-Development Peak Flow Rates Calculation			
	Prepared:	P.R.	Page No.	A-04
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Rational Formulae: Q = 2.78 CIA (L/s)

Site Area:	0.195	ha
Time of Concentration	15	minutes as per City Guidelines
Runoff Coefficient :	0.50	As per City's Criteria

Rainfall Intensity: $I = a/(Tc+b)^c$ (City Std. 2111.010)

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

Peak Flow Rate (L/s):

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under existing site conditions (L/s):	16.21	21.80	26.85	30.83	34.42	38.09

The proposed site is under Cooksville Creek and requires to control post development flow to 2-year pre development flow for storm events that include the regional storm based on the CVC stormwater management Criteria, 2012. Furthermore, the storm runoff from the building frontage along the Kirwin Avenue (Sub-catchment UC1) is not feaseable to controlled due to the site constraint, threfore, the stormwater discharge from catchment OC1 will be overcontrolled. I.e. allowable discharge flow rate from sub-catchment OC1 will be:

Sub-catchment UC1 (Post Development 100-yr storm):	4.50	L/s
Sub-catchment OC1 (Pre-development 2-yr storm):	16.21	L/s

Overcontrolled discharge rate from sub-Catchment OC1 into municipal storm sewer on Kirwin Avenue: 11.72 L/s

LEA Consulting Ltd. Consulting Engineers and Planners	Post-Development Peak Flow Rates Calculation (Uncontrolled)			
	Prepared:	P.R.	Page No.	A-05
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Rational Formulae: Q = 2.78 CIA (L/s)

Overcontrolled Area (OC1):	0.330	ha
Time of Concentration:	15	minutes as per City Guidelines
Runoff Coefficient :	0.90	As per City's request
Uncontrolled Area (UC1):	0.013	ha
Time of Concentration:	15	minutes as per City Guidelines
Runoff Coefficient :	0.88	

Runoff Coefficient Adjustment Factors	Adjusted runoff coefficient
1.00 (10-year)	0.9
1.10 (25-year)	0.99
1.20 (50-year)	1.0
1.25 (100-year)	1.0

Rainfall Intensity: $I = a/(Tc+b)^c$ (City Std. 2111.010)

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

Peak Flow Rates (L/s):
Sub-Catchment OC1

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under Post development site conditions (L/s):	49.42	66.44	81.83	93.98	104.91	116.10
Under Post development condition with Adjustment Factors (L/s):	49.42	66.44	81.83	103.38	116.57	129.00

Sub-Catchment UC1

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under Post development site conditions (L/s):	1.91	2.57	3.17	3.64	4.06	4.50

LEA Consulting Ltd. Consulting Engineers and Planners	Post-Development Peak Flow Rates to Jellyfish Filter			
	Prepared:	P.R.	Page No.	A-06
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Rational Formulae: Q = 2.78 CIA (L/s)

Non-clean drainage area	0.064	ha
Time of Concentration:	15	minutes as per City Guidelines
Runoff Coefficient :	0.90	As per City's request

Runoff Coefficient Adjustment Factors	Adjusted runoff coefficient
1.00 (10-year)	0.9
1.10 (25-year)	0.99
1.20 (50-year)	1.0
1.25 (100-year)	1.0

Rainfall Intensity: $I = a/(Tc+b)^c$ (City Std. 2111.010)

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

Peak Flow Rates (L/s):
Non-clean drainage area

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under Post development site conditions (L/s):	9.54	12.82	15.79	18.14	20.25	22.41
Under Post development condition with Adjustment Factors (L/s):	9.54	12.82	15.79	19.95	22.50	24.90

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (2-Year Storm)			
	Prepared:	P.R.	Page No.	A-07
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Total Drainage Area (ha) = 0.330 ha
Drainage Area Composite C = 0.90
Allowable Release Rate = 11.72 L/s
Return Period = 2 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
15	59.89	49.42	44.48	11.72	10.55	33.93
20	50.16	41.40	49.67	11.72	14.06	35.61
25	43.42	35.83	53.75	11.72	17.58	36.17
30	38.45	31.73	57.11	11.72	21.09	36.02
35	34.60	28.55	59.97	11.72	24.61	35.36
40	31.54	26.03	62.46	11.72	28.12	34.34
45	29.03	23.96	64.68	11.72	31.64	33.04
50	26.94	22.23	66.68	11.72	35.16	31.52
55	25.16	20.76	68.50	11.72	38.67	29.83
60	23.62	19.49	70.18	11.72	42.19	27.99
65	22.29	18.39	71.73	11.72	45.70	26.03
70	21.12	17.42	73.18	11.72	49.22	23.96
75	20.07	16.56	74.54	11.72	52.73	21.81
80	19.14	15.80	75.82	11.72	56.25	19.57
85	18.30	15.10	77.03	11.72	59.76	17.27
90	17.54	14.48	78.18	11.72	63.28	14.90
95	16.85	13.91	79.27	11.72	66.79	12.48
100	16.22	13.39	80.32	11.72	70.31	10.01
105	15.64	12.91	81.32	11.72	73.83	7.49
110	15.11	12.47	82.27	11.72	77.34	4.93

Required Storage Volume = 36.17 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (5-Year Storm)			
	Prepared:	P.R.	Page No.	A-08
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Total Drainage Area (ha) = 0.330 ha
Drainage Area Composite C = 0.90
Allowable Release Rate = 11.72 L/s
Return Period = 23.44 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
15	80.51	66.44	59.79	11.72	10.55	49.24
20	67.43	55.65	66.78	11.72	14.06	52.72
25	58.37	48.17	72.25	11.72	17.58	54.67
30	51.68	42.65	76.76	11.72	21.09	55.67
35	46.52	38.39	80.61	11.72	24.61	56.00
40	42.40	34.99	83.97	11.72	28.12	55.85
45	39.02	32.20	86.95	11.72	31.64	55.31
50	36.21	29.88	89.64	11.72	35.16	54.48
55	33.82	27.90	92.09	11.72	38.67	53.42
60	31.76	26.21	94.34	11.72	42.19	52.15
65	29.96	24.72	96.43	11.72	45.70	50.73
70	28.38	23.42	98.37	11.72	49.22	49.15
75	26.98	22.27	100.20	11.72	52.73	47.47
80	25.73	21.23	101.92	11.72	56.25	45.67
85	24.60	20.30	103.55	11.72	59.76	43.79
90	23.58	19.46	105.09	11.72	63.28	41.81
95	22.66	18.70	106.56	11.72	66.79	39.77
100	21.81	17.99	107.97	11.72	70.31	37.66
105	21.03	17.35	109.31	11.72	73.83	35.48
110	20.31	16.76	110.60	11.72	77.34	33.26

Required Storage Volume = 56.00 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (10-Year Storm)			
	Prepared:	P.R.	Page No.	A-09
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Total Drainage Area (ha) = 0.330 ha
Drainage Area Composite C = 0.90
Allowable Release Rate = 11.72 L/s
Return Period = 10 Year

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
15	99.17	81.83	73.65	11.72	10.55	63.10
20	83.06	68.54	82.25	11.72	14.06	68.19
25	71.90	59.33	88.99	11.72	17.58	71.41
30	63.66	52.53	94.55	11.72	21.09	73.46
35	57.30	47.28	99.29	11.72	24.61	74.68
40	52.22	43.09	103.42	11.72	28.12	75.30
45	48.07	39.66	107.09	11.72	31.64	75.45
50	44.60	36.80	110.40	11.72	35.16	75.24
55	41.65	34.37	113.42	11.72	38.67	74.75
60	39.11	32.28	116.20	11.72	42.19	74.01
65	36.91	30.45	118.77	11.72	45.70	73.07
70	34.96	28.85	121.17	11.72	49.22	71.95
75	33.24	27.43	123.42	11.72	52.73	70.69
80	31.69	26.15	125.54	11.72	56.25	69.29
85	30.31	25.01	127.54	11.72	59.76	67.78
90	29.05	23.97	129.44	11.72	63.28	66.16
95	27.90	23.03	131.25	11.72	66.79	64.46
100	26.86	22.16	132.98	11.72	70.31	62.67
105	25.90	21.37	134.64	11.72	73.83	60.81
110	25.01	20.64	136.22	11.72	77.34	58.88

Required Storage Volume = 75.45 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (25-Year Storm)			
	Prepared:	P.R.	Page No.	A-010
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Total Drainage Area (ha) = 0.330 ha
Drainage Area Composite C = 0.90
Allowable Release Rate = 11.72 L/s
Return Period = 25 Year
adjusted Runoff coefficient = 1.1
Adjustment runoff coefficient = 0.99

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
15	113.89	103.38	93.04	11.72	10.55	82.49
20	95.40	86.59	103.91	11.72	14.06	89.85
25	82.58	74.95	112.43	11.72	17.58	94.85
30	73.11	66.36	119.45	11.72	21.09	98.36
35	65.80	59.73	125.44	11.72	24.61	100.83
40	59.98	54.44	130.66	11.72	28.12	102.54
45	55.21	50.11	135.30	11.72	31.64	103.66
50	51.22	46.49	139.48	11.72	35.16	104.32
55	47.84	43.42	143.29	11.72	38.67	104.62
60	44.92	40.78	146.80	11.72	42.19	104.61
65	42.39	38.47	150.05	11.72	45.70	104.35
70	40.15	36.45	153.08	11.72	49.22	103.86
75	38.17	34.65	155.92	11.72	52.73	103.19
80	36.40	33.04	158.60	11.72	56.25	102.35
85	34.81	31.59	161.13	11.72	59.76	101.37
90	33.36	30.28	163.53	11.72	63.28	100.25
95	32.05	29.09	165.82	11.72	66.79	99.03
100	30.85	28.00	168.00	11.72	70.31	97.69
105	29.74	27.00	170.10	11.72	73.83	96.27
110	28.73	26.08	172.10	11.72	77.34	94.76

Required Storage Volume = 104.62 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (50-Year Storm)			
	Prepared:	P.R.	Page No.	A-11
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Total Drainage Area (ha) = 0.330 ha
Drainage Area Composite C = 0.90
Allowable Release Rate = 11.72 L/s
Return Period = 50 Year
Runoff coefficient adjustment factor = 1.2
Adjustment runoff coefficient = 1.0

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
15	127.13	116.57	104.91	11.72	10.55	94.36
20	106.57	97.71	117.26	11.72	14.06	103.20
25	92.30	84.63	126.94	11.72	17.58	109.36
30	81.75	74.95	134.92	11.72	21.09	113.83
35	73.60	67.48	141.72	11.72	24.61	117.11
40	67.10	61.52	147.65	11.72	28.12	119.53
45	61.77	56.64	152.92	11.72	31.64	121.28
50	57.32	52.56	157.67	11.72	35.16	122.51
55	53.54	49.09	162.00	11.72	38.67	123.33
60	50.28	46.11	165.98	11.72	42.19	123.79
65	47.45	43.50	169.67	11.72	45.70	123.97
70	44.95	41.22	173.11	11.72	49.22	123.89
75	42.74	39.18	176.33	11.72	52.73	123.60
80	40.76	37.37	179.37	11.72	56.25	123.12
85	38.97	35.73	182.24	11.72	59.76	122.48
90	37.36	34.25	184.97	11.72	63.28	121.69
95	35.89	32.91	187.56	11.72	66.79	120.77
100	34.54	31.67	190.04	11.72	70.31	119.73
105	33.31	30.54	192.41	11.72	73.83	118.58
110	32.17	29.50	194.69	11.72	77.34	117.35

Required Storage Volume = 123.97 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	On-Site Storage Calculation (100 - Year Storm)			
	Prepared:	P.R.	Page No.	A-12
	Checked:	F.M.		
3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga SUB-CATCHMENT EC1 & PC1 (OC1+UC1)	Proj. #	21111		
	Date:	25-Oct-23		

Total Drainage Area (ha) = 0.330 ha
Drainage Area Composite C = 0.90
Allowable Release Rate = 11.72 L/s
Return Period = 100 Year
Runoff coefficient adjustment factor = 1.25
Adjustment runoff coefficient = 1.0

Site storage Requirement:

Time (minutes)	Rainfall Intensity (mm/hr)	Peak Flow (L/s)	Storm Runoff Volume (m^3)	Release Rate (L/s)	Release Flow Volume (m^3)	Required Storage Volume (m^3)
15	140.69	129.00	116.10	11.72	10.55	105.55
20	118.12	108.30	129.96	11.72	14.06	115.90
25	102.41	93.90	140.85	11.72	17.58	123.27
30	90.77	83.23	149.81	11.72	21.09	128.72
35	81.77	74.98	157.45	11.72	24.61	132.84
40	74.58	68.38	164.11	11.72	28.12	135.99
45	68.68	62.97	170.03	11.72	31.64	138.39
50	63.75	58.45	175.36	11.72	35.16	140.20
55	59.56	54.61	180.22	11.72	38.67	141.55
60	55.95	51.30	184.68	11.72	42.19	142.49
65	52.81	48.42	188.82	11.72	45.70	143.12
70	50.03	45.88	192.68	11.72	49.22	143.46
75	47.58	43.62	196.29	11.72	52.73	143.56
80	45.38	41.60	199.70	11.72	56.25	143.45
85	43.39	39.79	202.92	11.72	59.76	143.16
90	41.60	38.14	205.97	11.72	63.28	142.69
95	39.97	36.65	208.88	11.72	66.79	142.09
100	38.47	35.28	211.65	11.72	70.31	141.34
105	37.10	34.02	214.31	11.72	73.83	140.48
110	35.84	32.86	216.86	11.72	77.34	139.52

Required Storage Volume = 143.56 m^3

LEA Consulting Ltd. Consulting Engineers and Planners	Storm Tank Drawdown Time			
	Prepared:	P.R.	Page No.	A-13
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga	Proj. #	21111		
	Date:	25-Oct-23		

Calculating the change in the stage within the tank over time using the Storage-Indication method.
Storage Indication Method calculations based on the method presented in Water Resources Engineering, Third Edition, David A. Chin,)
The calculation is based on the below formula

$$(I_1 + I_2) + \left(\frac{2S_1}{\Delta t} - O_1\right) = \left(\frac{2S_1}{\Delta t} - O_1\right)$$

Where subscript 1 indicates the current time step and sub-script 2 indicates the next time step
I: Inflow dt:Time Interval
S:Storage O: Outflow

To simplify the calculation, the individual components are calculated using the below table. Stage-Storage outflow table is presented in A-14 based on the tank geometry and the vortex control structure

The tank is assumed to start with the 100-year level and receive no additional flow

Initialize stage: 1.74 m
Time Step: 20 minutes

Time (minutes)	I (m3/s)	2S/dt-O (m3/s)	2S/dt+O (m3/s)	O (m3/s)	stage (m)
0	0	0.17	0.19	0.01	1.74
20	0	0.15	0.17	0.01	1.53
40	0	0.13	0.15	0.01	1.33
60	0	0.11	0.13	0.01	1.14
80	0	0.09	0.11	0.01	0.96
100	0	0.07	0.09	0.01	0.79
120	0	0.06	0.07	0.01	0.64
140	0	0.05	0.06	0.01	0.50
160	0	0.03	0.05	0.01	0.39
180	0	0.02	0.03	0.00	0.29
200	0	0.02	0.02	0.00	0.20
220	0	0.01	0.02	0.00	0.12
240	0	0.00	0.01	0.00	0.06
260	0	0.00	0.00	0.00	0.03
280	0	0.00	0.00	0.00	0.02
300	0	0.00	0.00	0.00	0.01
320	0	0.00	0.00	0.00	0.01
340	0	0.00	0.00	0.00	0.00
360	0	0.00	0.00	0.00	0.00
380	0	0.00	0.00	0.00	0.00
400	0	0.00	0.00	0.00	0.00
420	0	0.00	0.00	0.00	0.00
440	0	0.00	0.00	0.00	0.00

Tank Drawdown Time 340 minutes
5:40 Hours

LEA Consulting Ltd. Consulting Engineers and Planners	Storm Tank Stage-Storage Calculation			
	Prepared:	P.R.	Page No.	A-14
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE- City of Mississauga	Proj. #	21111		
	Date:	25-Oct-23		

In order to perform the Storage-Indication Method, the follow table needed to be developed. Storage is developed from Stage based on the area of the tank, and outfall is developed from stage based on the Vortex Valve control structure.

Time Step: 20 minutes

Stage Storage Outflow Curve

stage	S	O	2S/dt+O
m	m3	m3/s	m3/s
0	0	0	0
0.038	2.34	0.0012	0.0051
0.076	4.69	0.0024	0.0102
0.114	7.03	0.0037	0.0154
0.152	9.38	0.0044	0.0200
0.191	11.78	0.0045	0.0242
0.229	14.13	0.0045	0.0281
0.267	16.47	0.0045	0.0320
0.305	18.82	0.0049	0.0363
0.343	21.16	0.0053	0.0405
0.381	23.50	0.0056	0.0448
0.419	25.85	0.0059	0.0489
0.457	28.19	0.0062	0.0531
0.61	37.63	0.0072	0.0699
0.762	47.01	0.0081	0.0864
0.914	56.39	0.0089	0.1029
1.067	65.82	0.0095	0.1192
1.219	75.20	0.0099	0.1352
1.372	84.64	0.0102	0.1513
1.524	94.02	0.0105	0.1672
1.676	103.39	0.0108	0.1831
1.829	112.83	0.0110	0.1990
1.981	122.21	0.0112	0.2149
2.134	131.65	0.0114	0.2308
2.286	141.03	0.0116	0.2466
2.438	150.40	0.0117	0.2624
2.591	159.84	0.0119	0.2783
2.743	169.22	0.0121	0.2941
2.896	178.66	0.0122	0.3100
3.048	188.03	0.0123	0.3257

APPENDIX A-15

Estimation of the Percolation Rate and Permeability of the Soil Letter

Azure Group

Azure Group

October 13, 2022

Weston Consulting
201 Millway Avenue #19, Concord
ON L4K 5K8

Attention: Mr. Kaveh Wahdat - Planner

Re: **Estimation of the Percolation Rate and Permeability of the Soil** at 3016 - 3032 Kirwin Avenue and 3031 Little John Lane, Mississauga

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Dear Sir,

Azure Group carried out geotechnical investigations for the site located at 3016 - 3031 Kirwin Avenue and 3031 Little John Lane in Mississauga, Ontario, project number 2202-001 dated April 2022 to provide recommendations for the design and construction of multi storey building. Ten (10) boreholes were advanced at various locations to depths ranging between ±8 m and refusal depth of ±11 m below the existing ground surface and were sampled at 0.75 m (up to 3 m depth) and 1.5 m interval below 3 m depth with a conventional 50 mm diameter split barrel samplers when Standard Penetration Test (SPT) was carried out. The soil samples obtained from the spoons were then tested to obtain the engineering parameters and properties to be used for the design of the building.

However, parameters to obtain the percolation rate "T" and permeability "K" of the soils (for the design of Strom Water Managements "SWM" and/or swells) were not determined since they were not in the scope of work.

The percolation rate "T" and permeability "K" may be obtained directly from field test or indirectly from soil description (grain size analysis) as recommended by the Ontario Building Code (OBC) Supplementary Standard SP-7 Table 2. Table 2 provides an estimate of percolation Rate "T" and coefficient of permeability "K" of the soil based on soil description.

Since field percolation tests were not carried out at the time of the geotechnical investigation, OBC Supplementary Standard tables were used to estimate the percolation rate and permeability of the soil.

Table 1 provides a summary of the percolation and permeability of the soils obtained from the boreholes at various depths:

BH No.	Depth (m)	Type of soil	K (cm/sec)	T (min./cm)	Comments
BH101	0 - 2.3	Silty clay/clayey silt	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability
	2.3 - 4.6	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
BH102	0 – 1.5	Silty clay/clayey silt	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability
	1.5 - 2.3	Silty clay/clayey silt	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability

	2.3 - 4.6	Sand & gravel	$10^{-1} – 10^{-3}$	2 - 8	Medium to low permeability
BH103	0 – 2.3	Silty clay	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability
	2.3 - 4.6	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
BH104	0 – 0.8	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
	0.8 - 4.6	Clayey silt/silty clay	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability
BH105	0 – 0.8	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
	0.8 - 1.5	Sand trace clay	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
	1.5 - 4.6	Sand/silty sand	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
BH106	0 – 1.5	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
	1.5 - 4.6	Clayey silt	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability
BH107	0 – 4.6	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
BH108	0 – 4.6	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
BH109	0 –1.5	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
	1.5 - 4.6	Clayey silt trace gravel	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability
BH110	0 – 1.5	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability
	1.5 - 3.0	Clayey silt/sandy silt	$10^{-5} – 10^{-6}$	20 - 50	Medium to low permeability
	3.0 - 4.6	Silty sand/sandy silt	$10^{-3} – 10^{-5}$	8 - 20	Medium permeability

Table 1: Percolation and Permeability of the Soil

Discussion:
The percolation and permeability of the soils were obtained indirectly from soil description based on Table 2 of the OBC Supplementary Standard SP-7. In general, the soils tested may be classified as of Medium Permeability. However, the soils at some locations and depths may be classified as of medium to low permeability.

Recommendations:
The Percolation Rate "T" and Permeability "K" which were estimated from the soil description, do not represent the actual values since there were only a limited portion of samples collected from the layer tested. For more accurate values, additional field testing should be carried out at the location of the proposed Storm Water Management (SWM).

Should you have any questions, please contact us at your convenience.

Yours very truly,

AZURE GROUP INC.

Janan Sulaiman, Ph.D., P.Eng.
Senior Geotechnical Engineer
jsulaiman@azuregroup.ca

Ahmed Al-Temimi, M.Sc., P.Eng., QP(ESA)
Ontario Designated Consulting Engineer
aaltemimi@azuregroup.ca

LEA Consulting Ltd. Consulting Engineers and Planners	Drawdown Time Calculation			
	Prepared:	P.R.	Table No.	A-15
	Checked:	F.M.		
Project: 3016-3032 Kirwin Avenue	Proj. #	21111		
Bio-swale	Date	25-Oct-23		

Based on the Estimation of the Percolation and Permeability of the Soil by Azur Group (dated October 13, 2022)

Hydraulic Conductivity (K):	1×10^{-6}	m/s
Infiltration Rate Estimated from Hydraulic Conductivity:	46.264	mm/hr
Safety factor:	4.5	

The Hydraulic Conductivity (K) of soil was selected to produce the smallest infiltration rate based on the range provided by Azure. This results in a conservative estimation of the drawdown time.

Due to high conductivity soils in lower strata, it is expected that the factor should be 2.5. However, this calculation uses a conservative safety factor to demonstrate that the drawdown will be sufficient.

Adjusted infiltration rate:	**10.3**	**mm/hr**
Drainage to Bioswale:	**73.0**	**m^2**
Runoff from a 10mm storm event:	**0.73**	**m^3**

Clear Stone Detention Design Parameters:

Depth of Granular Stones:	500.0	mm
Porosity (n):	0.40	
Granular Area (A):	5.8	m^2
Distance to Water Table (D_{WT}):	3.3	m
Water Storage Volume (V):	**1.2**	**m^3**

A = (1000V) / Pnt

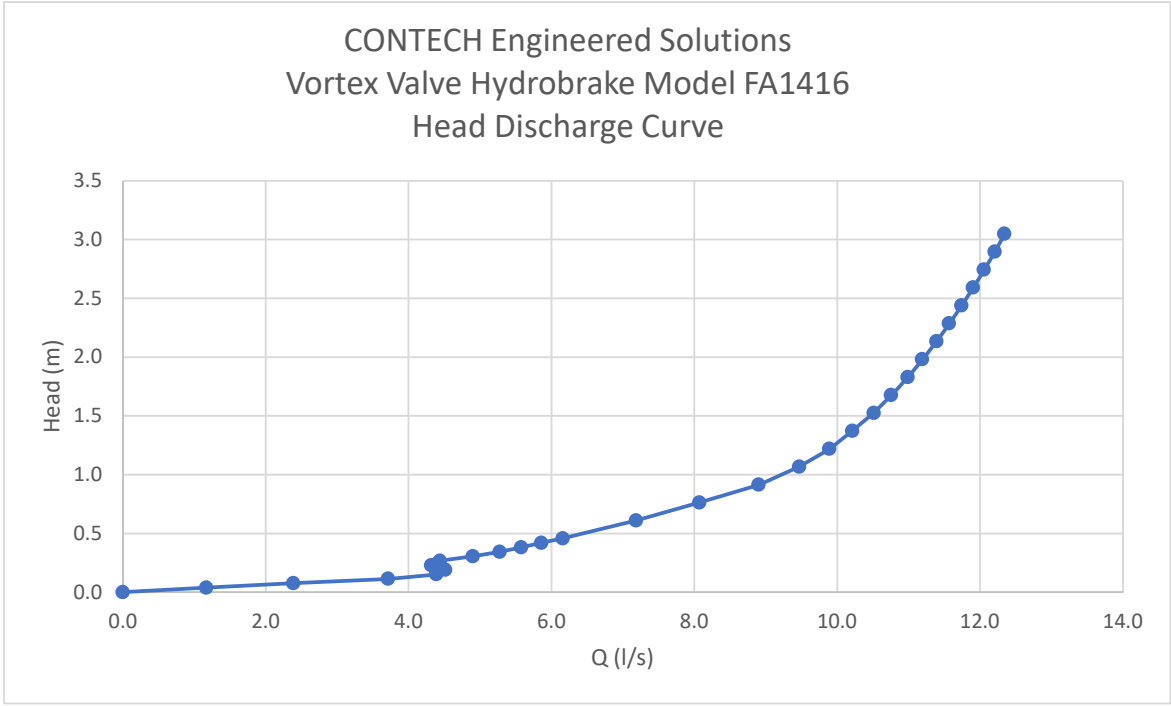
Drawdown time (t)	**48.63**	**hrs**

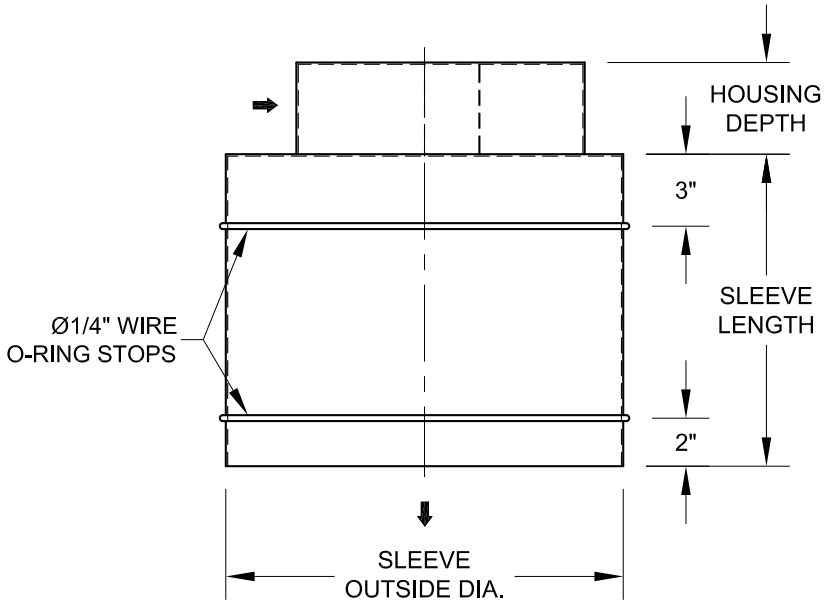
A = Bottom Area n = Porosity
V = Volume t = Drawdown time
P = Infiltration Rate (mm/hr)

APPENDIX A-16

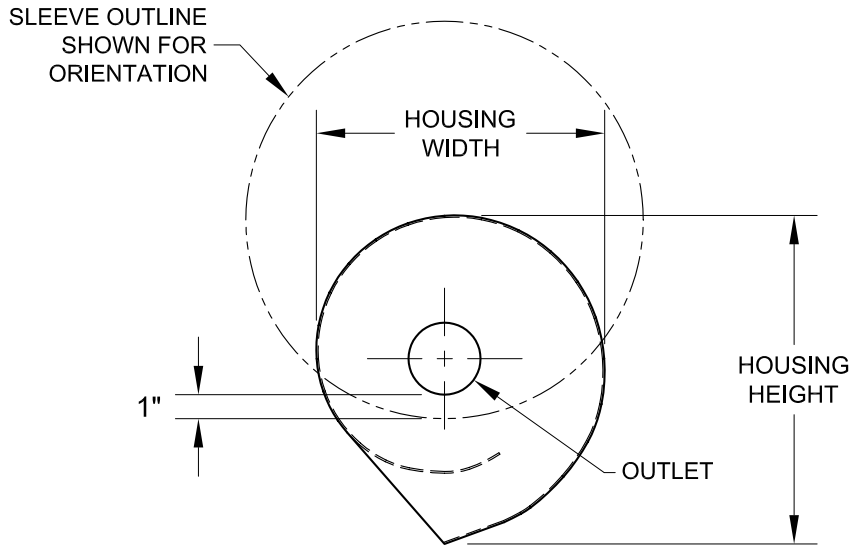
Vortex Valve Flow Control Device

	FA1416 with 105 mm Outlet
Head (m)	Flow (l/s)
0.000	0.000
0.038	1.168
0.076	2.389
0.114	3.713
0.152	4.389
0.191	4.513
0.229	4.318
0.267	4.439
0.305	4.902
0.343	5.278
0.381	5.578
0.419	5.858
0.457	6.159
0.610	7.185
0.762	8.070
0.914	8.902
1.067	9.468
1.219	9.893
1.372	10.212
1.524	10.513
1.676	10.757
1.829	10.990
1.981	11.192
2.134	11.394
2.286	11.567
2.438	11.741
2.591	11.904
2.743	12.056
2.896	12.208
3.048	12.343





TOP VIEW



FRONT VIEW
(SLEEVE DETAILS OMITTED THIS VIEW)

NOTES

1. FLUIDIC-AMP SIZES VARY BASED ON SITE REQUIREMENTS (SEE FLOW CHARTS)

2. SLEEVE DIAMETER & LENGTH DEPEND ON PIPE SIZE AND MATERIAL.

3. ATTACHMENT MAY BE MADE BY A PLATE, A SLEEVE (AS SHOWN) OR A BOLTING FLANGE

4. OUTLET SIZE VARIES BASED ON DESIRED OUTFLOW RATES (Ø3" MINIMUM)

5. ALL WELDS CONTINUOUS UNLESS NOTED OTHERWISE

MATERIALS:
12 GA. 304L STAINLESS STEEL
(1) Ø5/8" AND (1) Ø9/16"
BUNA N, 50 DUROMETER O-RINGS

CONTECH® STORMWATER SOLUTIONS™
contechstormwater.com

TYPICAL DETAIL
FLUIDIC-AMP™ HYDROBRAKE WITH SLEEVE ATTACHMENT

NOT INTENDED FOR CONSTRUCTION PURPOSES

DATE: 4/10/06	SCALE: NONE	FILE NAME: TYPFASLV	DRAWN: JBS	CHECKED: NDG

NOTES

1. FLUIDIC-AMP SIZES VARY BASED ON SITE REQUIREMENTS (SEE FLOW CHARTS)

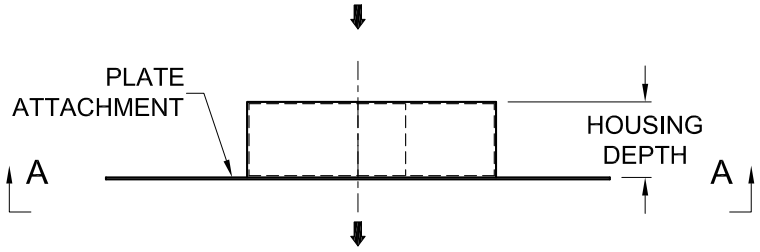
2. ATTACHMENT PLATE WIDTH AND HEIGHT VARIES BASED ON CONCRETE OPENING SIZE

3. ATTACHMENT MAY BE MADE BY A PLATE (AS SHOWN), A SLEEVE OR A BOLTING FLANGE

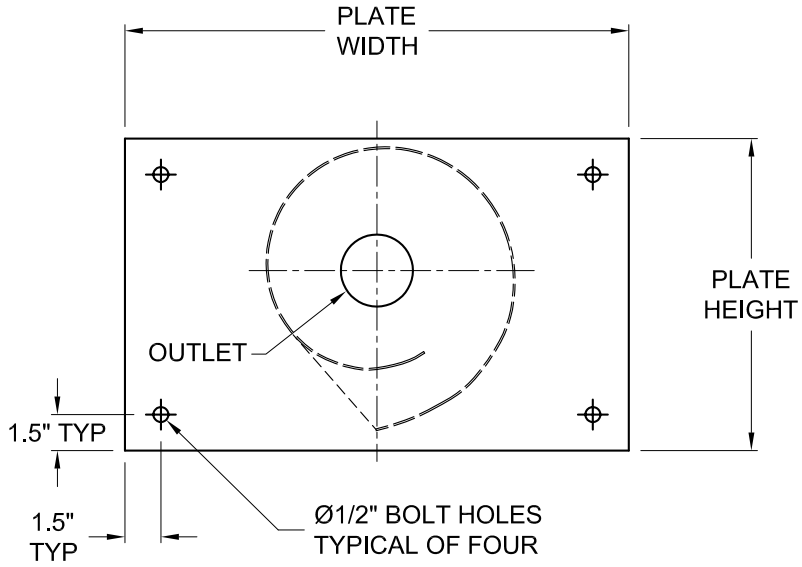
4. OUTLET SIZE VARIES BASED ON DESIRED OUTFLOW RATES (Ø3" MINIMUM)

5. ALL WELDS CONTINUOUS UNLESS NOTED OTHERWISE

MATERIALS:
12 GA. 304L STAINLESS STEEL



TOP VIEW



SECTION A-A VIEW

CONTECH® STORMWATER SOLUTIONS INC.
contechstormwater.com

TYPICAL DETAIL
FLUIDIC-AMP™ HYDROBRAKE
WITH PLATE ATTACHMENT

NOT INTENDED FOR CONSTRUCTION PURPOSES

DATE: 4/10/06	SCALE: NONE	FILE NAME: TYPFAPLT	DRAWN: JBS	CHECKED: NDG

CONTECH VORTEX VALVES

FLOW CONTROL FOR STORMWATER DRAINAGE AND STORAGE SYSTEMS

OPERATIONS AND MAINTENANCE GUIDE

OPERATION of a CONTECH Vortex Valve

A Vortex Valve is a self-activating vortex flow control with no moving parts. When the upstream water level reaches a suitable level the water entering the unit spins within it. This causes the formation of an air-filled core which takes up a significant proportion of the outlet of the unit. Water discharges around the periphery of the outlet from the Vortex Valve enabling the use of a significantly larger outlet than if a simple orifice was used. The outlet diameter is typically 2 to 4 times larger than an equivalent simple orifice required to meet the same stage and discharge condition. Because of the large outlet diameter there is less potential for blockage.

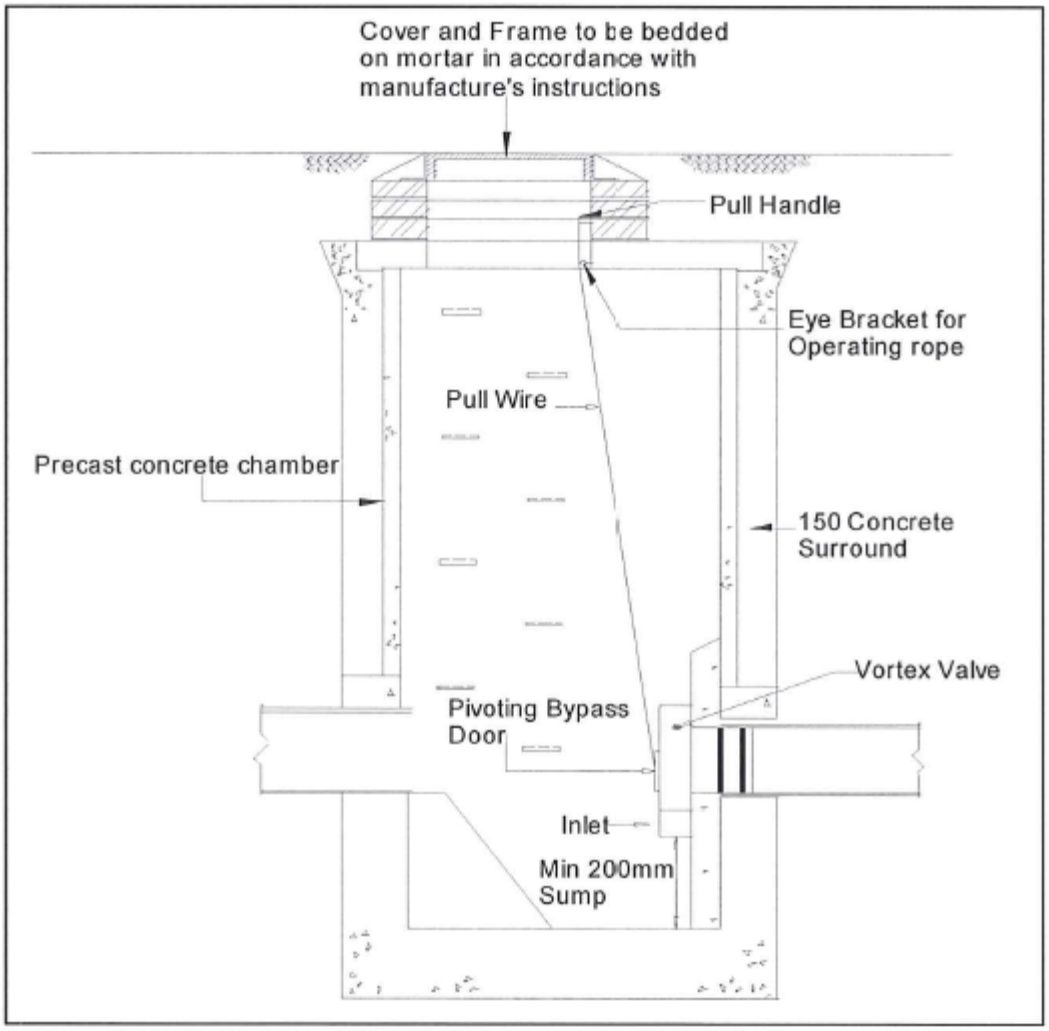
In the case of a downstream surcharge condition an air vent pipe may be required to ensure that the air core can form within the valve. The flow through a Vortex Valve is dependent upon the physical size of the unit itself and the differential head of water acting upon it.

MAINTENANCE

The need for maintenance will be site specific and depend on the following: 1) the size of the Vortex Valve (the larger the unit the less the likelihood of a blockage occurring); 2) the pollutant loading (e.g., a unit would be more susceptible to blockage were it placed on a foul system than a stormdrain catching a relatively clean impervious surface); 3) the physical characteristics of the control chamber itself (adequate benching or sump depth is essential); 4) and the presence of any pretreatment measures such as a sediment and debris removal structure.

All parts are made of corrosion resistant 304 stainless steel material which provides for exceptional design life in comparison to other drainage structures on the site.

The Vortex Valve flow control is fitted with an integral pivoting bypass door mounted to the front face of the unit. If a blockage occurs it is likely to occur on the intake of the flow control. The bypass door is fitted with a stainless steel wire rope that can be pulled from ground level, the door opens exposing a larger aperture on the front plate of the unit allowing the system to be drained of water. Once the water level in the housing structure subsides, which is typically a round manhole, the blockage can be easily accessed and cleared with a rod, debris grabbing or jetting device. Figure 1 shoes a typical Vortex Valve installation.


Cover and Frame to be bedded on mortar in accordance with manufacture's instructions
Pull Handle
Eye Bracket for Operating rope
Pull Wire
Precast concrete chamber
150 Concrete Surround
Vortex Valve
Pivoting Bypass Door
Inlet
Min 200mm Sump

APPENDIX A-17

Jellyfish Filter Unit Sizing and Design

Determining Number of Cartridges for Flow Based Systems

Date	**26/05/2022**	**Black Cells =**	**Calculation**

Site Information

Project Name	**3016-3032 Kirwin Avenue**		
Project Location	**Mississauga, ON**		
OGS ID	**OGS 1**		
Drainage Area, Ad	**0.16**	ac	(0.0637 ha)
Impervious Area, Ai	**0.16**	ac	
Pervious Area, Ap	**0.00**		
% Impervious	**100%**		
Runoff Coefficient, Rc	**0.90**		
Treatment storm flow rate, Q_{treat}	**0.07**	cfs	(2.1 L/s)
Peak storm flow rate, Q_{peak}	**0.88**	cfs	(24.9 L/s)

Filter System

Filtration brand	**StormFilter**	
Cartridge height	**18**	in
Specific Flow Rate	**1.67**	gpm/ft^2
Flow rate per cartridge	**12.53**	gpm

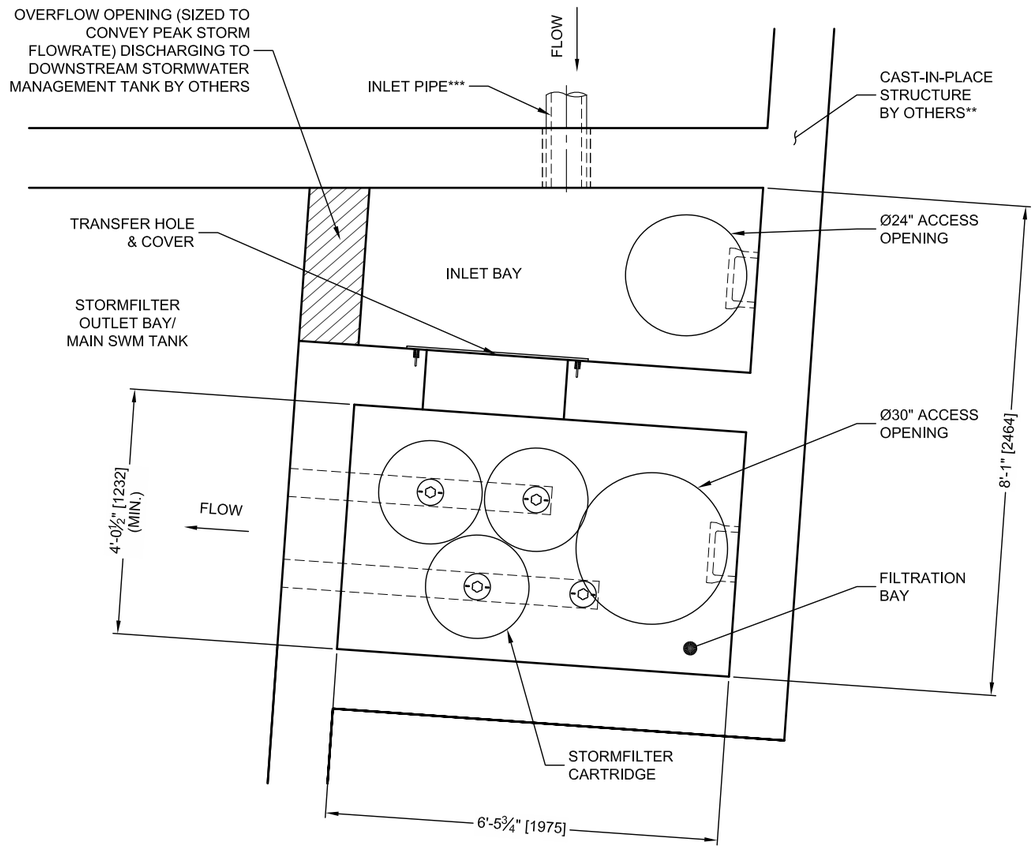
SUMMARY

Number of Cartridges	3
Media Type	Perlite

Event Mean Concentration (EMC)	**150**	mg/L
Annual TSS Removal	**80%**	
Percent Runoff Capture	**90%**	

Recommend SFPD0806 vault or CIP

200 Enterprise Drive
Scarborough, ME 04074
Phone 877-907-8676
Fax 207-885-9825



PLAN VIEW
SCALE 1:50

SITE DESIGN DATA

WATER QUALITY FLOW RATE	2.1 l/s
PEAK FLOW RATE	24.9 l/s
RETURN PERIOD OF PEAK FLOW	100 YRS
FILTER MEDIA TYPE	PERLITE

NOTES
NOT FOR CONSTRUCTION
* CRITICAL ELEVATIONS.
** STRUCTURAL DESIGN BY OTHERS.
MINIMUM INTERNAL DIMENSIONS TO REMAIN.
*** INLET & OUTLET PIPE SIZE, LOCATION AND MATERIAL TO BE CONFIRMED.

CONTECH
PROPOSAL
DRAWING

STORMFILTER DESIGN TABLE

- THE 8' x 6' PEAK DIVERSION STORMFILTER TREATMENT CAPACITY VARIES BY CARTRIDGE COUNT AND LOCALLY APPROVED SURFACE AREA SPECIFIC FLOW RATE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.
- THE PEAK DIVERSION STORMFILTER IS AVAILABLE IN A LEFT INLET (AS SHOWN) OR RIGHT INLET CONFIGURATION.
- ALL PARTS AND INTERNAL ASSEMBLY PROVIDED BY CONTECH UNLESS OTHERWISE NOTED.

CARTRIDGE HEIGHT	27"		18"		LOW DROP	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	3.05'		2.3'		1.8'	
HEIGHT OF WEIR (W)	3.00'		2.25'		1.75'	
TREATMENT BY MEDIA SURFACE AREA	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	10	5

MATERIAL LIST

COUNT	DESCRIPTION	SUPPLIED BY	INSTALLED BY
3	18", PERLITE CARTRIDGE	CONTECH	CONTRACTOR
4	RESTRICTOR DISK, 12.53 GPM,	CONTECH	CONTRACTOR
1	2" PVC SLIP PLUG	CONTECH	CONTRACTOR
1	FLOW KIT (CUSTOM)	CONTECH	CONTRACTOR
1	36" x 14" TRANSFER HOLE COVER	CONTECH	CONTRACTOR
1	Ø24" x 4" EJIW #41600389, OR EQUIVALENT FRAME AND COVER	CONTECH	CONTRACTOR
1	Ø30" x 4" EJIW #41600484, OR EQUIVALENT FRAME AND COVER	CONTECH	CONTRACTOR
TBD	STEPS, OR EQUIVALENT	CONTRACTOR	CONTRACTOR

PERFORMANCE SPECIFICATION
FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES**. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **37 SECONDS**.
SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM)**. SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM).**

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
5. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.

INSTALLATION NOTES
A. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE (IF APPLICABLE).
B. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR (IF APPLICABLE).
C. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
D. CONTRACTOR TO REMOVE THE TRANSFER HOLE COVER WHEN THE SYSTEM IS BROUGHT ONLINE.
E. CONTRACTOR TO NOTIFY ECHELON ENVIRONMENTAL WHEN THEY INTEND TO INSTALL COMPONENTS SO STAFF CAN BE PRESENT FOR SUPERVISION.

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3016-3032 KIRWIN AVENUE, MISSISSAUGA, ON
THE STORMWATER MANAGEMENT STORMFILTER
PEAK DIVERSION STORMFILTER CAST-IN-PLACE

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

The Stormwater Management StormFilter®

Developed by CONTECH Engineered Solutions LLC
Scarborough, Maine, USA

Registration: GPS-ETV_2020-06-15_NJDEP

In accordance with

ISO 14034:2016

Environmental Management —
Environmental Technology Verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

June 15, 2020
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Verification Overview

This Environmental Technology Verification (ETV) of The Stormwater Management StormFilter® (StormFilter) is the first part of a two-part verification process and entails the verification of performance claims (#1 & 2) based on laboratory testing in accordance with the New Jersey Department of Environmental Protection (NJDEP) *Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (January, 2013)*. This verification complements the subsequent verification of field testing data, collected in accordance with The Washington State Department of Ecology emerging stormwater treatment technologies, in accordance with guidelines identified by Ecology (2011) in the Technology Assessment Protocol – Ecology (TAPE).

Technology description and application

The Stormwater Management StormFilter® (StormFilter) is a manufactured treatment device that is provided by Contech Engineered Solutins LLC (Contech). The StormFilter improves the quality of stormwater runoff before it enters receiving waterways through the use of its customizable filter media, which removes non-point source pollutants. As illustrated in **Figure 1,** the StormFilter is typically comprised of a vault or manhole structure that houses rechargeable, media-filled filter cartridges. Stormwater entering the system percolates through these media-filled cartridges, which trap particulates and remove pollutants. Once filtered through the media, the treated stormwater is discharged through an outlet pipe to a storm sewer system or receiving water.

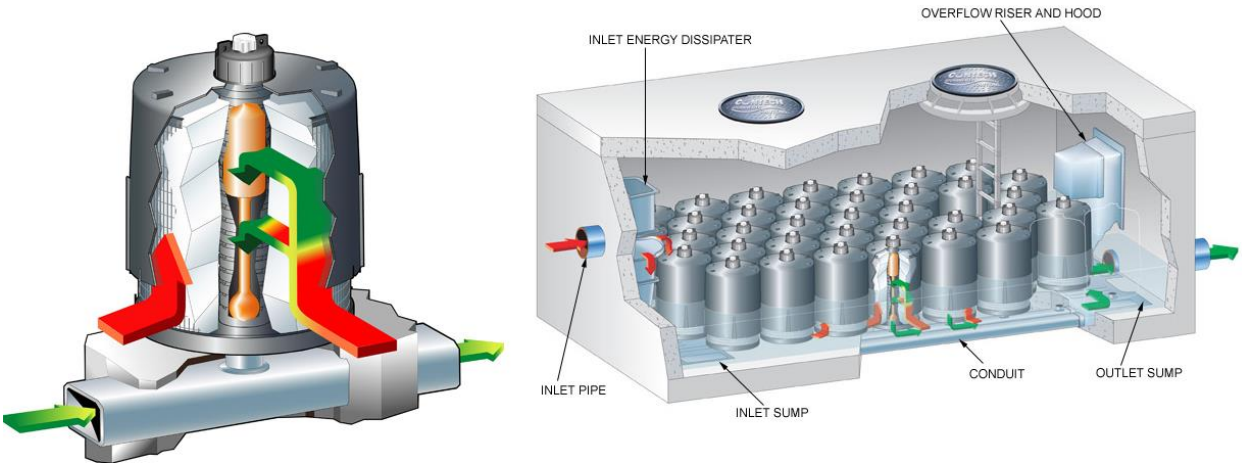

Figure 1 Individual StormFilter Cartridge (Left) and Typical Vault StormFilter Installation (Right)

Depending on the treatment requirements and expected pollutant characteristics at an individual site, the per cartridge filtration flow rate and driving head can be adjusted. The flow rate is individually controlled for each cartridge by a restrictor disc located at the connection point between the cartridge and the underdrain manifold. Driving head is managed by positioning of the inlet, outlet, and overflow elevations. The StormFilter is typically designed so that the restrictor disc passes the design treatment rate once the water surface reaches the shoulder of the cartridge which is equivalent to the cartridge height. Since the StormFilter uses a restrictor disc to restrict treatment flows below the hydraulic capacity of the media

the system typically operates under consistent driving head for the useful life of the media. Site specific head constraints are also addressed by three different cartridge heights (low drop (effective height of 12 inches), 18, and 27 inches) which operate on the same principal and surface area specific loading rates. The StormFilter requires a minimum of 1.8 ft, 2.3 ft and 3.05 ft of drop between inlet invert and outlet invert to accommodate the low drop, 18 and 27 inch cartridges, respectively, without backing up flow into the upstream piping during operation. When site conditions limit the amount of drop available across the StormFilter then flow is typically backed up into the upstream piping during operation to ensure sufficient driving head is provided. If desirable the StormFilter can be designed to operate under additional driving head.

The StormFilter is offered in multiple configurations including plastic, steel, and concrete catch basins; and precast concrete manholes, and vaults. Other configurations include panel vaults, CON/SPAN®, box culverts, and curb inlets. The filter cartridges operate consistently and act independently regardless of housing which enables linear scaling.

The StormFilter cartridge can house different types of media including perlite, zeolite, granular activated carbon (GAC), CSF® leaf media, MetalRx™, PhosphoSorb® or various media blends such as ZPG™ (perlite, zeolite and GAC). All of the media use processes associated with depth filtration to remove solids. Some media configurations also provide additional treatment mechanisms such as cation exchange, and/or adsorption, chelation, and precipitation. This verification is specific to a laboratory evaluation of the StormFilter using perlite media.

Performance conditions

The data and results published in this Verification Statement were obtained from the laboratory testing conducted on The Stormwater Management StormFilter® device, in accordance with the New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (January, 2013) (NJDEP Filtration Protocol). Prior to starting the performance testing program, a quality assurance project plan (QAPP) was submitted to and approved by the New Jersey Corporation for Advanced Technology (NJCAT).

Performance claim(s)

Performance Claim 1 (NJCAT)

The Stormwater Management StormFilter®, with perlite media, demonstrated at least 80% removal of total suspended solids at a design hydraulic loading rate of 1.44 l/s/m^2 (2.12 gpm/ft^2) of media surface area and at a constant influent test sediment concentration of 200 mg/L in laboratory testing conducted under the 2013 NJDEP Protocol (removal efficiency test). This performance claim was verified at a 95% level of confidence.

Performance Claim 2 (NJCAT)

During the load testing (mass sediment load capacity) conducted under the 2013 NJDEP Protocol, The Stormwater Management StormFilter®, with perlite media, maintained at least 80% removal of total suspended solids at a design hydraulic loading rate of 1.44 l/s/m^2 (2.12 gpm/ft^2) of media surface area to a cumulative mass sediment load of 54.3 lbs by a single 45.72 cm tall and 18in cartridge. This performance claim was verified statistically at a 95% level of confidence.

Performance results

Performance Claim 1 (NJCAT):
Raw data summarizing the percent removal of influent total suspended solids (TSS) by The Stormwater Management StormFilter®, at a concentration of 200 mg/L and a loading rate of 2.12 gpm/sq. ft. of media surface area.

Run #	Average Influent TSS Concentration (mg/L)	Background (mg/L)	Adjusted Effluent (mg/L)	TSS Removed (%)
1	203	2.11	37.7	81.8
2	210	1.83	35.4	83.7
3	207	2.84	40.5	81.2
4	213	2.04	36.8	83.3
5	212	2.17	35.8	83.7
6	208	2.34	38.0	82.3
7	212	2.08	38.4	82.5
8	203	2.42	35.8	83.0
9	206	2.86	35.2	83.5
10	207	3.16	35.6	83.3

Sum	823
N (COUNT)	10
Mean (AVG)	82.3
STDEV.s	0.871
VAR.s	0.758
Z (alpha)	1.65
Z (beta)	1.29
Hypothesized mean	80.0

Performance Claim 2 (NJCAT):
Raw data summarizing the percent removal of influent total suspended solids (TSS) and its capture by The Stormwater Management StormFilter®, at 200 mg/L (Run 1-45) and 400mg/L (Run 46-66).

Run #	Average Influent TSS Concentration (mg/L)	Background (mg/L)	Adjusted Effluent (mg/L)	Mass Captured (lbs)	TSS Removed (%)
1	203	2.11	37.7	0.640	81.8
2	210	1.83	35.4	1.32	83.7
3	207	2.84	40.5	1.96	81.2
4	213	2.04	36.8	2.65	83.3
5	212	2.17	35.8	3.33	83.7
6	208	2.34	38.0	3.99	82.3
7	212	2.08	38.4	4.67	82.5
8	203	2.42	35.8	5.32	83.0
9	206	2.86	35.2	5.98	83.5
10	207	3.16	35.6	6.65	83.3
11	200	1.78	37.4	7.29	81.8
12	209	1.55	36.0	7.96	83.4
13	211	2.29	40.9	8.62	81.3
14	206	1.96	37.7	9.21	*excluded*
15	209	2.32	36.2	9.87	83.2
16	202	2.07	36.5	10.5	82.6
17	206	1.97	39.9	11.2	81.3
18	203	3.13	35.1	11.8	83.2
19	204	2.57	37.2	12.5	82.4
20	210	2.64	35.6	13.1	83.6
21	199	3.17	39.8	13.8	80.7
22	206	3.07	40.5	14.4	80.9
23	203	3.32	37.1	15.1	82.3
24	206	2.91	38.5	15.7	81.8
25	203	3.44	37.4	16.3	82.1
26	204	2.77	40.4	17.0	80.8
27	208	2.85	29.4	17.6	*excluded*
28	199	2.46	37.7	18.2	81.5
29	199	3.72	37.6	18.8	81.6
30	202	3.66	37.6	19.5	82.0
31	200	3.41	42.4	20.1	79.3
32	202	3.17	43.4	20.7	79.1
33	204	4.52	42.5	21.3	79.8
34	200	5.11	40.0	22.0	80.6
35	198	4.11	44.4	22.5	78.1
36	204	3.90	43.1	23.2	79.5
37	203	4.55	43.1	23.8	79.4
38	202	4.84	41.4	24.4	80.0
39	203	5.55	34.8	25.1	83.3
40	203	6.34	39.9	25.7	80.9
41	199	3.53	43.3	26.3	78.7
42	199	3.21	45.1	26.9	77.9
43	200	3.21	40.9	27.5	80.1

44	203	3.41	40.0	28.2	80.9
45	202	3.61	46.6	28.8	77.4
46	401	1.78	79.2	30.0	80.8
47	402	1.91	81.6	31.3	80.2
48	401	2.38	85.6	32.5	79.2
49	396	2.83	87.0	33.7	78.5
50	412	1.62	85.5	35.0	79.6
51	396	3.66	87.6	36.2	78.3
52	396	4.12	90.1	37.3	77.6
53	403	4.05	92.4	38.5	77.4
54	403	4.85	89.9	39.8	78.1
55	400	3.59	86.3	41.0	78.8
56	400	1.85	89.0	42.2	78.2
57	403	2.33	88.7	43.4	78.5
58	407	3.25	89.6	44.6	78.2
59	395	3.22	92.5	45.8	76.9
60	404	3.01	88.2	47.0	78.5
61	410	1.82	90.7	48.2	*excluded*
62	398	2.15	86.6	49.4	78.6
63	401	2.60	88.1	50.6	78.3
64	402	2.75	91.5	51.9	77.6
65	403	4.10	89.1	53.1	78.2
66	402	3.65	89.5	54.3	77.8
Sum	5069				
N (COUNT)	63				
Median	80.7				
STDEV.s	2.03				
VAR.s	4.12				
Z (alpha)	1.65				
Z (beta)	1.29				
Hypothesized median	80.0				

Performance Claims were statistically analyzed and verified using the *mean* percent removal values for Claim #1, which utilized normally distributed data. The data set for Claims #2 was not normally distributed, which required the use of the *median* of the data as a surrogate for the mean, in order to be verified statistically at a 95% level of confidence.

Verification

This verification was completed by the Verification Expert, the Centre for Advancement of Water and Wastewater Technologies ("CAWT"), contracted by GLOBE Performance Solutions, applying the International Standard ***ISO 14034:2016 Environmental management -- Environmental technology verification (ETV)***. Data and information provided by Contech Engineered Solutions LLC to support the performance claim included the following:

- Performance test report "NJCAT TECHNOLOGY VERIFICATION, Stormwater Management StormFilter® (StormFilter) With Perlite Media" prepared by Contech Engineered Solutions, November 2016. This report is based on a test program was conducted at Contech's Portland, Oregon laboratory under the direct supervision of *Scott A. Wells, Ph.D. and Associates* in accordance with the New Jersey Department of Environmental Protection (NJDEP) *Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (January, 2013)* and in compliance with the requirements of ISO/IEC 17025.

What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV) and was developed and published by the International Organization for Standardization (ISO). The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the The Stormwater Management StormFilter® please contact:

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StormFilter Inspection and Maintenance Procedures

The Stormwater Management StormFilter®

Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

Maintenance Procedures

Although there are many effective maintenance options, we believe the following procedure to be efficient, using common equipment and existing maintenance protocols. The following two-step procedure is recommended::

1. **Inspection**
   - Inspection of the vault interior to determine the need for maintenance.
2. **Maintenance**
   - Cartridge replacement
   - Sediment removal

Inspection and Maintenance Timing

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, a maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.

In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/ maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, during dryer months in late summer to early fall.

Maintenance Frequency

The primary factor for determining frequency of maintenance for the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis, in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

The average maintenance lifecycle is approximately 1-5 years. Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions.

Regulatory requirements or a chemical spill can shift maintenance timing as well. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs..

Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

Warning: In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct an inspection:

Important: Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit and the unit's role, relative to detention or retention facilities onsite.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to whether or not maintenance is needed.

Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered).

Please note Stormwater Management StormFilter devices installed downstream of, or integrated within, a stormwater storage facility typically have different operational parameters (i.e. draindown time). In these cases, the inspector must understand the relationship between the retention/detention facility and the treatment system by evaluating site specific civil engineering plans, or contacting the engineer of record, and make adjustments to the below guidance as necessary. Sediment deposition depths and patterns within the StormFilter are likely to be quite different compared to systems without upstream storage and therefore shouldn't be used exclusively to evaluate a need for maintenance.

1. Sediment loading on the vault floor.
   a. If >4" of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
   a. If >1/4" of accumulation, maintenance is required.
3. Submerged cartridges.
   a. If >4" of static water above cartridge bottom for more than 24 hours after end of rain event, maintenance is required. (Catch basins have standing water in the cartridge bay.)
4. Plugged media.
   a. While not required in all cases, inspection of the media within the cartridge may provide valuable additional information.
   b. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
   a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
   a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
   a. If pronounced scum line (say ≥ 1/4" thick) is present above top cap, maintenance is required.

Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

Important: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows is occurring.

Replacement cartridges can be delivered to the site or customers facility. Information concerning how to obtain the replacement cartridges is available from Contech Engineered Solutions.

Warning: In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

Method 1:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

   Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact Contech Engineered Solutions for suggested attachment devices.

B. Remove the used cartridges (up to 250 lbs. each) from the vault.

Important: Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner.

C. Set the used cartridge aside or load onto the hauling truck.

D. Continue steps a through c until all cartridges have been removed.

Method 2:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

B. Unscrew the cartridge cap.

C. Remove the cartridge hood and float.

D. At location under structure access, tip the cartridge on its side.

E. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.

F. Set the empty, used cartridge aside or load onto the hauling truck.

G. Continue steps a through e until all cartridges have been removed.

8. Remove accumulated sediment from the floor of the vault and from the forebay. This can most effectively be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.
11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used **empty** cartridges to Contech Engineered Solutions.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

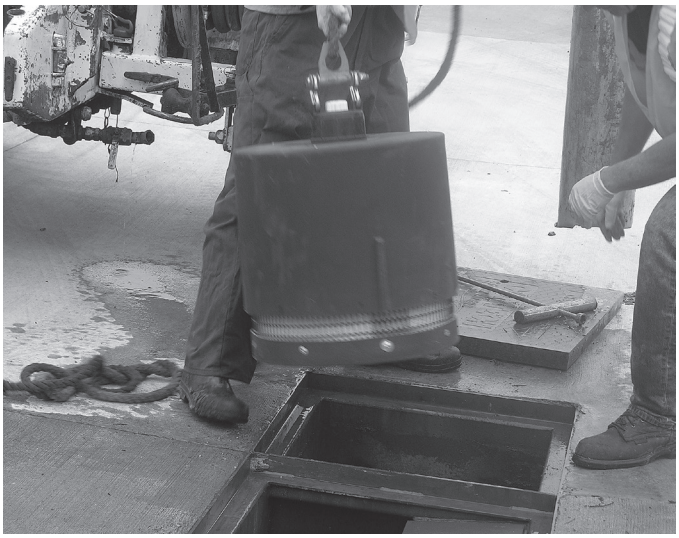
Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Related Maintenance Activities - Performed on an as-needed basis

StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.



Inspection Report

Date: _____ Personnel: _____

Location: _____ System Size: _____ Months in Service: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: _____

Sediment Thickness in Forebay: _____ Date: _____

Sediment Depth on Vault Floor: _____

Sediment Depth on Cartridge Top(s): _____

Structural Damage: _____

Estimated Flow from Drainage Pipes (if available): _____

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water: _____

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal: _____

☐ Minor Structural Repairs: _____

☐ Drainage Area Report _____

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

Items Needing Further Work: _____

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Review the condition reports from the previous inspection visits.

StormFilter Maintenance Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other: _____

List Safety Procedures and Equipment Used: _____

_____

_____

System Observations

Months in Service: _____

Oil in Forebay (if present): Yes ☐ No ☐

Sediment Depth in Forebay (if present): _____

Sediment Depth on Vault Floor: _____

Sediment Depth on Cartridge Top(s): _____

Structural Damage: _____

Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Yes ☐ No ☐ Details: _____

Replace Cartridges: Yes ☐ No ☐ Details: _____

Sediment Removed: Yes ☐ No ☐ Details: _____

Quantity of Sediment Removed (estimate?):

Minor Structural Repairs: Yes ☐ No ☐ Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes:

_____

_____

_____

_____

_____

_____

_____

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Support

- Drawings and specifications are available at www.conteches.com.
- Site-specific design support is available from our engineers.

APPENDIX A-18

Area Drain Typical Details

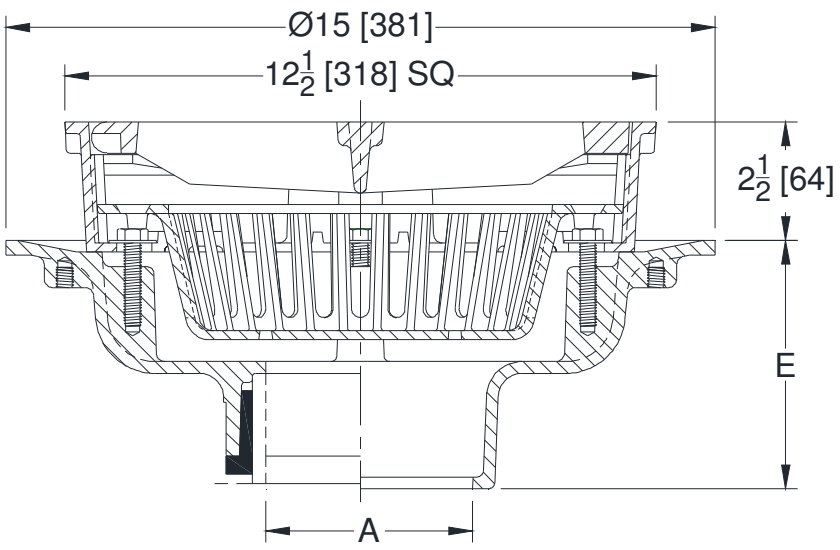
Z610

12-1/2 [318] SQUARE TOP HEAVY-DUTY DRAIN

SPECIFICATION SHEET

TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



A Pipe Size In. [mm]	Approx. Wt. Lbs. [kg]	Grate Open Area Sq. In. [cm²]
2, 3, 4, 6 [51, 76, 102, 152]	54 [24]	42 [271]
8 [203]	56 [25]	

ENGINEERING SPECIFICATION: ZURN Z610
12-1/2" [305mm] Square top drain, Dura-Coated cast iron body with bottom outlet, seepage pan and combination membrane flashing clamp and frame for heavy-duty cast iron loose slotted duresist grate, with suspended polypropylene sediment bucket.

OPTIONS (Check/specify appropriate options)

PIPE SIZE
3, 4, 6 [76, 102, 152]
3, 4, 6 [76, 102, 152]
2, 3, 4, 6, [51, 76, 102, 152]
2, 3, 4, 6, 8 [51, 76, 102, 152, 203]
2, 3, 4 [51, 76, 102]

(Specify size/type) **OUTLET**

____	IC	Inside Caulk
____	IG	Inside Gasket
____	IP	Threaded
____	NH	No-Hub
____	NL	Neo-Loc

'E' BODY HT. DIM.
5-1/4 [133]
5-1/4 [133]
3-3/4 [95]
5-1/4 [133]
4-5/8 [117]

PREFIXES

____	Z	D.C.C.I. Body and Top*
____	ZB	D.C.C.I Body w/Polished Bronze Top (Add 3/16 [5] to 2-1/2 [64] Dim. and 3/4 [19] to 12-1/2 [318] Dim.)
____	ZN	D.C.C.I Body w/Polished Nickel Bronze Top (Add 3/16 [5] to 2-1/2 [64] Dim. and 3/4 [19] to 12-1/2 [318] Dim.)

SUFFIXES

____	-AR	Acid Resistant Epoxy Coated Cast Iron
____	-DS	Ductile Iron Solid Cover
____	-DX	Dex-O-Tex Flange (ZB, ZN Only)
____	-F	2 [51] High Extension
____	-G	Galvanized Cast Iron
____	-H	Hinged Grate
____	-HC	Hinged Solid Cover
____	-HL	Hinged Locking Grate
____	-HLC	Hinged Locking Cover
____	-LY	(Less) Sediment Bucket
____	-P	Trap Primer Connection
____	-S	Secondary Strainer
____	-SC	Solid Cover
____	-SS	Stainless Steel Mesh Liner for Bucket
____	-TC	Neo-Loc Test Cap Gasket (2, 3, 4 [51, 76, 102] NL Bottom Outlet Only)
____	-TS	Top Secured with Slotted Screws
____	-V	Backwater Valve (See Z1099)
____	-VP	Vandal-Proof Secured Top
____	-YA	Aluminum Sediment Bucket
____	-YC	Cast Iron Sediment Bucket
____	-90	90º Threaded Side Outlet Body

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | **Specification Drainage Operation**
1801 Pittsburgh Avenue, Erie, PA 16502, Ph. 855.663.9876
In Canada | **Zurn Industries Limited**
7900 Goreway Drive, Unit 10, Brampton, Ontario L6T 5W6, Ph. 877.892.5216
www.zurn.com

Rev. J
Date: 10/16/2019
C.N. No. 141246
Prod. | Dwg. No. Z610

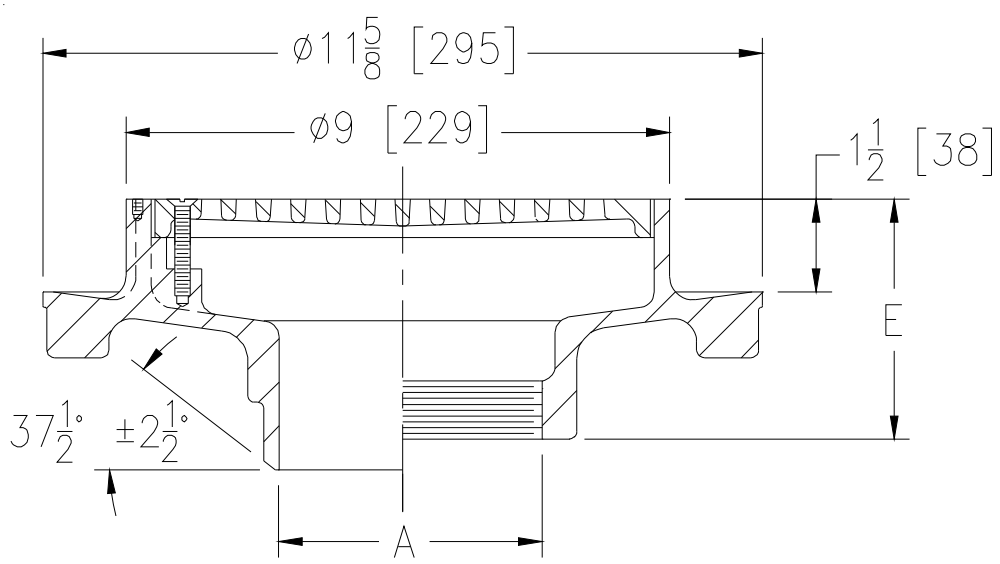
Z1730

9 [229] DIAMETER FLOOR DRAIN
SHALLOW TYPE

SPECIFICATION SHEET

TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



A Pipe Size In.[mm]	Approx. Wt. Lbs. [kg]	Grate Open Area Sq. In. [cm²]
2, 3, 4 [51, 76, 102]	20 [9]	21 [135]

ENGINEERING SPECIFICATION: ZURN Z1730
9" [229mm] Diameter shallow type heavy-duty floor drain, all Type 304 (CF8) stainless steel with integral anchor flange, and non-tilt grate with plain finish.

OPTIONS (Check/specify appropriate options)

PIPE SIZE	(Specify size/type) **OUTLET**	**'E' BODY HT. DIM.**
2, 3, 4 [51, 76, 102]	____ BW Butt-Weld (Specify Schedule 10 or 40)	4-13/16 [122]
2, 3, 4 [51, 76, 102]	____ NH No-Hub	4-13/16 [122]
2, 3, 4 [51, 76, 102]	____ IP Threaded	4-13/16 [122]

PREFIXES

____ Z Type 304 (CF8) Stainless Steel Body*
____ ZM Type 316 (CF8M) Stainless Steel Body

SUFFIXES

____ -K Seepage Holes Only
____ -KC Clamp Collar with Seepage Holes
____ -TS Top Secured with Slotted Screws
____ -VP Vandal-Proof Secured Top

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | **Specification Drainage Operation**
1801 Pittsburgh Avenue, Erie, PA U.S.A. 16502 · Ph. 855-663-9876, Fax 814-454-7929
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

Rev. F
Date: 09/28/2017
C.N. No. 138051
Prod. | Dwg. No. Z1730

APPENDIX B

Stormwater Peak Flow Calculation for Sub-Catchment Area UC2

LEA Consulting Ltd. Consulting Engineers and Planners	Land Use			
	Prepared:	P.R.	Page No.	B-01
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE SUB-CATCHMENT EC2 & PC2	Proj. #	21111		
	Date:	25-Oct-23		

Pre-Development CONDITION

Sub-Catchment EC2

Existing Land Use	Area (m^2)
Lawn & Tree	4435.0
Total Area:	**4435.0**

Post-Development Ccondition:

Sub-Catchment PC2

Proposed Land Use	Area (m^2)
Lawn & Tree	2953.0
Total Area	**2953.0**

LEA Consulting Ltd. Consulting Engineers and Planners	Composite "C" Calculation			
	Prepared:	P.R.	Page No.	B-02
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE SUB-CATCHMENT EC2 & PC2	Proj. #	21111		
	Date:	25-Oct-23		

Pre-Development Composite Runoff Coefficient "C"

Sub-Catchment EC2

Location	Area (ha)	C	Composite "C"
Lawn & Tree	0.444	0.25	
Total Area:	**0.444**		**0.25**
Imperviousness Percent:			**0.0**

Post-Development Composite Runoff Coefficient "C"

Sub-Catchment PC2

Location	Area (ha)	C	Composite "C"
Lawn & Tree	0.295	0.25	
Total Area	**0.295**		**0.25**
Imperviousness Percent:			**0.0**

LEA Consulting Ltd. Consulting Engineers and Planners	Pre-Development Peak Flow Rates Calculation			
	Prepared:	P.R.	Page No.	B-03
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE SUB-CATCHMENT EC2 & PC2	Proj. #	21111		
	Date:	25-Oct-23		

Rational Formulae: Q = 2.78 CIA (L/s)

Site Area:	0.444	ha
Time of Concentration	15	minutes as per City Guidelines
Runoff Coefficient :	0.25	Pre-development condition

Rainfall Intensity: $I = aT^c$

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

Peak Flow Rate (L/s):

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under existing site conditions (L/s):	18.45	24.80	30.54	35.08	39.16	43.33

LEA Consulting Ltd. Consulting Engineers and Planners	Post-Development Peak Flow Rates Calculation (Uncontrolled)			
	Prepared:	P.R.	Page No.	B-04
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE SUB-CATCHMENT EC2 & PC2	Proj. #	21111		
	Date:	25-Oct-23		

Rational Formulae: Q = 2.78 CIA (L/s)

Site Area:	0.295	ha
Time of Concentration	15	minutes as per City Guidelines
Runoff Coefficient :	0.25	Pre-development condition

Rainfall Intensity: $I = aT^c$

Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Rainfall Intensity (mm/hr):	59.89	80.51	99.17	113.89	127.13	140.69

Peak Flow Rate (L/s):

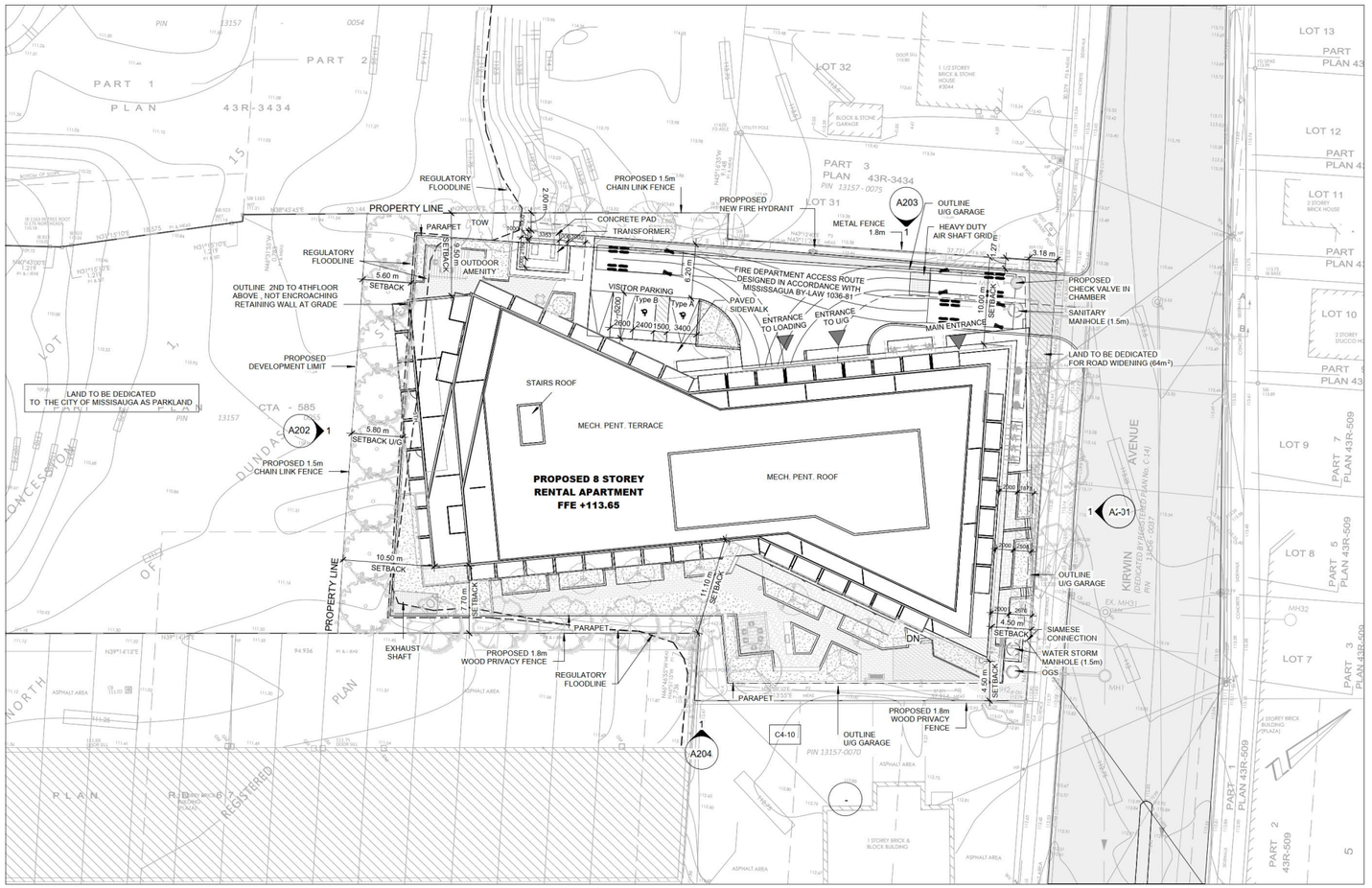
Return Period:	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Under existing site conditions (L/s):	12.28	16.51	20.34	23.36	26.07	28.85

APPENDIX C

Sanitary and Water Demand Calculations

1. SATELLITE AERIAL VIEW

2. TOPOGRAPHIC AERIAL VIEW



3. SITE PLAN / 1:300

3016-3022 Kirwin Ave

Review: Sept 18th, 2023

Legal Description

ALL OF LOTS 27 TO 30 REGISTERED PLAN No. C-14 AND PART OF LOT 5 REGISTERED PLAN TOR-12 AND PART OF LOT 15 CONCESSION 1, NORTH OF DUNDAS TREET CITY OF MISSISSAUGA REGIONAL MUNICIPALITY OF PEEL

Site

Gross Site Area	**6,385.0** m²	*68,730 sf*
Parkland Dedication	2,450.0 m²	*26,372 sf*
Road Widening Area	12.0 m²	*129 sf*
Net Site Area	**3,923.0** m²	*42,228 sf*
Lot Frontage	50.3 m	
Lot Depth	131.4 m	

Building proposal

Building Footprint		1,703.0 m²	
Buiding Height		25.5 m	**Mech. Pent. Excluded*
Gross Floor Area	*(Based on GFA - Apartment Zone)*	10,520.0 m²	
Lot Coverage (%)	*(Based on Gross Site Area)*	27%	
Lot Coverage (%)	*(Based on Net Site Area)*	43%	
FSI	*(GFA / Gross Site Area)*	**1.65**	
FSI	*(GFA / Net Site Area)*	**2.68**	

Proposed Areas	Floor	**GCA** (m²)**	**GFA* (m²)**	*Total (ft²)*
	Ground Floor	1,583.0	930.0	*10,011*
	2nd Floor	1,585.0	1,525.0	*16,415*
	3rd Floor	1,703.0	1,628.0	*17,524*
	4th Floor	1,508.0	1,448.0	*15,587*
	5th Floor	1,427.0	1,367.0	*14,715*
	6th Floor	1,370.0	1,297.0	*13,961*
	7th Floor	1,311.0	1,265.0	*13,617*
	8th Floor	1,106.0	1,060.0	*11,410*
	Total GFA	11,593.0	10,520.0	*113,240*
Total Proposed GFA			**10,520.0 m²**	*113,240 ft²*

***Gross Floor Area (GFA)** - Apartment Zone means the sum of the areas of each storey of a building above or below established grade, measured from the exterior of outside walls of the building including floor area occupied by interior walls but excluding any part of the building used for mechanical floor area, stairwells, elevators, motor vehicle parking, bicycle parking, storage lockers, below-grade storage, any enclosed area used for the collection or storage of disposable or recyclable waste generated within the building, common facilities for the use of the residents of the building, a day care and amenity area.*

****Gross Construction Area (GCA)** - The total enclosed area of a floor or building measured to the outside surface of the permanent exterior walls of the building or structure or to a predetermined surface, or plane as in the case of overhangs and projections to the outside surface of the building.*

Unit Count	Units	1 Bed	2 Bed	3 Bed
Ground Floor	10	6	4	
2nd Floor	18	17	1	
3rd Floor	23	21	1	1
4th Floor	22	18	4	0
5th Floor	20	15	5	
6th Floor	19	14	5	
7th Floor	18	12	6	
8th Floor	16	14	1	1
Total Units	**146**	117	27	2
		80.1%	18.5%	1.4%

Vehicular Parking

Parking Required	UNITS		PARKING	RATIO
Rental Residential @0.8 per unit	146		117	*0.80*
		Tot:	**117**	
Rental Visitors @ 0.2 per unit	146		29	*0.20*
Total Vehicular Parking Required		**Tot:**	**146**	

Parking Provided (estimated)	At Grade	P1 Level	P2 Level	Sub Total	*Ratio*
Residential	0	55	87	142	*0.97*
Residential Visitor	4	25	0	29	*0.20*
	4	80	87	171	
Total Vehicular Parking Provided			**Tot:**	**171**	**1.17**

Bicycle Parking

Required	Ratio		
Short Term Residential	*0.08 x unit*		12
Long Term Residential	*0.7 x unit*		102
		Tot:	**114**

Provided (estimated)	At Grade	P1 Level		
Short Term Residential	14	0		
Long Term Residential	0	100		
			Tot:	**114**

Landscaped Area

Soft Landscaping	912.0 m²	*23%*
Hard Landscaping	760.0 m²	*19%*
Green Roof	466.0 m²	*12%*
Total Landscape	**2138.0 m²**	*54%*

Amenity Area

Amenity Area Required	
5.6 m² per unit	817.6 m²
Total Amenities Required	**817.6 m²**

Amenity Area Provided (estimated)		
1) **Indoor**		
Ground Floor	330.0 m²	
2) **Outdoor**		
Ground Floor	100.0 m²	
Roof	450.0 m²	
Total Amenities	**880.0 m²**	*6.0 sqm x unit*

3016 KIRWIN AVE

3016-3022 Kirwin Avenue
Mississauga - ON - Canada

No.	Description	Date
1	ISSUED FOR OPA/ZBA	2021/03/10
2	ISSUED FOR OPA/ZBA	2022/01/21
10	ISSUED FOR OPA/ZBA	2022/12/20
11	ISSUED FOR OPA/ZBA	2023/09/18

North Arrow

N

Stamp

KFA architects + planners inc.
197 SPADINA AVE - SUITE 500
TORONTO - ON - M5T 2C8
416.633.6226
www.kfarchitecture.com

Project No:	20009
Scale:	1 : 300
Date:	Feb. 04, 2020
Drawn by:	FC

Drawing Title

SITE PLAN & STATS

Drawing Number

A001

LEA Consulting Ltd. Consulting Engineers and Planners	Sanitary Flow Rate Calculation			
	Prepared:	P.R.	Page No.	C-01
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE	Proj. #	21111		
	Date:	25-Oct-23		

POPULATION CALCULATION

Net Site Area	3923	m^2
Number of Townhoses	148	units

Proposed Building Type	Units	**Density** (P.P.U)	**Population**
Residential			0.00
>750 SQF	43	3	129
<=750 SQF	105	1.6	168
Total			**297.00**

SANITARY FLOW CALCULATION

Harmon Peaking Factor: $M=1+14/(4+P^{0.5})$

Peaking Factor	4.08	
Average Daily Wastewater Flow	302.8	L/cap/day
Total Actual Domestic Flow	4.25	L/sec
Total Domestic Flow (For less than 1000 person shall be 13.0 L/sec-STD.DWG. 2-5-2, Region of Peel)	13.00	L/sec
Infiltration Allowance (@ 0.2 L/sec/ha)	0.08	L/sec
Actual Design flow	**4.33**	L/sec
Standard Design Flow	**13.08**	L/sec

LEA Consulting Ltd. Consulting Engineers and Planners	Water Demand Calculation BLK A			
	Prepared:	P.R.	Page No.	C-02
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE	Proj. #	21111		
	Date:	25-Oct-23		

This calculation is following the "Water Supply for Public Fire Protection"
by Fire Underwriters Survey.

Formula: $F = 220C\sqrt{A}$

where

F = the required fire flow in litres per minute
C = coefficient related to the type of construction.
= 0.8 for non-combustible construction
A = the total floor area in square metres. For non-combustible buildings with unprotected openings, the areas shall be calculated by taking the largest two adjoining floors plus 50% of each floor above, up to 8 floors.

STEP 1

According the building stats, Dated Nov. 12, 2020	BLK A Area (m2)	
1st Floor	1583.0	Not Used
2nd Floor	1585.0	Largest joined floor
3rd Floor	1703.0	Largest joined floor
4th Floor	1508.0	Above Floor
5th Floor	1427.0	Above Floor
6th Floor	1370.0	Above Floor
7th Floor	1311.0	Above Floor
8th Floor	1106.0	Above Floor
A	6649	

Therefore, F (l/min)= 14000

STEP 2

Occupancy reduction:

For occupancies with a low contents fire hazard, the reduction rate is 25%,

Therefore: F (l/min)= 10500

Reduction for sprinkler protection:

Using the NFPA sprinkler system, a reduction rate of 30% is used.

Therefore: F (l/min)= 7350

STEP 3

Separation charge:

Charge for the separations on each side:

Expsure Charge		Charge	
0 to 3m	25%	0%	West
3.1 to 10m	20%	15%	North
10.1 to 20m	15%	15%	South
20.1 to 30m	10%	10%	East
30.1 to 45m	5%		
>45m	0%		
Total charge in %		40%	
Total charge in l/min		2900	

STEP 4

Required Fire Flow: 10000 l/min

or 166.67 l/s

or 2642 US GPM

LEA Consulting Ltd. Consulting Engineers and Planners	Water Demand Calculation			
	Prepared:	P.R.	Page No.	C-03
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & 3031 LITTLE JOHN LANE	Proj. #	21111		
	Date:	25-Oct-23		

Total Population: **297** (See Page C-01)

Average Day Demand Calculation:

Residential Per Capita Demand	280	L/cap/day
Average Day Flow	**0.963**	L/sec

Peak Hour Demand Calculation:

Residential Per Capita Demand	280	L/cap/day
Peaking Factor	3	
Peak Hour Demand	**2.888**	L/sec

Maximum Day Demand Calculation:

Residential Per Capita Demand	280	L/cap/day
Peaking Factor	2	
Maximum Day Demand	**1.925**	L/sec

Fire Flow for Residential:	166.67	L/sec
Max. Day Demand plus Fire Flow:	**168.59**	L/sec
Design Water Demand	**168.59**	L/sec
or	**2672.18**	**US GPM**

LEA Consulting Ltd. Consulting Engineers and Planners	Connection Demand Table			
	Prepared:	P.R.	Page No.	C-04
	Checked:	F.M.		
Project: 3016-3032 KIRWIN AVE & LITTLE JOHN LANE **City Of Mississauga**	Proj. #	21111		
	Date:	25-Oct-23		

Connection Demand Table

WATER CONNECTION

Connection Point	Kirwin Ave
Pressure zone of connection point	Zone 2
Total equivalent population to be serviced	297 Based on Region of Peel 2020 Criteria
Total lands to be serviced	0.392 ha

HYDRANT FLOW TEST

Hydrant flow test location	KIRWIN AVE		
	Pressure (kPa)	Flow (l/s)	Time
Minimum water pressure	20	332.8	
Maximum water pressure	76	63.1	

No.	Wate Demand Demand type	Demand	Units
1	Average day flow	0.96	l/s
2	Maximum day flow	1.93	l/s
3	Peak hour flow	2.89	l/s
4	Fire flow	166.67	l/s
	Analysis		
5	Maximum day plus fire flow	168.59	l/s

HYDRANT FLOW TEST

Connection Point	Existing 300mm Watermain on Kirwin Ave
Total equivalent population to be serviced	297
Total lands to be serviced	0.392 ha
Standard Wastewater Sewer Effluent (L/s)	13.08
Actual Wastewater Sewer Effluent (L/s)	4.33

APPENDIX D

Storm Sewer Capacity Assessment

APPENDIX D-01

Historic Drainage Area Plan 1979

City of Mississauga

Note: 2.11 ha up to the tracks

Little John Lane

Kirwin Ave

Regional Valley Dr

DRAINAGE AREA
(AS PER DESIGN SHEET (1979))

Residential (1979)

Plaza and Parking
(Existing)

PROPOSED
DEVELOPMENT SITE
3016-3032 Kirwin Ave

99-125 Dundas St. E

Dundas Street

ARKENDO DEV.
T 79041
111 - 79079

APPENDIX D-02

Historic Design Sheet 1979

City of Mississauga

DESIGN SHEET (1979)

SUBDIVISION _____
CONSULTANT _____
MAJOR DRAINAGE AREA _____

CITY OF MISSISSAUGA
STORM DRAINAGE DESIGN CHART
FOR CIRCULAR DRAINS FLOWING FULL

SHEET No. 2 OF 3 DATE _____
PROJECT No. _____
DESIGNED BY _____

LOCATION OF SECTION	FROM UPSTREAM	TO DOWNSTREAM	ADJACENT CONTRIBUTARY AREA	RUNOFF COEFFICIENT		ACCUMULATIVE AREA DRAINED BY SECTION	ACCUMULATIVE AREA TIMES RUNOFF COEFFICIENT FOR SECTION	FLOW TIME TO SECTION (FROM EXTREME UPSTREAM INLET)	INITIAL TIME OF CONCENTRATION AT EXTREME UPSTREAM INLET	TIME OF CONCENTRATION AT UPSTEAM END OF SECTION	INTENSITY OF RAINFALL	QUANTITY OF FLOW TO BE ACCOMMODATED IN SECTION.	TYPE OF PIPE	MANNINGS ROUGHNESS COEFFICIENT	SLOPE	DIAMETER	LENGTH OF SECTION	VELOCITY OF FLOW WITH PIPE FLOWING FULL	CAPACITY OF PIPE FLOWING FULL	PIPE INVERT AT UPSTREAM M.H.	PIPE INVERT AT DOWNSTREAM MH.	TIME OF FLOW IN SECTION
	MH#	MH#	A_A	C_A	$A_A C_A$	$A = \Sigma A_A$	$A C = \Sigma A_A C_A$	t_{cf}	t_{ci}	$t_c = t_{cf} + t_{ci}$	I	$Q = \frac{IAC}{360}$		n	S	D	L	V	Q			$t = \frac{L}{V \times 60}$
			(ha)			(ha)		(min)	(min)	min	mm/hr	m^3/SEC			%	mm	m	m/SEC	m^3/SEC	m	m	min
DUNDAS ST	9	8	10.01	0.40	4.00																	
			0.92	0.75	0.69	31.79	17.00			23.50	75	3.54			0.44	1050	105	2.11	1.87			0.83
								PBS							0.45	1050	91	2.14	1.90			
																			3.79			
	8	7	1.02	0.75	0.77	32.81	17.77			24.33	73	3.60			0.49	1050	65	2.23	1.99			0.49
								PBS							0.45	1050	91	2.14	1.90			
																			3.89			
	7	6	0.59	0.75	0.44	33.40	18.21			24.82	72	3.64			0.29	1050	47	1.73	1.55			0.45
	6	5	1.70	0.75	1.28	35.10	19.49			25.27	71	3.84			0.63	1050	76	2.55	2.26			0.50
								PSS							0.63	1050	91	2.55	2.26			
																			4.52			
	5	4	0.25	0.75	0.19	35.35	19.68			25.77	70	3.84			0.81	1050	74	2.87	2.56			0.43
								PSS							0.80	975	91	2.71	2.09			
																			4.65			
	4	3	1.37	0.40	0.55																	
			0.29	0.75	0.22	37.01	20.45			26.20	69	3.92			0.79	1050	86	2.87	2.53			0.50
								PSS							0.80	975	91	2.71	2.09			
																			4.62			

EFFECTIVE DATE: 79 08 PLAN Nº 2-1-5
REVISED DATE: 79 09

SUBDIVISION _____

CONSULTANT _____

MAJOR DRAINAGE AREA _____

CITY OF MISSISSAUGA

STORM DRAINAGE DESIGN CHART FOR CIRCULAR DRAINS FLOWING FULL

SHEET No. 3 OF 3 DATE _____

PROJECT No. _____

DESIGNED BY _____

LOCATION OF SECTION	FROM UPSTREAM	TO DOWNSTREAM	ADJACENT CONTRIBUTARY AREA	RUNOFF COEFFICIENT		ACCUMULATIVE AREA DRAINED BY SECTION	ACCUMULATIVE AREA TIMES RUNOFF COEFFICIENT FOR SECTION	FLOW TIME TO SECTION (FROM EXTREME UPSTREAM INLET)	INITIAL TIME OF CONCENTRATION AT EXTREME UPSTREAM INLET	TIME OF CONCENTRATION AT UPSTEAM END OF SECTION	INTENSITY OF RAINFALL	QUANTITY OF FLOW TO BE ACCOMMODATED IN SECTION.	TYPE OF PIPE	MANNINGS ROUGHNESS COEFFICIENT	SLOPE	DIAMETER	LENGTH OF SECTION	VELOCITY OF FLOW WITH PIPE FLOWING FULL	CAPACITY OF PIPE FLOWING FULL	PIPE INVERT AT UPSTREAM M.H.	PIPE INVERT AT DOWNSTREAM MH	TIME OF FLOW IN SECTION
	MH#	MH#	A_A	C_A	$A_A C_A$	$A = \Sigma A_A$	$A \times C = \Sigma A_A C_A$	t_{cf}	t_{ci}	$t_c = t_{cf} + t_{ci}$	I	$Q = \frac{I A C}{360}$		n	S	D	L	V	Q			$t = \frac{L}{V \times 60}$
			(ha)			(ha)		(min)	(min)	min	mm/hr	m^3/SEC			%	mm	m	m/SEC	m^3/SEC	m	m	min
DUNDAS ST	3	2	0.36	0.75	0.27	37.37	20.72			26.70	68	3.92			0.78	1050	91	2.81	2.52			0.54
								PSS							0.80	975	76	2.71	2.09			
																			4.61			
	2	CULV	0.18	0.75	0.14	37.55	20.86			27.24	67	3.92			0.84	1050	43	2.92	2.61			0.25
								PSS							0.80	975	35	2.71	2.09			
																			4.70			

PSS — PARALLELING STORM SEWER

EFFECTIVE DATE: 79 08 PLAN Nº 2-1-5

APPENDIX D-03

Updated Existing Drainage Area Plan for Kirwin

UPDATED EXISTING DRAINAGE AREAS (2022)

SUBJECT SITE

E1 | 0.75
0.682 ha

E2 | 0.62
0.138 ha

E3 | 0.62
0.057 ha

E4 | 0.9
0.266 ha

CB1
SE INV 0.89m DIA 250mm

CB2
SW INV 0.85m DIA 250mm

CB3
SE INV 1.37m DIA 250mm

CB4
SW 0.65m DIA 250mm

CB5

CB6

MH 32
W INV 1.63 DIA 250mm
N INV not surveyed
S INV not surveyed

MH31
S INV 2.69m DIA 400mm
E INV 2.56m DIA 250mm
NE INV 2.56m DIA 250mm
NW INV 2.55m DIA 250mm

MH30 (4)
N INV 2.71m 400mm

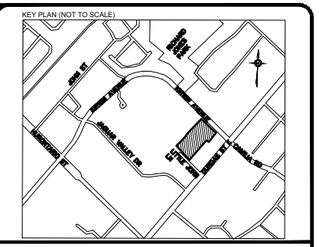
MH33
NE INV 1.08m DIA 250mm
SW INV 1.24m DIA 250mm

5
Location marker for
D/S Storm Analysis

Kirwin Ave

Dundas St E

KEY PLAN (NOT TO SCALE)



LEGEND

- MH — EXISTING MANHOLE
- CB — EXISTING CATCHBASIN
- SUBJECT SITE EXISTING PROPERTY LINE
- DRAINAGE BOUNDARY
- C1 | 0.25 / 0.388 ha — DRAINAGE ID/RUNOFF COEFFICIENT DRAINAGE AREA (ha)

No.	Revision	Date	By	App.
1	ISSUED FOR SPA SUBMISSION	2022-11-16	P.R.	F.M.

625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

Owner/Client:

DASS METAL

Location:

3031 LITTLE JOHN & 3016-3032
KIRWIN AVE DEVELOPMENT

Title:

KIRWIN AVE STORM SEWER ANALYSIS
EXISTING DRAINAGE PLAN

Designed By:	F.M.	Drawn By:	J.W.	Checked By:	F.M.
Scale:	1:500	Date:	FEB., 2021	Drawing No.:	FIG-3
Project No.:	21111				

APPENDIX D-04

Updated Design Sheet

DEVELOPMENT: 3016 Kirwin Ave

CONSULTANT: LEA Consulting Ltd

MAJOR DRAINAGE AREA: Cooksville Creek

MISSISSAUGA Transportation and Works

STORM DRAINAGE DESIGN CHART

FOR CIRCULAR DRAINS FLOWING FULL

SHEET No.: DATE: 16-Nov-22

DESIGNED BY: F.M.

CHECKED BY: F.F.

City of Mississauga Intensity 10yr = $1010/(tc+4.6)^{0.78}$

Pre-Development Condition

FROM UPSTREAM	TO DOWNSTREAM	Drainage area ID	Catchment AREA	RUNOFF COEFFICIENT	AREA TIMES RUNOFF COEFFICIENT	ACCUMULATIVE AREA DRAINED BY SECTION	ACCUMULATIVE AREA TIMES RUNOFF COEFFICIENT FOR SECTION	FLOW TIME TO SECTION FROM EXTREME UPSTREAM INLET	INITIAL TIME OF CONCENTRATION AT EXTREME UPSTREAM INL.	TIME OF CONCENTRATION UPSTREAM END OF SECTION	INTENSITY OF RAINFALL	QUANTITY OF FLOW ACCUMULATED IN SECTION	TYPE OF PIPE	MANNING ROUGHNESS COEFFICIENT	SLOPE	DIAMETER	LENGTH OF SECTION	VELOCITY OF FLOW WITH PIPE FLOWING FULL	CAPACITY OF PIPE FLOWING FULL	PIPE INVERT AT UPSTREAM M.H.	PIPE INVERT AT DOWNSTREAM M.H.	TIME OF FLOW IN SECTION	QUANTITY OF FLOW TO PIPE FLOWING FULL	NOTES
MH#	MH#		A ha	C	AxC	SUM. A ha	SUM AxC	tc_f min	tc_i min	$tc=tc_f+tc_i$ min	i mm/hr	Q=iAC/360 m3/sec		n	S %	D mm	L m	V m/sec	Q_f m3/sec	m	m	t=L/Vx60 min	Q/Q_f %	
																						0		
MH31	5	E1	0.682	0.75	0.51	0.682	0.51	0	15	15	99.2	**0.141**	CONC	0.013	1.25	400	49.33	1.85	0.233	110.35	N/A	0.44	0.71	Surcharged
		E2	0.138 *	0.62	0.09	0.138	0.09	0	15	15	99.2	**0.024** **	CONC	0.013	1.25	400	49.33	1.85	0.233	110.35	N/A	0.44	0.71	
5	4 (MH30)	E4	0.266	0.90	0.24	1.143	0.87	0.44	15	15.44	97.5	**0.236** ***	CONC	0.013	1.25	400	4.56	1.85	0.233	N/A	109.69	0.04	1.01	
		E3	0.057 *	0.62	0.04																			
Flow from STM Sewer on Dundas Street						35.350	19.68			25.77	70.5	**3.85**										0.43		SUM AxC= 19.68, Q=3840l/s, Tc=25.77 min
4 (MH30)	3		0.290	0.75	0.22	36.783	20.77	0.43	25.77	26.20	69.7	**4.02**	CONC	0.013	0.79	1050	86.00	2.80	2.43			0.51	0.91	
													CONC	0.013	0.80	975	91.00	2.68	2.00			0.56		
																			4.43					
3	2		0.360	0.75	0.27	37.143	21.04	0.51	26.20	26.71	68.8	**4.02**	CONC	0.013	0.78	1050	91.00	2.79	2.41			0.54	0.91	
													CONC	0.013	0.80	975	76.00	2.68	2.00			0.47		
																			4.42					
2	CULVERT		0.180	0.75	0.14	37.323	21.17	0.54	26.71	27.26	67.9	**3.99**	CONC	0.013	0.84	1050	35.97	2.89	2.50			0.21	0.89	
													CONC	0.013	0.80	975	35.00	2.68	2.00			0.22		
																			4.51					

* Drainage area from Subject Site

** 10-yr storm flow from the proposed site under existing conditions, using actual runoff coefficient. (i.e. not discounting to 0.5)

*** includes flow from 0.057 ha from the subject site, equivalent to 9.7 L/s

Post-Development Condition

FROM UPSTREAM	TO DOWNSTREAM		Catchment AREA	RUNOFF COEFFICIENT	AREA TIMES RUNOFF COEFFICIENT	ACCUMULATIVE AREA DRAINED BY SECTION***	ACCUMULATIVE AREA TIMES RUNOFF COEFFICIENT FOR SECTION	FLOW TIME TO SECTION FROM EXTREME UPSTREAM INLET	INITIAL TIME OF CONCENTRATION AT EXTREME UPSTREAM INL.	TIME OF CONCENTRATION UPSTREAM END OF SECTION	INTENSITY OF RAINFALL	QUANTITY OF FLOW ACCUMULATED IN SECTION	TYPE OF PIPE	MANNING ROUGHNESS COEFFICIENT	SLOPE	DIAMETER	LENGTH OF SECTION	VELOCITY OF FLOW WITH PIPE FLOWING FULL	CAPACITY OF PIPE FLOWING FULL	PIPE INVERT AT UPSTREAM M.H.	PIPE INVERT AT DOWNSTREAM M.H.	TIME OF FLOW IN SECTION	QUANTITY OF FLOW TO PIPE FLOWING FULL	NOTES
MH#	MH#		A ha	C	AxC	SUM. A ha	SUM AxC	tc_f min	tc_i min	$tc=tc_f+tc_i$ min	i mm/hr	Q=iAC/360 m3/sec		n	S %	D mm	L m	V m/sec	Q_f m3/sec	m	m	t=L/Vx60 min	Q/Q_f %	
																						0		
MH31	5	E1	0.682	0.75	0.51	0.682	0.51	0	15	15	99.2	**0.141**	CONC	0.013	1.25	400	49.33	1.85	0.233	110.35	N/A	0.44	0.67	
		E2+E3	0.337 *									**0.015** **												
5	4 (MH30)	E4	0.266	0.90	0.24	0.948	0.75	0.44	15	15.44	97.5	**0.218**	CONC	0.013	1.25	400	4.56	1.85	0.233	N/A	0.00	0.04	0.94	
Flow from STM Sewer on Dundas Street						35.350	19.68			25.77	70.5	**3.85**										0.43		SUM AxC= 19.68, Q=3840l/s, Tc=25.77 min
4	3		0.290	0.75	0.22	36.588	20.65	0.43	25.77	26.20	69.7	**4.013**	CONC	0.013	0.79	1050	86.00	2.80	2.43			0.51	0.91	
													CONC	0.013	0.80	975	91.00	2.68	2.00			0.56		
																			4.431					
3	2		0.360	0.75	0.27	36.948	20.92	0.51	26.20	26.71	68.8	**4.013**	CONC	0.013	0.78	1050	91.00	2.79	2.41			0.54	0.91	
													CONC	0.013	0.80	975	76.00	2.68	2.00			0.47		
																			4.416					
2	CULVERT		0.180	0.75	0.14	37.128	21.05	0.54	26.71	27.26	67.9	**3.985**	CONC	0.013	0.84	1050	35.97	2.89	2.50			0.21	0.88	
													CONC	0.013	0.80	975	35.00	2.68	2.00			0.22		
																			4.507					

* Controlled Drainage area from Subject Site, post-development conditions.

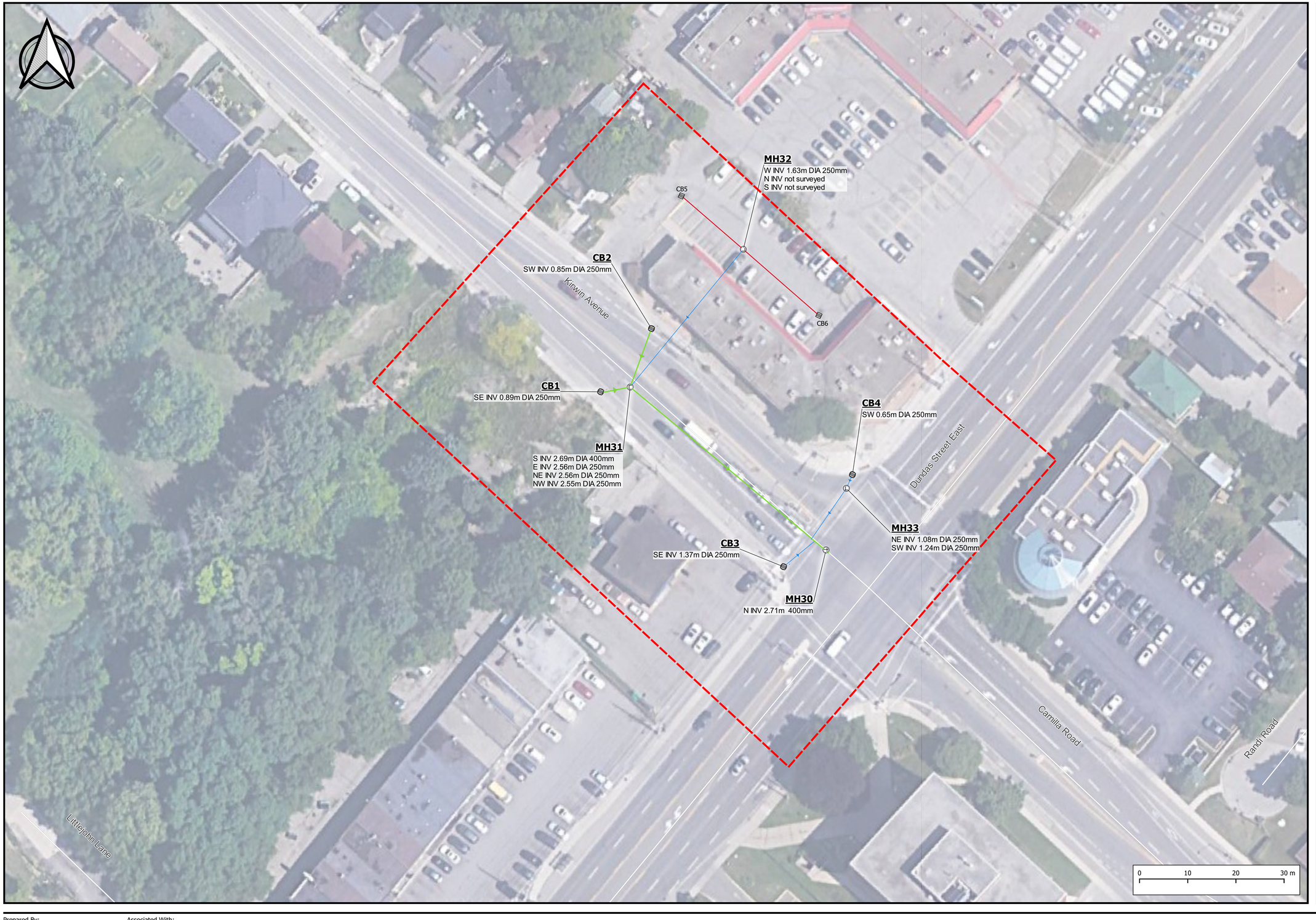
** Overcontrolled flows based on the 2-year pre-development with C = 0.5 was used for flow from the proposed site under post-development condition. Includes 10-year uncontrolled flow from the subject site under post-development conditions.

Note: Area from Overcontrolled site is not included in the Accumulated Area so that it does not impact the flow calculation. The overcontrolled flow has been directly included in the flow in all downstream sewers.

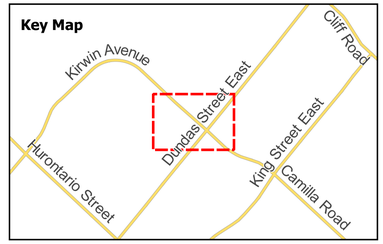
*** Cumulative Drainage area does not include controlled/uncontrolled area from the subject site.

APPENDIX D-05

CCTV Report



Key Map



General Notes

1. Field inspection was performed on March 31, 2022. The scope of work included sewer flushing, sewer CCTV inspections, and invert measurements.
2. The location of the sewers and direction of flow were defined based on line-of-sight and judgment of the field technician.
3. Other buried utilities within the Investigation Limits are not shown.

Map Legend

Sewerlines
- Storm Sewer
- Lateral Lines
- Sewer not Surveyed

Point Features
- CB
- Manhole

Sources:
Projection System: NAD 83 UTM ZONE 17N

Prepared By:

Associated With:

Drawn:	M.Skerlan	Apr 7, 2022
Checked:	A.Durante	Apr 7, 2022
Approved:		

Revision History

Project: Dundas Street E and Kirwin Avenue, Mississauga

Project #: 2022-602
CCTV and Flush

Pipe Segment ID	Street Name	Type	Upstream MH	Downstream MH	Length (m)	Material	Size (mm)	CCTV Inspection Date	CCTV Survey Length	CCTV Reversal Date	CCTV Rev Survey Length	Rim To Invert (Inlet)	Rim To Invert (Outlet)	Comments
MH31MH30	Kirwin Ave.	STM	MH31	MH30		CONC	400	31-Mar	58.1m			2.69m	2.71m	Survey Complete.
CB1MH31	Kirwin Ave.	STM	CB1	MH31		CONC	250	31-Mar	5.4m	31-Mar	2.1	0.89m	2.55m	Survey abandoned due to offset joint. Reversal Complete.
CB2MH31	Kirwin Ave.	STM	CB2	MH31		CONC	250	31-Mar	12.7m			0.85m	2.56m	Survey Complete.
MH32MH31	Kirwin Ave.	STM	MH32	MH31		CONC	250	31-Mar	35.2m			2.56m	1.63m	MH32 is a lot line MH located east of Kirwin Ave, behind the shops in the parking lot. 1 tap located at 24.7m from DSMH. Tap services either the roof or floor drain.
CB3MH31MH30	Kirwin Ave.	STM	CB3	MH31MH30		CONC	250	31-Mar	3.1m			1.37m		Survey Complete.
CB4MH33	Kirwin Ave.	STM	CB4	MH33		CONC	250	31-Mar	3.4m			0.65m	1.08m	Survey Complete.
MH33MH31MH30	Kirwin Ave.	STM	MH33	MH31MH30		CONC	250	31-Mar	15.9m			1.24m		Survey Complete.

I2S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	CB1MH31
Upstream MH:	CB1
Downstream MH:	MH31

	USMH	DSMH
Rim to Invert:	0.89 m	2.55 m
Rim to Grade:		

Pipe Geometry:	250 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	

Inspection

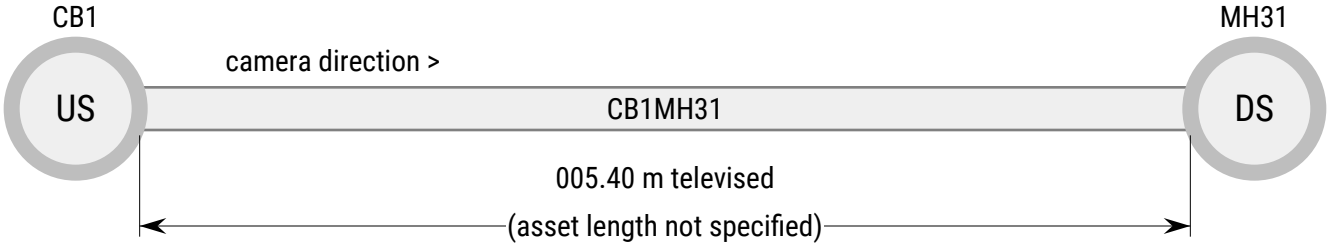
Media Date/Time:	31 • Mar • 2022 10:28
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Downstream
Purpose:	Sewer System Evaluation Survey
Technology:	CCTV
Pre-Cleaning:	No Pre-Cleaning
Date Cleaned:	
Flow Control:	
Length Surveyed:	005.40 m
Weather:	Light Rain

Ratings

	Structural	O & M	Overall
Quick:	4131	0000	4131
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	7	0	7
Rating Index (RI):	3.5	0	3.5

Consequence of Failure:

Summary



Observations

CB1

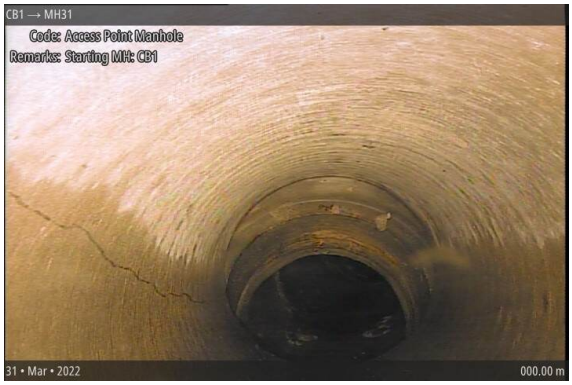
camera direction >

flow >

Metres	Code	Clock	Value	Grade	Description	Remarks
000.00	AMH				Access Point Manhole	Starting MH: CB1. Cannot view cb due to slope
	MWL		5%		Miscellaneous Water Level	
003.20	FL	9		3	Fracture Longitudinal	
005.30	JOL			4	Joint Offset Large	
005.40	MSA				Miscellaneous Survey Abandoned	Survey abandoned due to offset joint.

MH31

Snapshots



Access Point Manhole at 000.00 m | Starting MH: CB1. Cannot view cb due to slope

Miscellaneous Water Level at 000.00 m

Fracture Longitudinal at 003.20 m, 9 o'clock

Joint Offset Large at 005.30 m

Miscellaneous Survey Abandoned at 005.40 m | Survey abandoned due to offset joint.

I2S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	CB3MH31MH32
Upstream MH:	CB3
Downstream MH:	MH31MH32

	USMH	DSMH
Rim to Invert:	1.37 m	
Rim to Grade:		

Pipe Geometry:	250 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	

Inspection

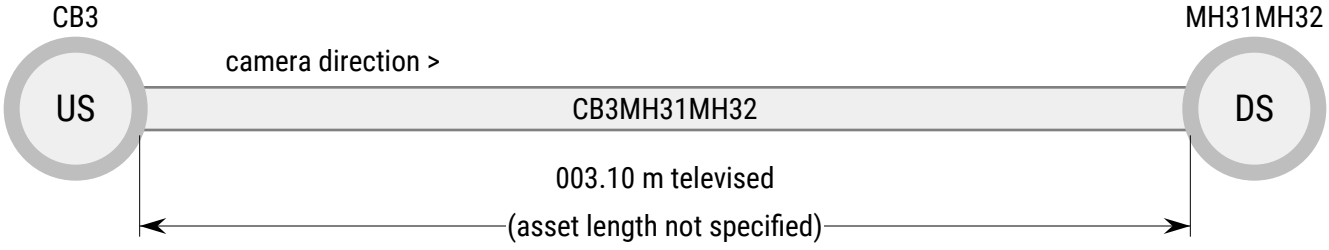
Media Date/Time:	31 • Mar • 2022 11:17
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Downstream
Purpose:	Sewer System Evaluation Survey
Technology:	CCTV
Pre-Cleaning:	No Pre-Cleaning
Date Cleaned:	
Flow Control:	
Length Surveyed:	003.10 m
Weather:	Light Rain

Ratings

	Structural	O & M	Overall
Quick:	0000	0000	0000
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	0	0	0
Rating Index (RI):	0	0	0

Consequence of Failure:

Summary



Observations

CB3

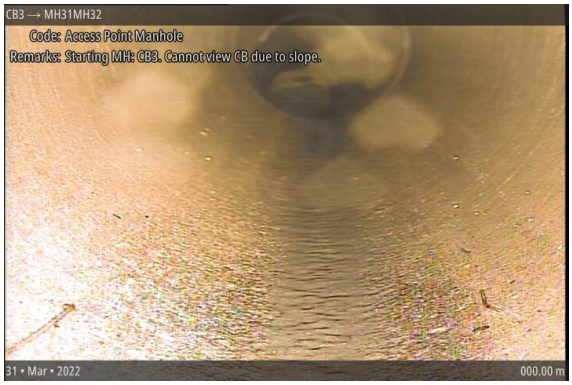
camera direction >

flow >

Metres	Code	Clock	Value	Grade	Description	Remarks
000.00	AMH				Access Point Manhole	Starting MH: CB3. Cannot view CB due to slope.
	MWL		5%		Miscellaneous Water Level	
003.10	ADP				Access Point Discharge Point	MH31MH32. Survey Complete.

MH31MH32

Snapshots



Access Point Manhole at 000.00 m | Starting MH: CB3. Cannot view CB due to slope.

Miscellaneous Water Level at 000.00 m

Access Point Discharge Point at 003.10 m | MH31MH32. Survey Complete.

I²S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	CB4MH31MH32
Upstream MH:	CB4
Downstream MH:	MH31MH32

	USMH	DSMH
Rim to Invert:	0.65 m	
Rim to Grade:		

Pipe Geometry:	250 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	

Inspection

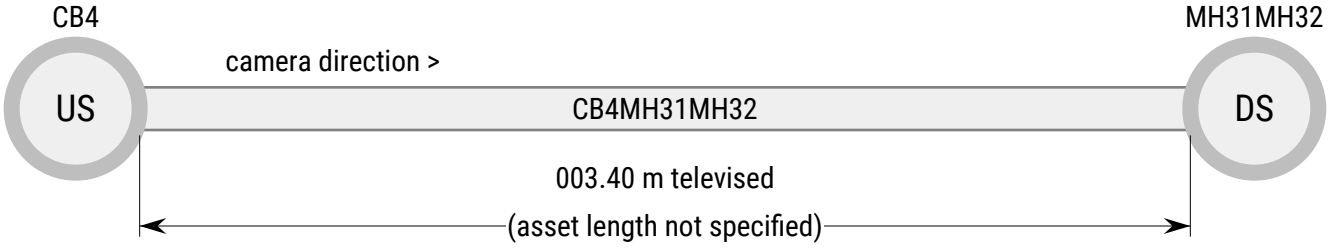
Media Date/Time:	31 • Mar • 2022 11:33
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Downstream
Purpose:	Sewer System Evaluation Survey
Technology:	CCTV
Pre-Cleaning:	No Pre-Cleaning
Date Cleaned:	
Flow Control:	
Length Surveyed:	003.40 m
Weather:	Dry - No Precipitation During Survey

Ratings

	Structural	O & M	Overall
Quick:	3100	0000	3100
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	3	0	3
Rating Index (RI):	3	0	3

Consequence of Failure:

Summary



Observations

CB4

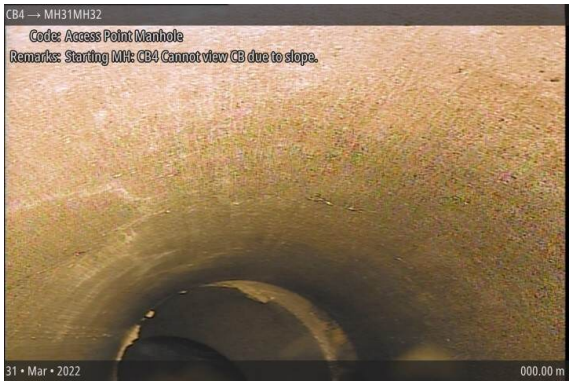
camera direction >

flow >

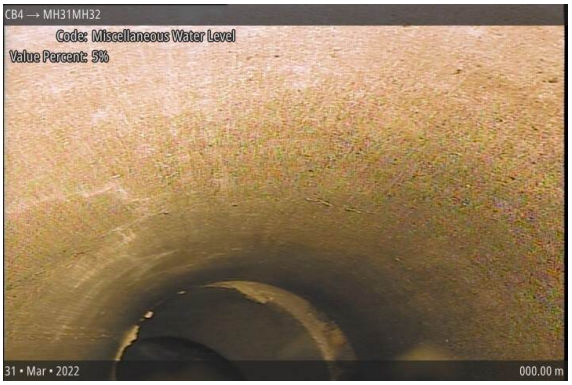
Metres	Code	Clock	Value	Grade	Description	Remarks
000.00	AMH				Access Point Manhole	Starting MH: CB4 Cannot view CB due to slope.
	MWL		5%		Miscellaneous Water Level	
001.40	JOM			3	Joint Offset Medium	
003.40	ADP				Access Point Discharge Point	MH31MH32. Survey Complete.

MH31MH32

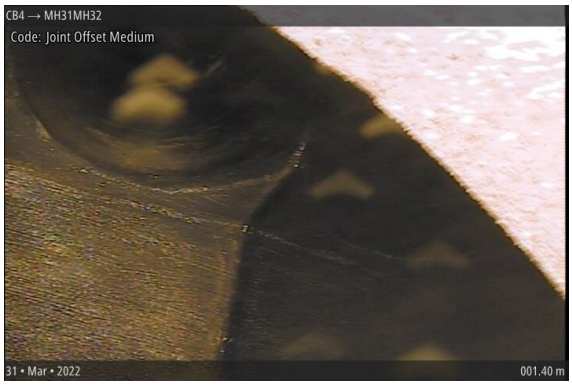
Snapshots



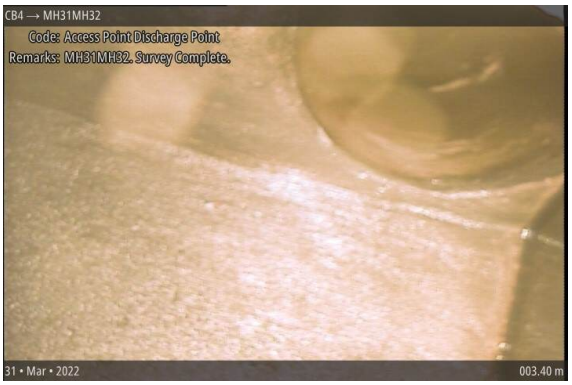
Access Point Manhole at 000.00 m | Starting MH: CB4 Cannot view CB due to slope.



Miscellaneous Water Level at 000.00 m



Joint Offset Medium at 001.40 m



Access Point Discharge Point at 003.40 m | MH31MH32. Survey Complete.

I2S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	CB1MH31
Upstream MH:	CB1
Downstream MH:	MH31

	USMH	DSMH
Rim to Invert:	0.89 m	2.55 m
Rim to Grade:		

Pipe Geometry:	250 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	Reverse to Upstream.

Inspection

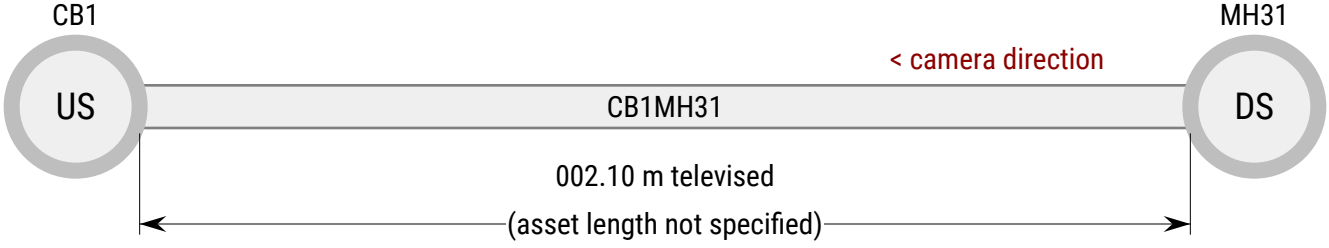
Media Date/Time:	31 • Mar • 2022 10:41
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Upstream
Purpose:	Sewer System Evaluation Survey
Technology:	CCTV
Pre-Cleaning:	No Pre-Cleaning
Date Cleaned:	
Flow Control:	
Length Surveyed:	002.10 m
Weather:	Light Rain

Ratings

	Structural	O & M	Overall
Quick:	0000	0000	0000
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	0	0	0
Rating Index (RI):	0	0	0

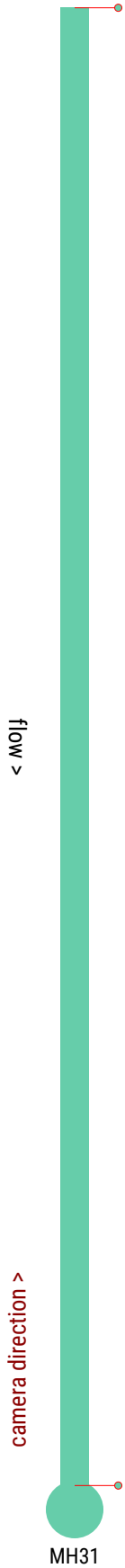
Consequence of Failure:

Summary



Observations

CB1



Metres	Code		Clock	Value	Grade	Description	Remarks
002.10	AM					Access Point Meter	Cannot get to reversal point do to offset joint. Reversal complete.
000.00	MWL AMH			5%		Miscellaneous Water Level Access Point Manhole	Starting MH: MH31. Cannot view MH due to slope.

Snapshots

Access Point Manhole at 000.00 m | Starting MH: MH31. Cannot view MH due to slope.

Miscellaneous Water Level at 000.00 m

Access Point Meter at 002.10 m | Cannot get to reversal point do to offset joint. Reversal complete.

I²S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	CB2MH31
Upstream MH:	CB2
Downstream MH:	MH31

	USMH	DSMH
Rim to Invert:	0.92 m	1.63 m
Rim to Grade:		

Pipe Geometry:	250 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	

Inspection

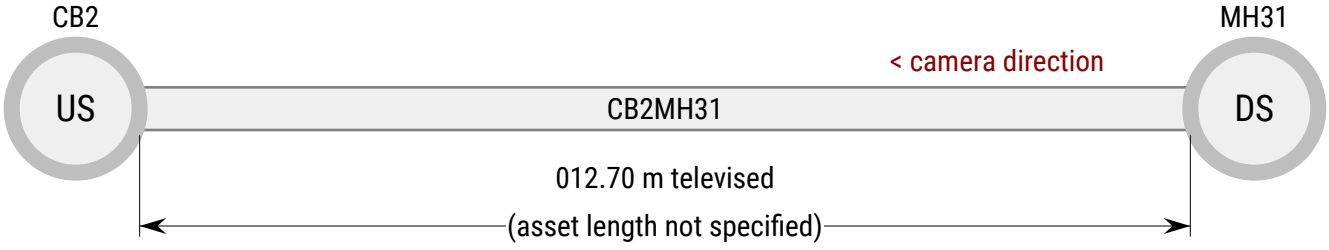
Media Date/Time:	31 • Mar • 2022 10:13
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Upstream
Purpose:	Sewer System Evaluation Survey
Technology:	CCTV
Pre-Cleaning:	No Pre-Cleaning
Date Cleaned:	
Flow Control:	
Length Surveyed:	012.70 m
Weather:	Light Rain

Ratings

	Structural	O & M	Overall
Quick:	0000	0000	0000
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	0	0	0
Rating Index (RI):	0	0	0

Consequence of Failure:

Summary



Observations

CB2

Metres	Code		Clock	Value	Grade	Description	Remarks
012.70	AMH					Access Point Manhole	Ending MH: CB2. Survey Complete.
000.00	MWL AMH			5%		Miscellaneous Water Level Access Point Manhole	Starting MH: MH31. Cannot view MH due to slope.

< flow >

camera direction >

MH31

Snapshots

Access Point Manhole at 000.00 m | Starting MH: MH31. Cannot view MH due to slope.

Miscellaneous Water Level at 000.00 m

Access Point Manhole at 012.70 m | Ending MH: CB2. Survey Complete.

I²S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	MH31MH30
Upstream MH:	MH31
Downstream MH:	MH30

	USMH	DSMH
Rim to Invert:	2.69 m	
Rim to Grade:		

Pipe Geometry:	400 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	

Inspection

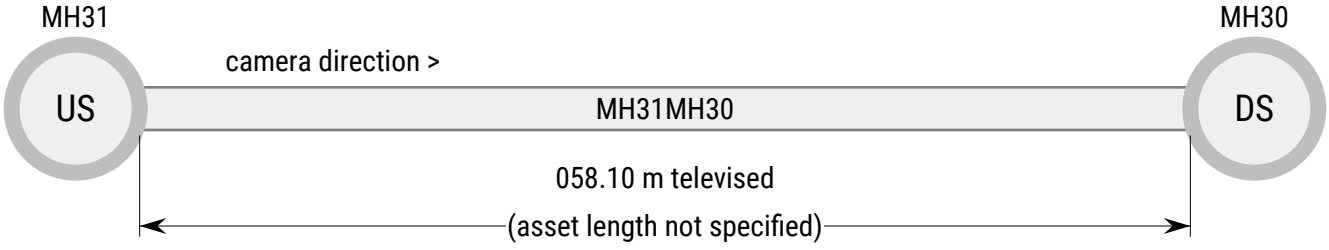
Media Date/Time:	31 • Mar • 2022 08:32
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Downstream
Purpose:	Sewer System Evaluation Survey
Technology:	CCTV
Pre-Cleaning:	Light Cleaning
Date Cleaned:	2022-03-31
Flow Control:	
Length Surveyed:	058.10 m
Weather:	Light Rain

Ratings

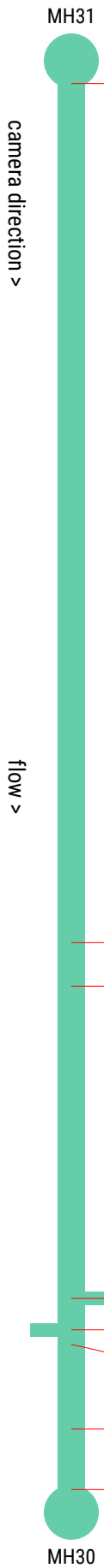
	Structural	O & M	Overall
Quick:	3100	3200	3300
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	3	6	9
Rating Index (RI):	3	3	3

Consequence of Failure:

Summary



Observations



Metres	Code	Clock	Value	Grade	Description	Remarks
000.00	AMH				Access Point Manhole	Starting MH: MH31
	MWL		5%		Miscellaneous Water Level	
035.50	MWL		15%		Miscellaneous Water Level	
037.30	OBN	5 - 7	20%	3	Obstruction Construction Debris	
050.20	TB	10	200 mm		Tap Break-in/Hammer	
051.50	TB	2	200 mm		Tap Break-in/Hammer	
052.10	CM	10 - 2		3	Crack Multiple	
055.60	ISSRH	4 - 8	20%	3	Intruding Sealing Ring Hanging	
058.10	AMH				Access Point Manhole	Starting MH: MH30. Cannot view MH due to hanging seal ring.

Snapshots

Access Point Manhole at 000.00 m | Starting MH: MH31

Miscellaneous Water Level at 000.00 m

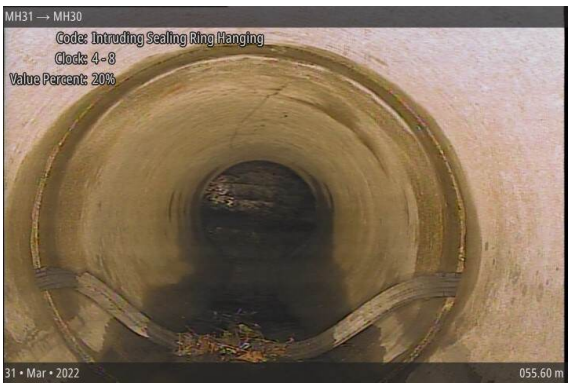
Miscellaneous Water Level at 035.50 m

Obstruction Construction Debris at 037.30 m, 5 - 7 o'clock

Tap Break-in/Hammer at 050.20 m, 10 o'clock

Tap Break-in/Hammer at 051.50 m, 2 o'clock

Crack Multiple at 052.10 m, 10 - 2 o'clock



Intruding Sealing Ring Hanging at 055.60 m, 4 - 8 o'clock

Snapshots

Access Point Manhole at 058.10 m | Starting MH: MH30. Cannot view MH due to hanging seal ring.

I2S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	MH31MH32
Upstream MH:	MH32
Downstream MH:	MH31

	USMH	DSMH
Rim to Invert:	1.63 m	2.56 m
Rim to Grade:		

Pipe Geometry:	250 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	

Inspection

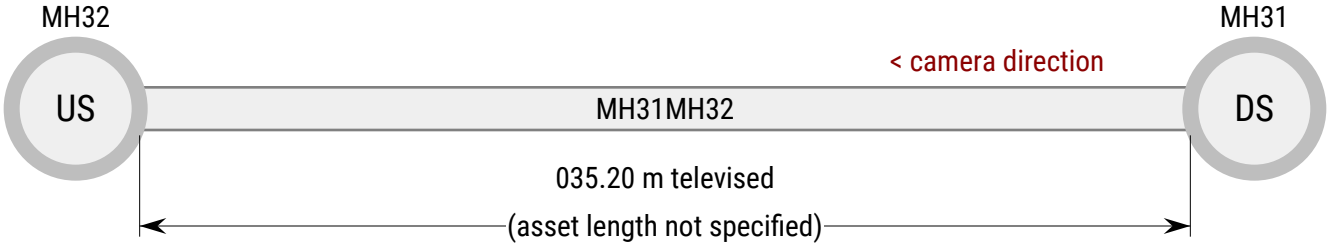
Media Date/Time:	31 • Mar • 2022 09:51
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Upstream
Purpose:	Sewer System Evaluation Survey
Technology:	CCTV
Pre-Cleaning:	Light Cleaning
Date Cleaned:	2022-03-31
Flow Control:	
Length Surveyed:	035.20 m
Weather:	Light Rain

Ratings

	Structural	O & M	Overall
Quick:	0000	0000	0000
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	0	0	0
Rating Index (RI):	0	0	0

Consequence of Failure:

Summary



Observations

MH32

Metres	Code		Clock	Value	Grade	Description	Remarks
035.20	AMH					Access Point Manhole	Ending MH: MH32. Survey Complete.
024.70	TB		2	100 mm		Tap Break-in/Hammer	
000.00	MWL AMH			5%		Miscellaneous Water Level Access Point Manhole	Starting MH: MH31. Cannot view MH due to slope.

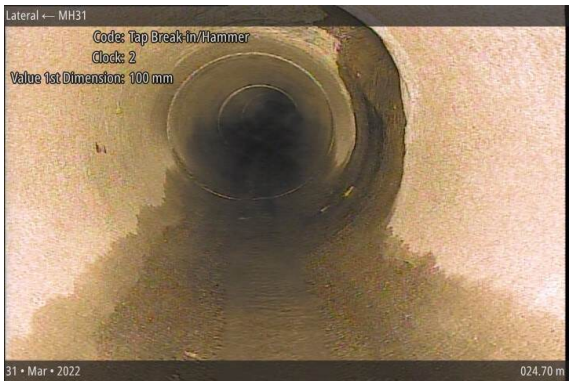
camera direction >

MH31

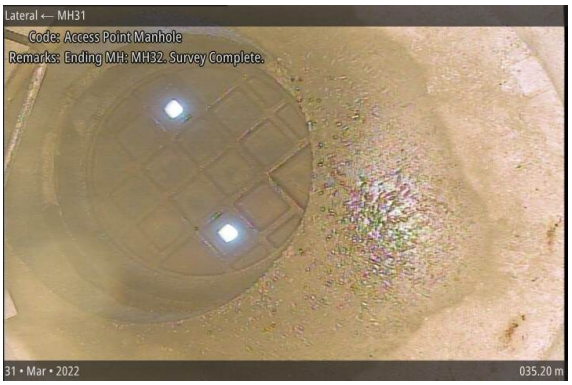
Snapshots

Access Point Manhole at 000.00 m | Starting MH: MH31. Cannot view MH due to slope.

Miscellaneous Water Level at 000.00 m



Tap Break-in/Hammer at 024.70 m, 2 o'clock



Access Point Manhole at 035.20 m | Ending MH: MH32. Survey Complete.

I²S Infrastructure Intelligence Services Inc.
INTEGRITY | COLLABORATION | PERFORMANCE

615 Main Street East
Milton, Ontario L9T 3J2
Phone: 905-699-1065

Asset

Owner:	City of Mississauga
PSR:	MH33MH31MH32
Upstream MH:	MH33
Downstream MH:	MH31MH32

	USMH	DSMH
Rim to Invert:	1.24 m	
Rim to Grade:		

Pipe Geometry:	250 mm (Circular)
Material:	Concrete Pipe (non-reinforced)
Lining Method:	
Coating Method:	
Year Constructed:	
Pipe Use:	Stormwater Pipe
Total Length:	(unspecified)

Location

Address:	Kirwin Ave, Mississauga
Drainage Area:	
Latitude:	
Longitude:	
Elevation:	
GPS Accuracy:	
Location Code:	Secondary Road
Location Details:	

Project

Project:	2022-602
Work Order:	
Customer:	Lea Consulting Ltd.
PO Number:	
Additional Info:	

Inspection

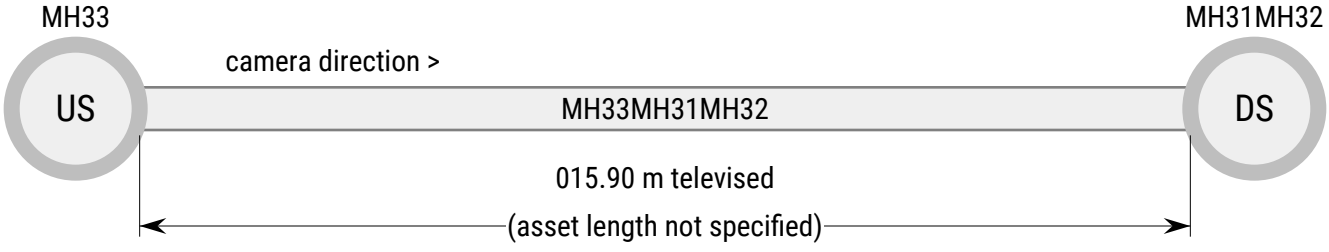
Media Date/Time:	31 • Mar • 2022 11:44
Surveyed By:	Markus Hirani - I2S inc
Reviewed By:	
Camera Direction:	Downstream
Purpose:	Sewer System Evaluation Survey
Technology:	
Pre-Cleaning:	No Pre-Cleaning
Date Cleaned:	
Flow Control:	
Length Surveyed:	015.90 m
Weather:	Light Rain

Ratings

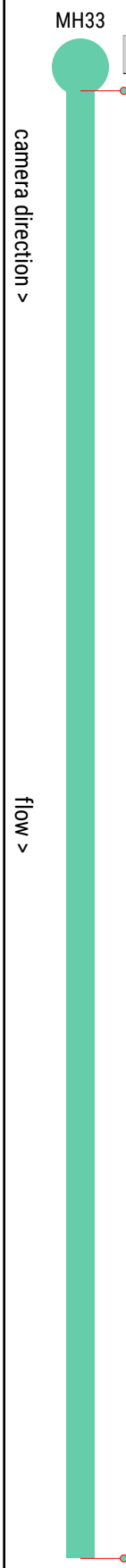
	Structural	O & M	Overall
Quick:	0000	0000	0000
$\sum_{i=1}^{5} SG_i$ Pipe Rating (OR):	0	0	0
Rating Index (RI):	0	0	0

Consequence of Failure:

Summary

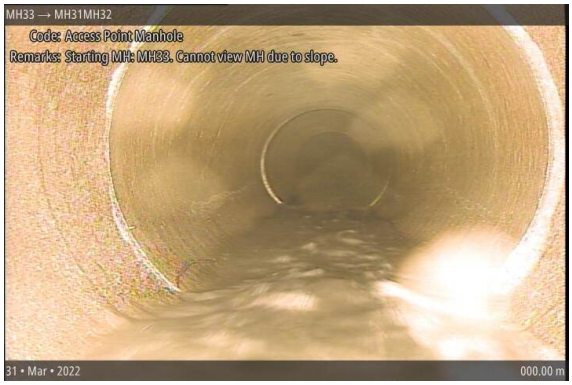


Observations

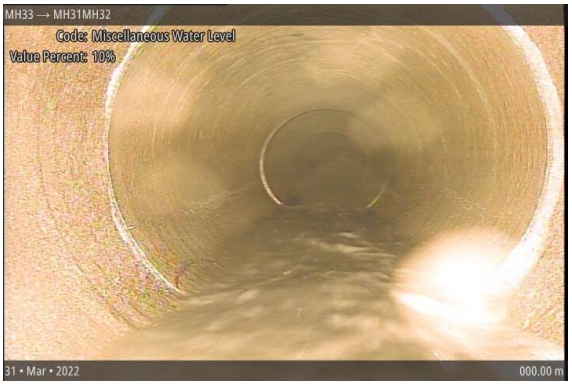


Metres	Code		Clock	Value	Grade	Description	Remarks
000.00	AMH					Access Point Manhole	Starting MH: MH33. Cannot view MH due to slope.
	MWL			10%		Miscellaneous Water Level	
015.90	ADP					Access Point Discharge Point	MH31MH30. Survey Complete.

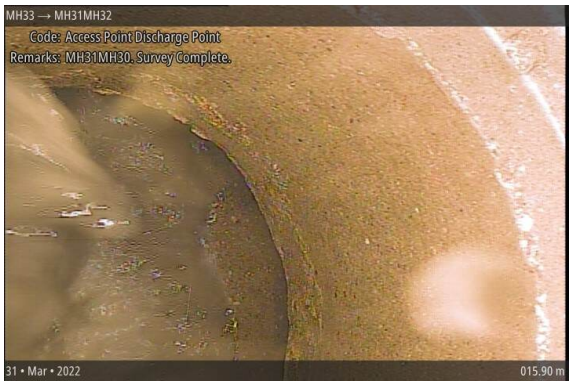
Snapshots



Access Point Manhole at 000.00 m | Starting MH: MH33. Cannot view MH due to slope.



Miscellaneous Water Level at 000.00 m



Access Point Discharge Point at 015.90 m | MH31MH30. Survey Complete.

APPENDIX E

Hydrant Flow Test Data and Watermain Adequacy Assessment Data

LEA Consulting Ltd. Consulting Engineers and Planners	Residual Pressure			
	Prepared:	P.R.	Page No.	E-01
	Checked:	F.M.		
Project: Proposed Development 3016 Kirwin Ave, Mississauga	Proj. #	21111		
	Date:	25-Oct-23		

Hydrant Test Readings (300mm watermain, 3016 Kirwin Ave) undertaken on June 15, 2017, by Focus Fire Protection

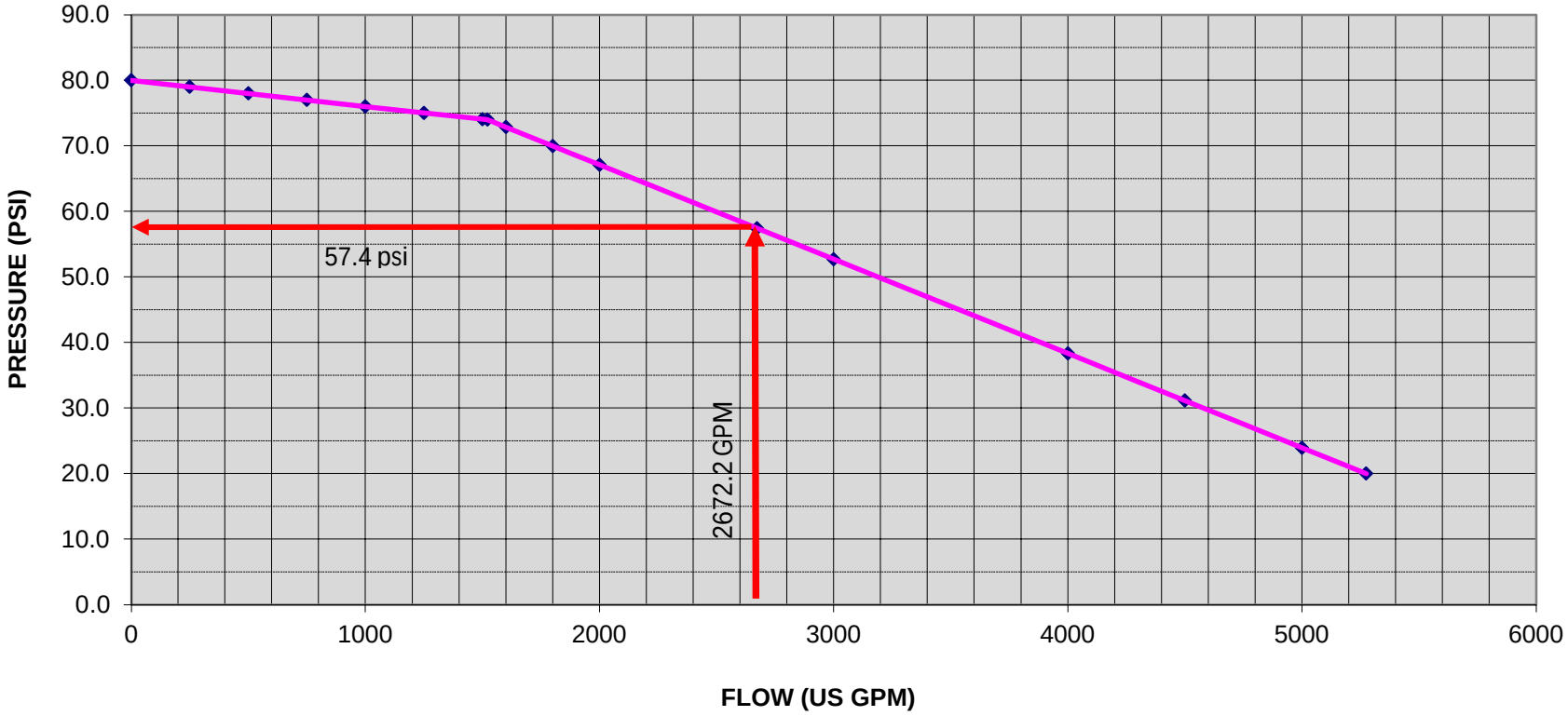
Flow	Residual Pressure	
0 US GPM	80 psi	
1000 US GPM	76 psi	
1521 US GPM	74 psi	
5274 US GPM	20 psi	Focus Fire Protection Estimate

Interpolated

Flow (US GPM)	Residual Pressure (psi)
0	**80.0**
250	79.0
500	78.0
750	77.0
1000	**76.0**
1250	75.0
1500	74.1
1521	**74.0**
1600	72.9
1800	70.0
2000	67.1
2672.2	57.4
3000	52.7
4000	38.3
4500	31.1
5000	23.9
5274	**20.0**

Existing 300mm Watermain on Kirwin Ave, Mississauga

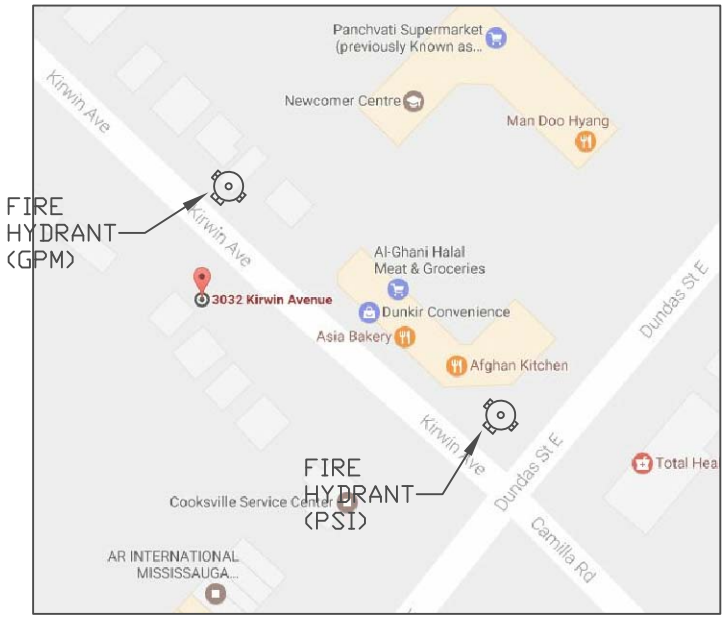
FLOW TEST CHART (BASED ON FOCUS FIRE PROTECTION TEST, JUN. 15, 2017)
Page: E-02

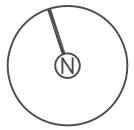


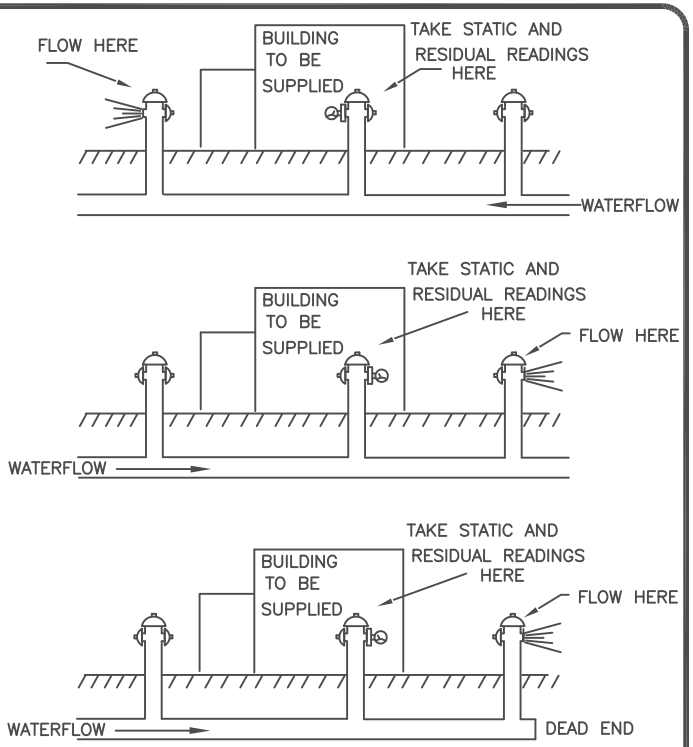
APPENDIX E-02

Hydrant Test

Classic Fire Protection 2017-06-15



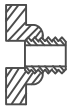




TEST:	PLAY PIPE	C=	STATIC(PSI)	RESIDUAL(PSI)	PITOT(PSI)	FLOW(USGPM)
	1x1 1/8					
	2x1 1/8					
	3x1 1/8					
	4x1 1/8					
	1x1 3/4					
	2x1 3/4					
	3x1 3/4					
	4x1 3/4					
	HYDRANT BUTT					
1	1x2 1/2	.80	80	76	45	1000
2	2x2 1/2	.80	80	74	26	1521
	3x2 1/2					
	4x2 1/2					
	FM NOZZLE					
	1x2 1/4	.88				
	2x2 1/4	.88				
	3x2 1/4	.88				
	4x2 1/4	.88				

OUTLET TYPE

☐  COEF.=0.90 OUTLET SMOOTH AND WELL ROUNDED

☒  COEF.=0.80 OUTLET SQUARE AND SHARP

☐  COEF.=0.70 OUTLET SQUARE AND PROJECTING INTO BARREL

Client:

Location:

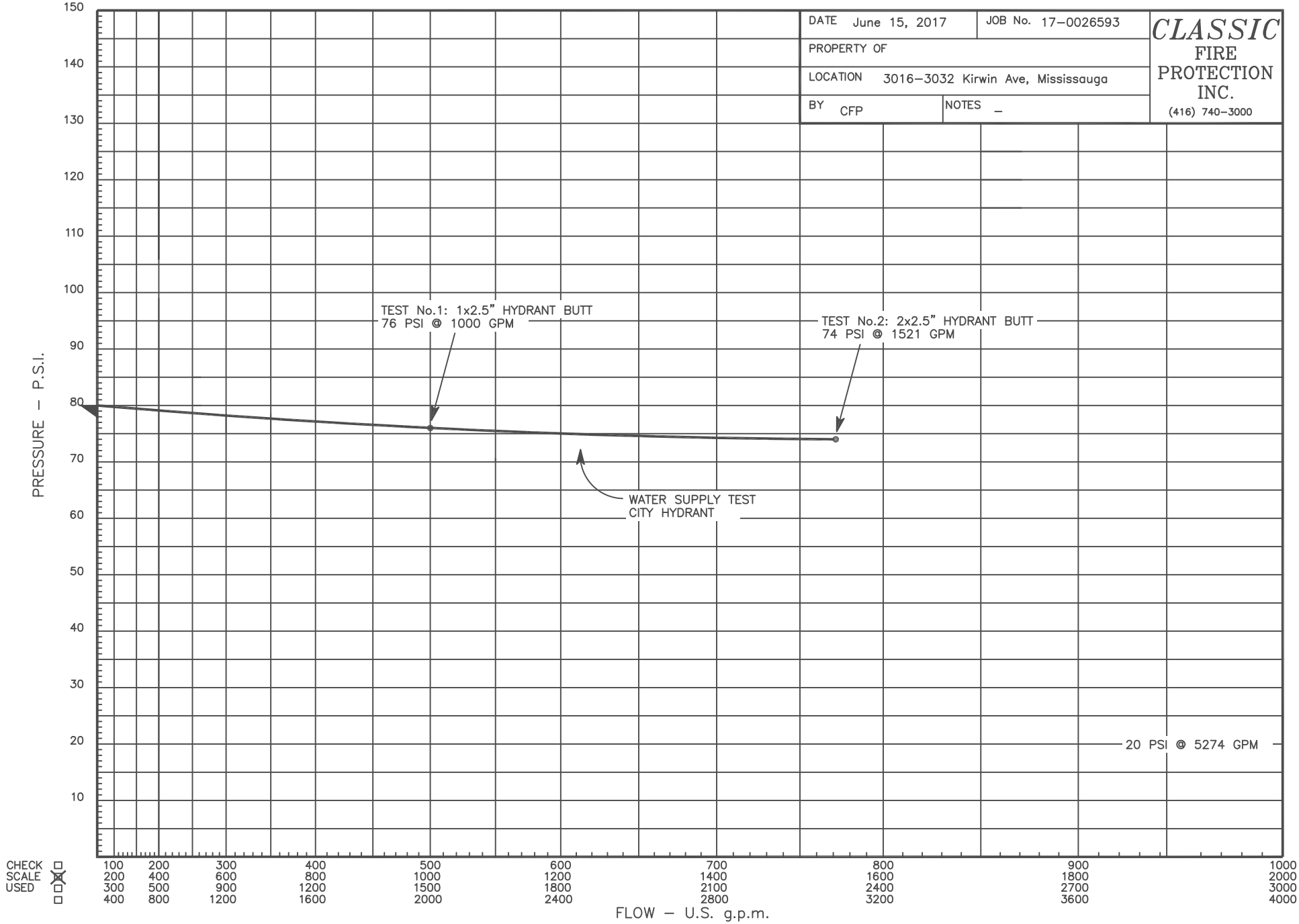
3016–3032 Kirwin Ave

Mississauga, ON

DEDICATED SERVICE SINCE 1988
CLASSIC FIRE PROTECTION INC.
645 GARYRAY DR.
North York, ON
M9L 1P9
(416) 740-3000
Web: www.classicfire.com

WATER SUPPLY GRAPH

DATE June 15, 2017		JOB No. 17–0026593	CLASSIC FIRE PROTECTION INC. (416) 740–3000
PROPERTY OF			
LOCATION 3016–3032 Kirwin Ave, Mississauga			
BY CFP	NOTES –		



APPENDIX F

Floodlines Information

Credit Valley Conservation
inspired by nature

COOKSVILLE CREEK - 2D AREA CO3
REGULATED AREAS (2D MODELLING)

FIGURE NO:	CO3-2D
Date:	Sep. 16, 2020
Dwn By:	JGS
SCALE:	AS SHOWN

LOCATION\NAME: K:\WATERSHED MANAGEMENT\HFRM\MAPPING AND RISK STUDIES\COOKSVILLE 1D\ANALYSIS\CAD\2D\SPILL 3+8\COOKSVILLE CREEK–FLOODING EXTENT OF 2D SPILL AREA 3+8.DWG

Credit Valley Conservation
inspired by nature

FLOOD HAZARD MAP

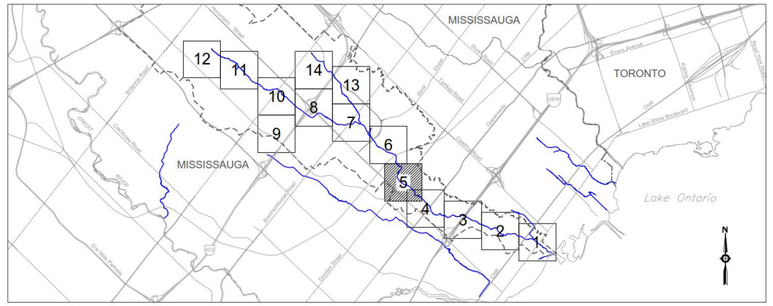
COOKSVILLE CREEK WATERSHED

LEGEND

Bridges		Marsh		Spot Height	•123.45
Building		Municipal Boundary		Trail	
Building Ruin		Overhead Walkway		Wall	
Building Under Construction	UC	Parcel Fabric		Watershed Boundary	
Contour Index	172	Parking Lot	P/A	Waterbody Elevation	•97.5
Contour Intermediate	172.5	Pile		Wooded Area	
Culvert Symbol		Pipe	P		
Culvert to Scale		Pit		Regulatory Floodline	
Dam		Playground	PLAY	Regulatory Floodplain (2D Model)	
Ditch		Pole		1D-2D Model Limits	1D 2D
Dock,Wharf,Pier		Pool		Two-Zone Policy Area	
Driveway		Railway		Section	
Falls,Rapids	Rapid Falls	Railway Abandoned		Overflow Section	
Fire Hydrant		River,Creek,Shoreline		Structure ID	10
Flow Direction		Road		Spill	
Footbridge		Road Shoulder		Regional Flood Elevation Section Number	15426 98.75 98.25
Guiderail		Road Understruction (UC)	UC	100 Year Flood Elevation	
Headwall		Sidewalk			
Hedge	H	Silo			

Note: The Regulatory flood elevation and floodline is the greater of the Regional and 100 Year storms.

SHEET INDEX



SCALE 1:2000

Metres 100 0 100 200 METRES

CONTOUR INTERVAL 0.5 METRE

General Notes:

1. Contourlines on this map were generated by Airborne Imaging using the Spring of 2015 LiDAR point cloud, breaklines and hydrologic enforcement at bridges. The vertical accuracy of the original points is 0.10 metres RMSE.
2. The planimetric data was obtained from the City of Mississauga in 2017.
3. The vertical datum is mean sea level established by the CGVD 28, 1978 Southern Ontario adjustment.
4. The horizontal datum is North American Datum 1983 CSRS (Epoch 2010) UTM Zone 17.
5. To obtain City of Mississauga datum, add 0.121 metres to elevation data.

ASSOCIATION OF ONTARIO LAND SURVEYORS — PAUL FRANCIS — CR 21

LICENSED PROFESSIONAL ENGINEER — PROVINCE OF ONTARIO

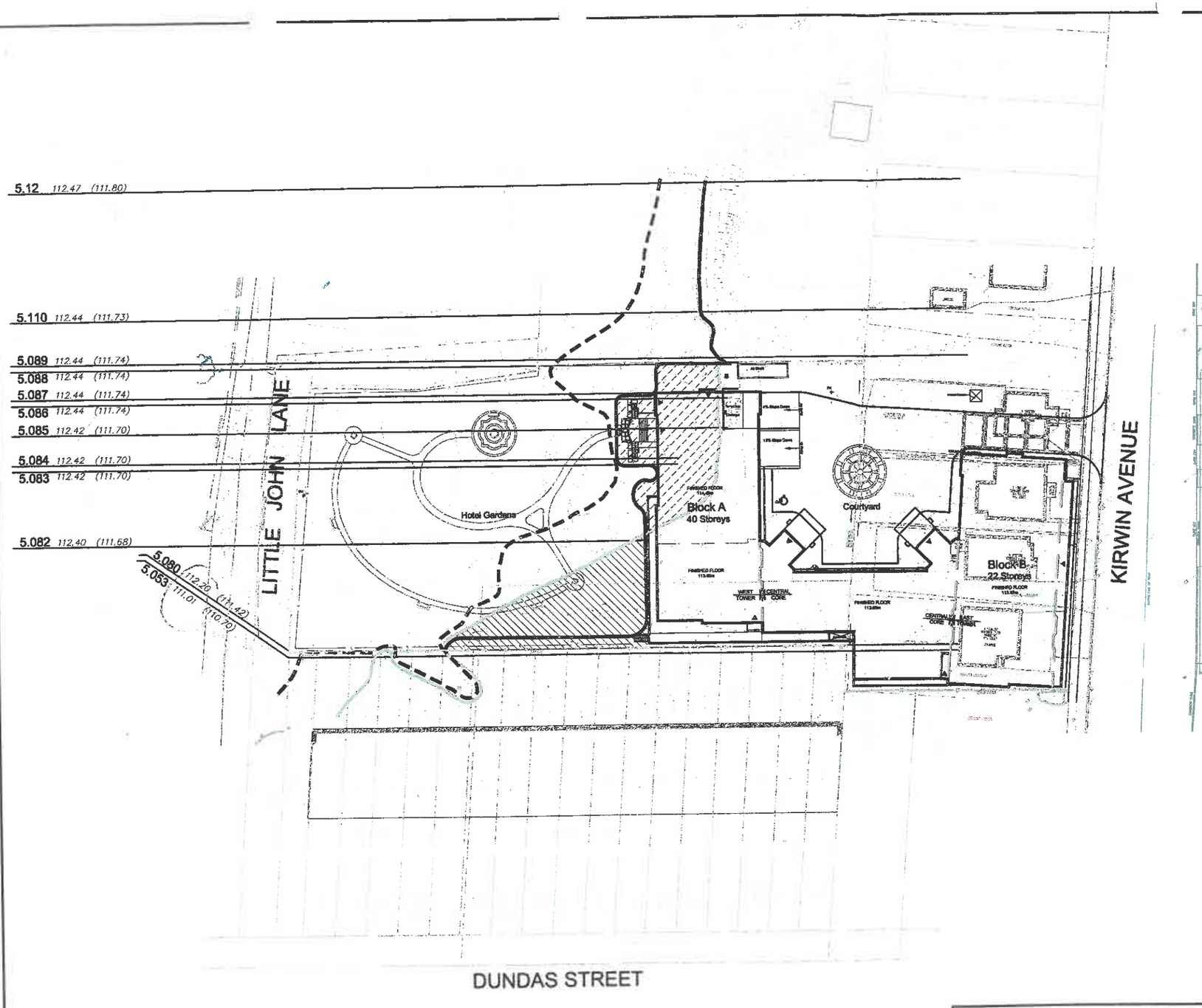
N

AIRBORNE IMAGING — A Clean Harbors Company

MISSISSAUGA

No	Amendment/Revision	By	Date

SHEET No 5 of 14



NOTE:

MAXIMUM REGIONAL FLOOD ELEVATION = 112.47m

MINIMUM PROPOSED FLOOR ELEVATION = 113.65m

PROPOSED FREEBOARD = 0.77m

LEGEND

5.053 — HEC-2 CROSS SECTION AND LABEL

FUT WITH HOTEL

111.03 (109.78) — REGIONAL FLOOD LEVEL / 100 YEAR FLOOD LEVEL

EXISTING REGIONAL FLOODLINE

CUT AREA = 365m²

FILL AREA = 272m²

G:\Work\103068\land\dwg\contract\sub4\cvc\1_floodupdate.dwg

LITTLE JOHN LANE
HYDRAULIC ASSESSMENT
ACTIVE MANAGEMENT LTD.
PROPOSED DEVELOPMENT
FLOODPLAIN

amec

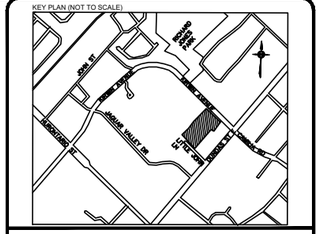
PROJECT No.	103068
DATE	FEBRUARY 2011
SCALE	1:750
DRAWING No.	2

FEBRUARY 10 2011 – D.B.

APPENDIX G

Figures and Drawings

KEY PLAN (NOT TO SCALE)



LEGEND

- EXISTING MANHOLE (MH)
- EXISTING CATCHBASIN (CB)
- EXISTING WV (WV)
- PROPERTY LINE
- OVERLAND FLOW ROUTE
- DRAINAGE BOUNDARY
- DRAINAGE ID/RUNOFF COEFFICIENT (C1 0.20) / DRAINAGE AREA (0.388 ha)
- EXISTING TREE
- EXISTING BUILDING

No.	Revision	Date	By	App.
2	ISSUED FOR ZBA RE-SUBMISSION	2022-12-19	P.R.	F.M.
1	ISSUED FOR ZBA SUBMISSION	2021-03-19	M.N.	B.H.

625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

Owner/Client:

DASS METAL

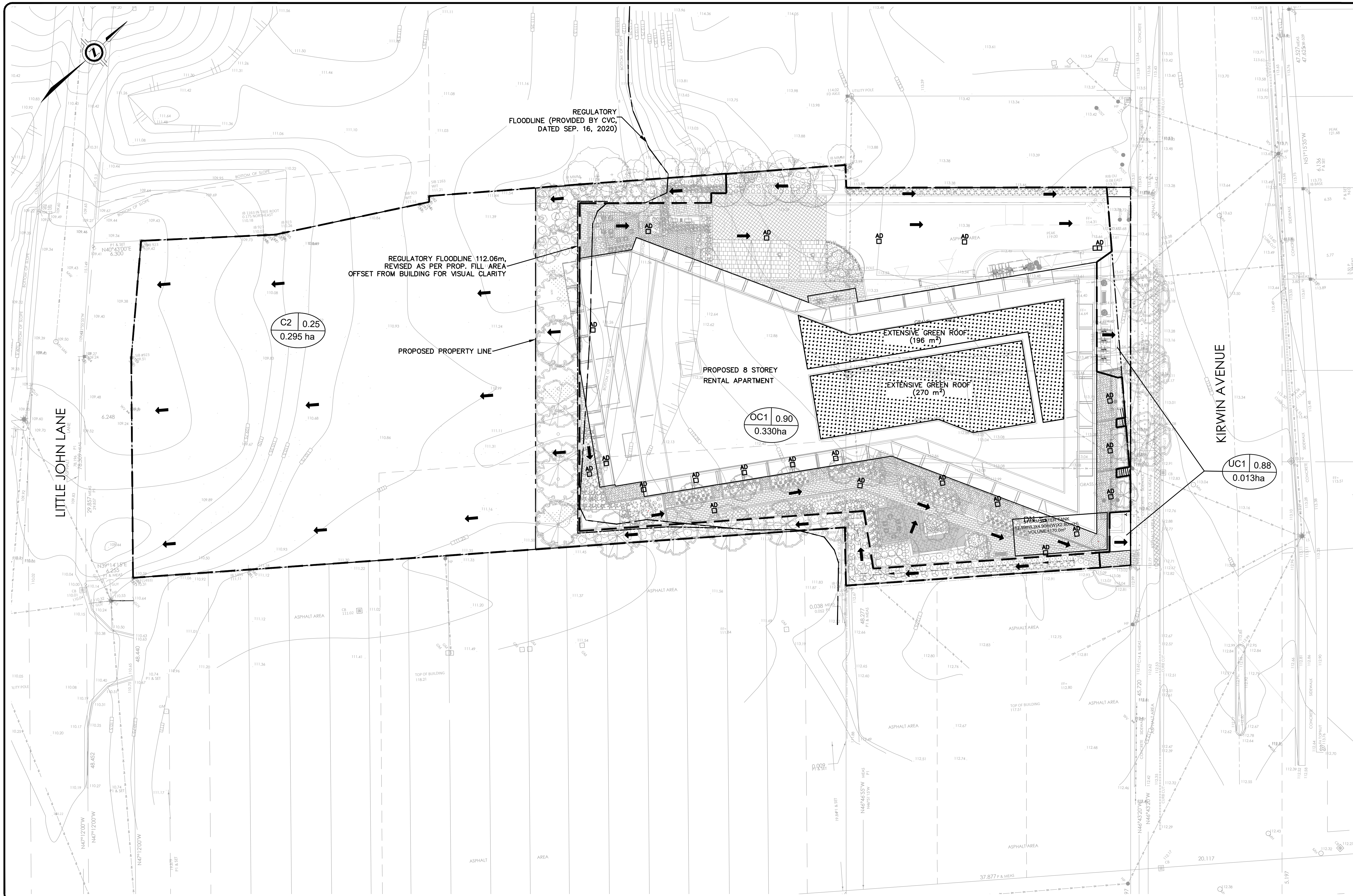
Location:

3031 LITTLE JOHN & 3016-3032
KIRWIN AVE DEVELOPMENT

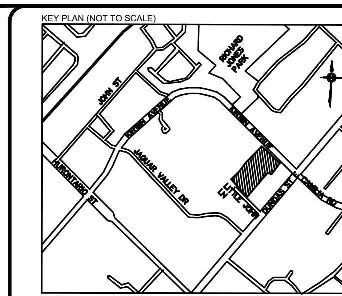
Title:

EXISTING DRAINAGE PLAN

Designed By:	F.M.	Drawn By:	J.W.
Checked By:	F.M.	Scale:	1:500
Date:	FEB., 2021	Drawing No.:	FIG-1
Project No.:	21111		



KEY PLAN (NOT TO SCALE)



LEGEND

- EXISTING MANHOLE
- EXISTING CATCHBASIN
- EXISTING WV
- PROPERTY LINE
- OVERLAND FLOW ROUTE
- DRAINAGE BOUNDARY
- DRAINAGE ID/RUNOFF COEFFICIENT DRAINAGE AREA (ha)
- PROPOSED TREE
- SOFT LANDSCAPE AREA
- UNCONTROLLED AREA
- PROPOSED AREA DRAIN
- PROPOSED CATCHBASINE
- PROPOSED SWALE

No.	Revision	Date	By	App.
2	ISSUED FOR ZBA RE-SUBMISSION	2022-12-19	P.R.	F.M.
1	ISSUED FOR ZBA SUBMISSION	2021-03-19	M.N.	B.H.

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L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

F:\5600\Private-Sector\CAD Border\LEA Logo\LEA Logo.png

Owner/Client:

DASS METAL

Location:

3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

Title:

PROPOSED DRAINAGE PLAN

Designed By: F.M.	Drawn By: J.W.	Checked By: F.M.
Scale: 1:500	Date: FEB., 2021	Drawing No.: FIG-2
Project No.: 21111		

F:\21111.00 3016-3032 Kirwin Ave\Municipal\Drafting\Contract Drawings\FIG2-Prop drainage area.dwg PRINTED: 11/8/2023

JOHN C PRICE PARK P-202

LITTLE JOHN LANE

KIRWIN AVENUE

LIMITS OF GREENLAND

FFE: 113.65

REGULATORY FLOODLINE 112.06m (PROVIDED BY CVC, DATED SEP. 16, 2020)

REGULATORY FLOODLINE 112.06m, REVISED AS PER PROP. FILL AREA OFFSET FROM BUILDING FOR VISUAL CLARITY

REGULATORY FLOODLINE 112.06m (PROVIDEDBY CVC, DATED SEP. 16, 2020)

PROP. TRANSFORMER

PROP. TPZ

PARAPET

PROP. DEVELOPMENT LIMIT

PROPOSED 1.5m BLACK VINYL CHAIN LINK FENCE (REFER TO LANDSCAPE DRAWINGS FOR DETAIL)

PROPOSED 1.8m HIGH METAL VISUAL SCREEN (SEE LANDSCAPE DRAWINGS FOR DETAILS)

PROPOSED 1.2m ORNAMENTAL METAL FENCE (REFER TO LANDSCAPE DRAWINGS FOR DETAIL)

PROPOSED 1.2m ORNAMENTAL METAL FENCE (REFER TO LANDSCAPE DRAWINGS FOR DETAIL)

PROPOSED FIRE HYDRANT

PROPOSED TOE WALL (DRY-FLOODROOFING)

PROPOSED BIO-SWALE BTM. EL. 112.45 (REFER TO DWG.C-07 FOR DETAIL)

PROPOSED 1.8m WOOD PRIVACY FENCE (REFER TO LANDSCAPE DRAWINGS FOR DETAIL)

EXISTING PROPERTY LINE

PROPOSED PROPERTY LINE

EXISTING SIDEWALK

PROP. PROPERTY LINE

LAND TO BE DEDICATED FOR ROAD WIDENING (64m²)

EX. PROPERTY LINE

CONNECT TO EXISTING SIDEWALK

CURB RETURNS AS PER CITY OF MISSISSAUGA STANDARDS (STD.2240.031)

EX. FULL CURB TO BE REPLACED WITH DEPRESSED CURB (STD. 2230.020)

HEAVY DUTY CURB AND SIDEWALK AS PER CITY OD MISSISSAUGA STANDARDS (STD.2230.020, STD.2211.158)

EX. DEPRESSED CURB WITH DEPRESSED CURB (STD.2230.020)

CURB RETURNS AS PER CITY OF MISSISSAUGA STANDARDS (STD.2240.031)

PROP. 1.50m CONCRETE SIDEWALK

EX. DEPRESSED CURB TO BE REPLACED WITH FULL CURB (STD. 2230.010)

EX. DEPRESSED CURB TO BE REPLACED WITH FULL CURB (STD.2230.010)

PROP. SIAMESE (REFER TO SITE PLAN)

Ø24" JELLYFISH ACCESS OPENING TO INLET BAY

Ø30" JELLYFISH ACCESS OPENING TO OUTLET BAY

EX. DEPRESSED CURB TO BE REPLACED WITH FULL CURB (STD.2230.010)

PROP. STORM CAST-IN-PLAC JELLYFISH (SFPD0806 OR APPROVED EQUIVALENT)

CONNECT TO EXISTING SIDEWALK

EXISTING SIDEWALK

PROPOSED 1.8m WOOD PRIVACY FENCE (REFER TO LANDSCAPE DRAWINGS FOR DETAIL)

PROP. SWALE

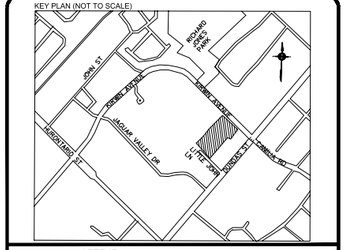
PROP. TOE WALL

APPROX. 12.3m (3) DEPRESSED CURB (OPSD 350.010)

MINIMIM PAVEMENT STUCTURE FOR THE DRIVEWAY AND PARKING AREAS AS PER GEOTECHNICAL REPORT PREPARED BY AZURE GROUP

MATERIAL	COMPACTION	THICKNESS (mm)
		Heavy Duty
Asphaltic Concrete (HL3)	92 to 96.5% Maximum Relative Density	40
Asphaltic Concrete (HL8)	92 to 96.5% Maximum Relative Density	65
19 mm Granular "A" Base	100% SPMDD	200
Granular "B" Type II Subbase	100% SPMDD	250

KEY PLAN (NOT TO SCALE)



LEGEND

- PROPOSED V & B
- PROPOSED DETECTOR CHECK VALVE CHAMBER
- PROPERTY LINE
- EXISTING CATCHBASIN
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING FIRE HYDRANT
- EXISTING HYDRO POLE
- PROPOSED AREA DRAIN
- PROPOSED CATCHBASIN
- EXISTING GROUND ELEVATION (WHERE THE EXISTING GRADES ARE TO BE MATCHED)
- EXISTING BOTTOM OF CURB ELEVATION
- EXISTING GROUND ELEVATION
- PROPOSED GROUND ELEVATION
- TOC TOP OF CURB ELEVATION
- BOC BOTTOM OF CURB ELEVATION
- TOW TOP OF WALL ELEVATION
- BOW BOTTOM OF WALL ELEVATION
- T/G TOP OF GRATE ELEVATION
- OVERLAND FLOW ROUTE
- UNDERGROUND PARKING WALL
- OUTLINE OF THE BUILDING
- PROPOSED SWALE
- ACOUSTIC WALL
- 1.5m BLACK VINYL CHAIN LINK FENCE
- 1.8m WOOD PRIVACY FENCE
- TREE PROTECTION FENCING
- ARCHITECTURAL CROSS SECTIONS

GENERAL NOTES:

1. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM, 1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 793 LOCATED ON THE NORTH FACE AT THE EAST CORNER OF CONCRETE END POST OF BOX CULVERT UNDER DUNDAS STREET EAST ON SOUTH SIDE OF DUNDAS STREET EAST, 15M EAST OF JAGUAR VALLEY DRIVE; HAVING A PUBLISHED ELEVATION OF 110.955 METERS.
2. NO EXTERNAL DRAINAGE OR GRADING PERMITTED INTO PARK BLOCKS
3. VEGETATION CLEARING, AND TREE REMOVAL ACTIVITIES SHOULD BE AVOIDED BETWEEN APRIL-OCTOBER OF EACH YEAR TO PROTECT THE BREEDING SEASONS OF MIGRATORY BIRDS AND BATS.
4. REFER TO DWG C-108 "STREETSCAPE CROSS SECTIONS" FOR CROSS SECTION H & J-J

No.	Revision	Date	By	App.
4	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
3	ISSUED FOR ZBA RE-SUBMISSION	2023-09-15	P.R.	F.M.
2	ISSUED FOR ZBA RE-SUBMISSION	2022-12-19	P.R.	F.M.
1	ISSUED FOR ZBA SUBMISSION	2021-03-19	M.N.	B.H.

625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

Owner/Client:

DVB REAL ESTATE INVESTMENTS INC.

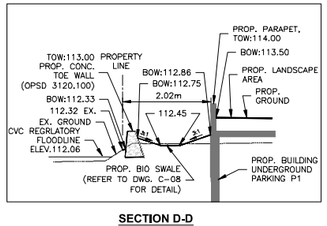
Location:

3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

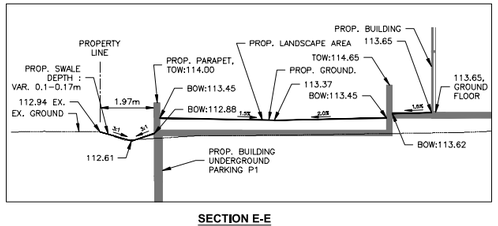
Title:

PRELIMINARY SITE GRADING PLAN

Designed By:	F.M.	Drawn By:	J.W.W.
Checked By:	F.M.	Scale:	1:250
Date:	FEB., 2021	Project No.:	21111
Drawing No.:	C-01		



SECTION D-D
SC 1:100



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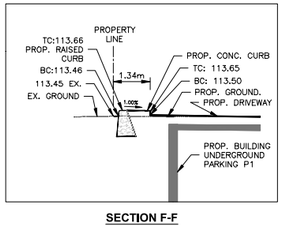
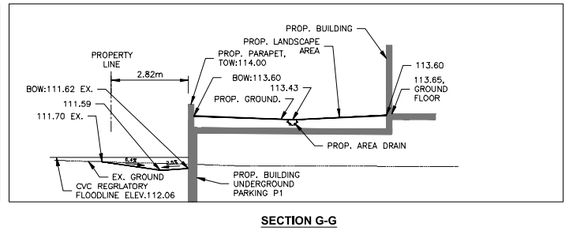
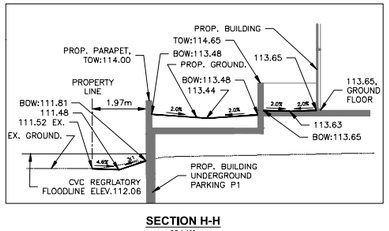


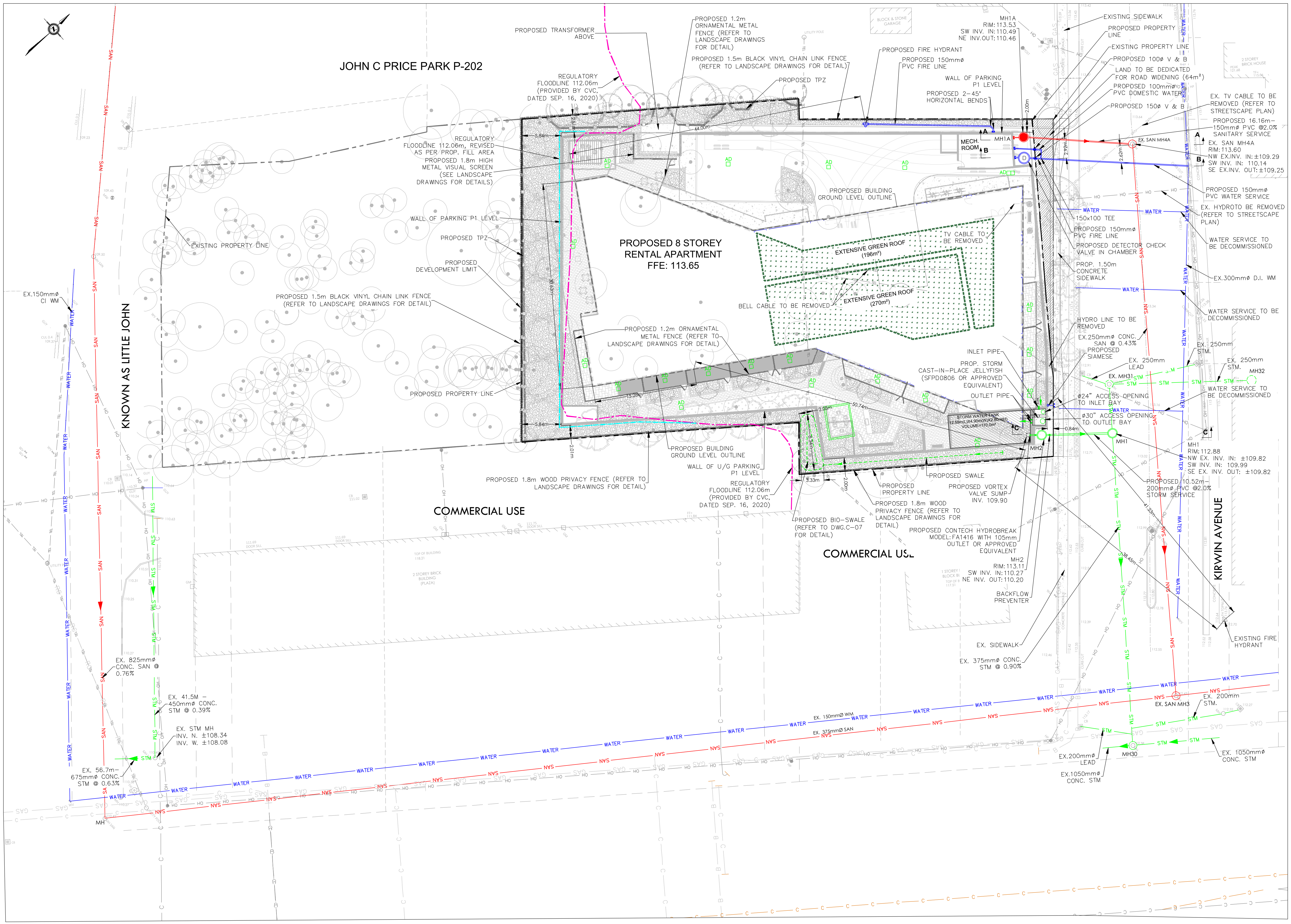
SECTION F-F
SC 1:100



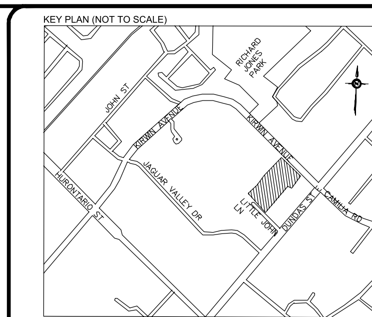
SECTION G-G
SC 1:100



SECTION H-H
SC 1:100



KEY PLAN (NOT TO SCALE)



LEGEND:

- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED OIL GRIT SEPARATOR
- PROPOSED V & B
- PROPOSED DETECTOR CHECK VALVE CHAMBER
- CB PROPOSED CATCHBASIN
- AD PROPOSED AREA DRAIN
- PROPERTY LINE
- BUILDING OUTLINE ABOVE
- CB EXISTING CATCHBASIN
- MH EXISTING SANITARY MANHOLE
- MH EXISTING STORM MANHOLE
- EXISTING FIRE HYDRANT
- WV EXISTING FIRE HYDRANT
- HP EXISTING HYDRO POLE
- WATER EXISTING WATERMAIN
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- GAS EXISTING GAS MAIN
- OH EXISTING HYDRO
- TEL EXISTING BELL CABLE
- CATV EXISTING TV CABLE
- C EXISTING BELL CONDUIT
- B EXISTING BURIED BELL CABLE
- RG EXISTING AERIAL ROGERS CABLE
- X X 1.5m BLACK VINYL CHAIN LINK FENCE
- 1.8m WOOD PRIVACY FENCE
- TREE PROTECTION FENCING

GENERAL NOTES:

1. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM, 1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 793 LOCATED ON THE NORTH FACE AT THE EAST CORNER OF CONCRETE END POST OF BOX CULVERT UNDER DUNDAS STREET EAST ON SOUTH SIDE OF DUNDAS STREET EAST, 15M EAST OF JAGUAR VALLEY DRIVE; HAVING A PUBLISHED ELEVATION OF 110.955 METERS.
2. REFER TO DWG C-105 "SITE SERVICING CROSS SECTIONS" FOR SERVICING CROSS SECTIONS.
3. NO EXTERNAL DRAINAGE OR GRADING IS PERMITTED INTO PARK BLOCKS.
4. ALL AREA DRAINS TO BE CONNECTED TO INTERNAL BUILDING PLUMBING. THE ENTIRE MECHANICAL STORM PIPING BELOW FINISHED FLOOR TO BE JOINT RESTRAINED AND WATERTIGHT.
5. VEGETATION CLEARING, AND TREE REMOVAL ACTIVITIES SHOULD BE AVOIDED BETWEEN APRIL-OCTOBER OF EACH YEAR TO PROTECT THE BREEDING SEASONS OF MIGRATORY BIRDS AND BATS.

No.	Revision	Date	By	App.
4	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
3	ISSUED FOR ZBA RE-SUBMISSION	2023-09-15	P.R.	F.M.
2	ISSUED FOR ZBA RE-SUBMISSION	2022-12-19	P.R.	F.M.
1	ISSUED FOR ZBA SUBMISSION	2021-03-19	F.M.	B.H.

625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

Owner/Client:

DVB REAL ESTATE INVESTMENTS INC.

Location:

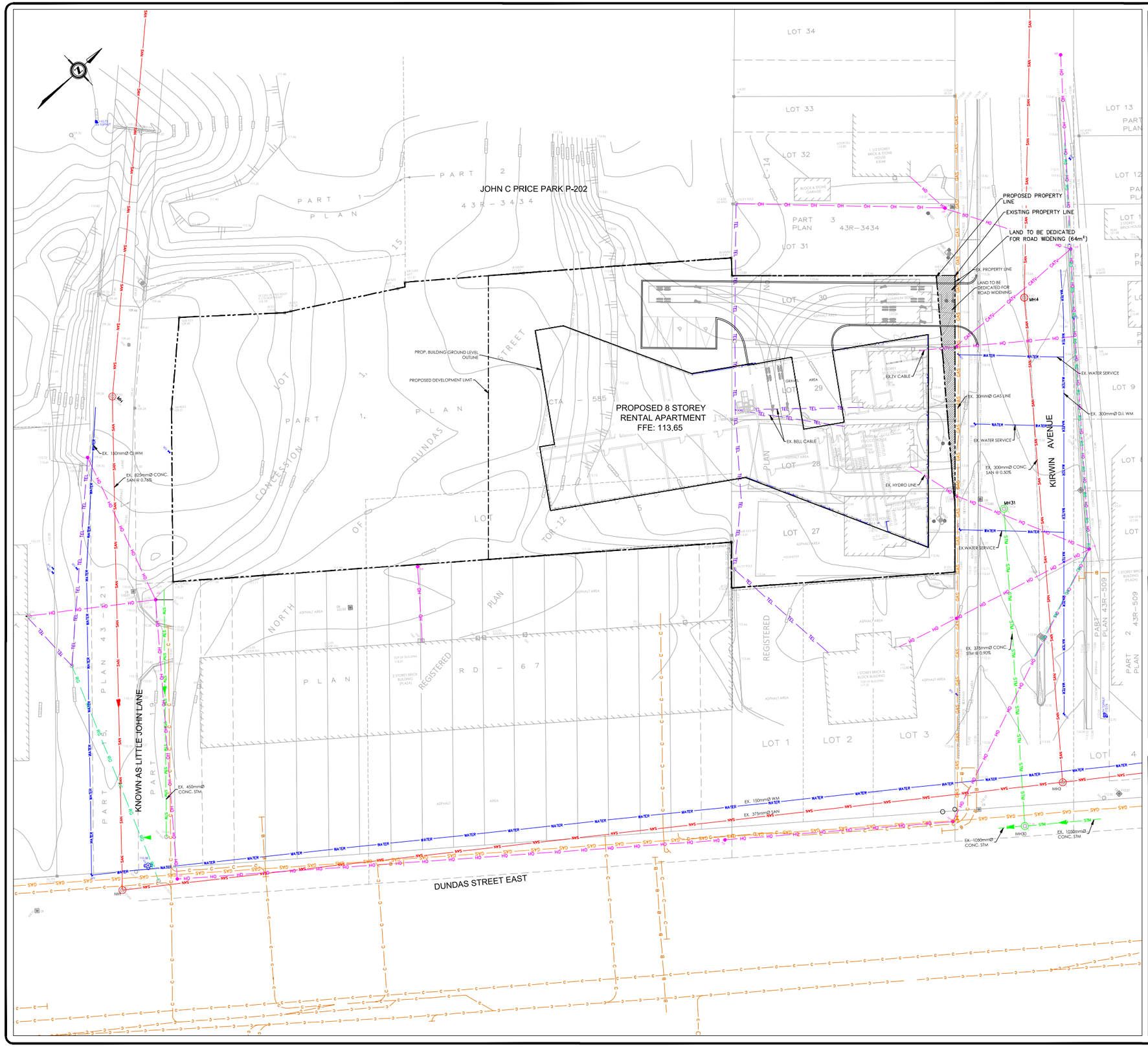
3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

Title:

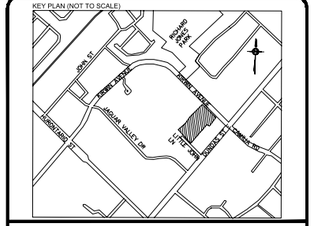
PRELIMINARY SITE SERVICING PLAN

Designed By:	F.M.	Drawn By:	J.W.	Checked By:	F.M.
Scale:	1:250	Date:	FEB., 2021	Drawing No.:	C-02
Project No.:	21111				

F:\21111.00 3016-3032 Kirwin Ave\Municipal\Drafting\Contract Drawings\C-02-Site Servicing Plan.dwg PRINTED: 11/8/2023



KEY PLAN (NOT TO SCALE)



LEGEND:

- PROPOSED STORM MANHOLE
- PROPOSED SANITARY MANHOLE
- PROPOSED OIL GRIT SEPARATOR
- PROPOSED V & B
- PROPOSED VALVE CHAMBER
- PROPERTY LINE
- EXISTING CATCHBASIN
- EXISTING SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING FIRE HYDRANT
- EXISTING HYDRO POLE
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- EXISTING GAS MAIN
- EXISTING HYDRO
- EXISTING BELL CABLE
- EXISTING TV CABLE
- EXISTING BELL CONDUIT
- EXISTING BURRIED BELL ABEL
- EXISTING AERIAL ROGERS CABLE
- EXISTING TREE

GENERAL NOTES:

1. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM, 1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 793 LOCATED ON THE NORTH FACE AT THE EAST CORNER OF CONCRETE END POST OF BOX CULVERT UNDER DUNDAS STREET EAST ON SOUTH SIDE OF DUNDAS STREET EAST, 15M EAST OF JAGUAR VALLEY DRIVE; HAVING A PUBLISHED ELEVATION OF 110.955 METERS.
2. REFER TO DWG C-05 and C-06 FOR CROSS SECTIONS.
3. I HEREBY CERTIFY THAT THE INFORMATION FOR GAS AND WATERMAIN LINES ALONG THE DEVELOPMENT SITE ON KIRWIN AVE. ON THE PLAN IS COMPLETE, ACCURATE AND BASED ON TEST PITS, AS PROVIDED BY T2 UTILITY ENGINEERS, ON OCTOBER 23, 2019.

Engineer's Signature _____

No.	Revision	Date	By	Appd.
4	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
3	ISSUED FOR ZBA RE-SUBMISSION	2023-09-15	P.R.	F.M.
2	ISSUED FOR ZBA RE-SUBMISSION	2022-12-19	P.R.	F.M.
1	ISSUED FOR ZBA SUBMISSION	2021-03-19	F.M.	B.H.

625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

Owner/Client:

DVB REAL ESTATE INVESTMENTS INC.

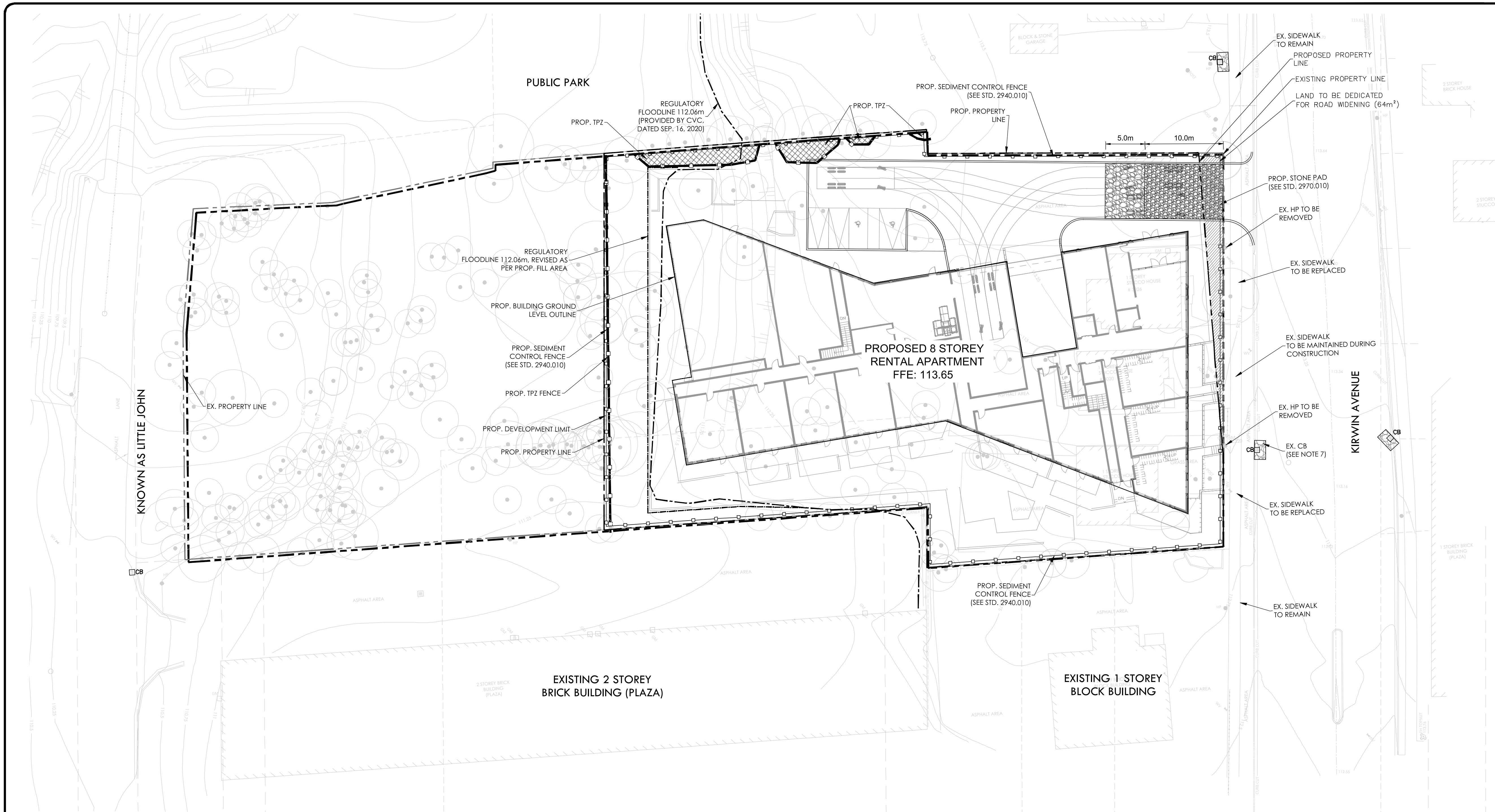
Location:

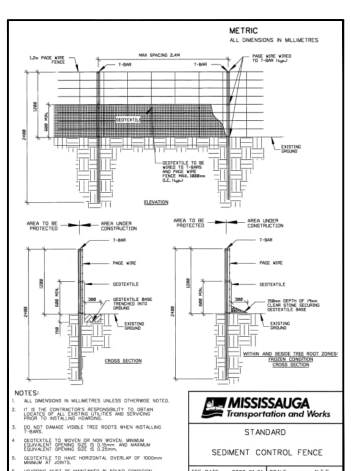
3031 LITTLE JOHN & 3016-3032
KIRWIN AVE DEVELOPMENT

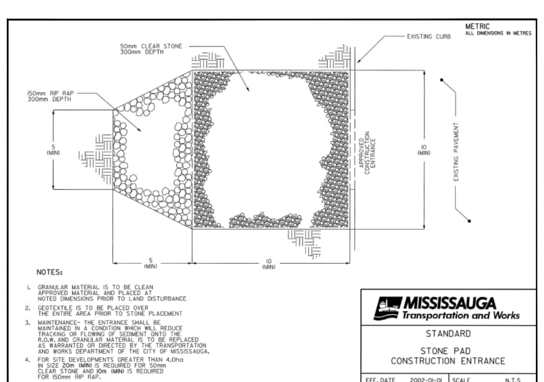
Title:

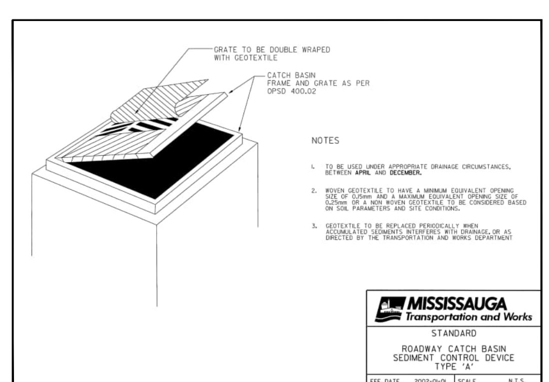
COMPOSITE UTILITY PLAN

Designed By:	F.M.	Drawn By:	J.W.	Checked By:	F.M.
Scale:	1:200	Date:	FEB., 2021	Drawing No.:	C-03
Project No.:	21111				

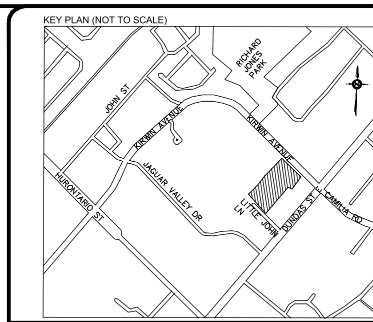








KEY PLAN (NOT TO SCALE)



LEGEND:

- CATCHBASINS TO BE COVERED (SEE NOTE 7)
- STONE PAD
- PROPOSED SEDIMENT CONTROL FENCE
- EXISTING CURB
- PROPOSED PROPERTY LINE
- EXISTING CONTOUR LINE
- EXISTING CATCHBASIN
- EXISTING HYDRO POLE
- EXISTING FIRE HYDRANT
- EXISTING MANHOLE
- EXISTING TREE
- TREE PROTECTION FENCING

GENERAL NOTES:

1. CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON THE JOB.
2. DO NOT SCALE DRAWINGS.
3. ALL DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS ARE THE COPYRIGHT PROPERTY OF THE ARCHITECT AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS IN PART OR IN WHOLE IS FORBIDDEN WITHOUT THE WRITTEN PERMISSION OF THE ARCHITECT.
4. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL SIGNED BY THE ARCHITECT.

TEMPORARY EROSION AND SEDIMENT CONTROL NOTES:

1. ALL SEDIMENT CONTROL DEVICES TO BE INSTALLED PRIOR TO THE BEGINNING OF CONSTRUCTION.
2. SEDIMENTATION AND EROSION CONTROL MEASURES WILL BE IMPLEMENTED PRIOR TO AND MAINTAINED DURING CONSTRUCTION TO PREVENT ENTRY OF SEDIMENT INTO PERMANENT STORM DRAINAGE SYSTEMS. CONTRACTOR SHALL PERFORM ROUTINE INSPECTION OF ALL SEDIMENTATION AND EROSION CONTROL MEASURES WEEKLY AND AFTER RAINFALL/SNOW MELT EVENTS AND DAILY DURING EXTENDED RAIN OR SNOW MELT PERIODS.
3. ALL MAINTENANCE TO SEDIMENT AND EROSION CONTROLS TO BE COMPLETED WITHIN 48 HOURS OF INSPECTION.
4. CONTRACTOR SHALL CONSTRUCT & MAINTAIN STONE PAD AT ALL COMPOUND EXITS.
5. ALL EROSION AND SEDIMENT CONTROLS TO REMAIN IN PLACE UNTIL SITE IS COMPLETELY STABILIZED.
6. THE MINIMUM EROSION AND SEDIMENT CONTROLS ARE SHOWN ON THIS PLAN. THE CONTRACTOR IS RESPONSIBLE FOR MODIFYING THIS PLAN AS REQUIRED TO COMPLY WITH THE SEDIMENT AND EROSION CONTROL NOTES SHOWN ON THIS DRAWING AND AS PER "EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN CONSTRUCTION" BY THE TRCA DURING ALL CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR SHALL PROVIDE UPDATED PLANS TO THE CITY WHERE MODIFICATIONS TO THIS PLAN OCCUR.
7. ALL EXISTING CATCH BASINS SHALL HAVE GEOTEXTILE FILTER CLOTH PLACED ON THEM TO CONTROL ANY SILT THAT MAY ENTER THE STORM SEWER. ALL FILTERS ARE TO BE MAINTAINED BY THE CONTRACTOR, AND TO BE REMOVED UPON COMPLETION OF THE PROJECT.
8. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM, 1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 793 LOCATED ON THE NORTH FACE AT THE EAST CORNER OF CONCRETE END POST OF BOX CULVERT UNDER DUNDAS STREET EAST ON SOUTH SIDE OF DUNDAS STREET EAST, 15M EAST OF JAGUAR VALLEY DRIVE; HAVING A PUBLISHED ELEVATION OF 110.955 METERS.
9. ALL SNOW FENCING AND SEDIMENT CONTROL FENCING TO BE ERECTED AROUND PERIMETER OF DISTURBED AREA PRIOR COMMENCEMENT OF ANY GRADING OPERATIONS (AS PER CITY STD. 2940.01)
10. ALL ROADSIDE CATCHBASINGS TO HAVE SEDIMENT PROTECTION AS PER CITY STD.2930.04 INSTALLED IMMEDIATELY AFTER C/B INSTALLATION. SEDIMENT PROTECTION TO BE MAINTAINED ON A REGULAR BASIS UNTIL NO LONGER REQUIRED.
11. UNDER THE EROSION AND SEDIMENT CONTROL BY-LAW NO. 512-91, AS AMENDED IF SITE CONSTRUCTION IS INTERRUPTED AND/OR INACTIVITY EXCEEDS 30DAYS ALL STROPPED AND/OR BARE AREAS WILL BE STABILIZED BY SEEDING.
12. EXISTING SIDEWALK TO BE MAINTAINED DURING CONSTRUCTION.
13. VEGETATION CLEARING, AND TREE REMOVAL ACTIVITIES MUST BE AVOIDED BETWEEN APRIL [1] - OCTOBER OF EACH YEAR TO PROTECT THE BREEDING SEASONS OF MIGRATORY BIRDS AND BATS.
14. EROSION AND SEDIMENT CONTROLS METHODS ARE TO BE CONTINUOUSLY EVALUATED; AND UPGRADES ARE TO BE IMPLEMENTED, WHEN NECESSARY.
15. ADDITIONAL EROSION AND SEDIMENT CONTROL MATERIALS (I.E. SILT FENCE, STRAW BALES, CLEAR STONES ETC) ARE TO BE KEPT ON SITE FOR EMERGENCIES AND REPAIRS.
16. 16.THE CONTRACTOR IS ULTIMATELY RESPONSIBLE FOR CONTROLLING SEDIMENT & EROSION WITHIN THE CONSTRUCTION SITE FOR THE TOTAL PERIOD OF THE CONSTRUCTION. THE SEDIMENT LADEN WATER WILL NOT BE ALLOWED TO DISCHARGE TO THE CREEK.
17. 17. AN AFTER HOURS CONTACT NUMBER IS TO BE VISIBLY POSTED ON-SITE FOR EMERGENCIES.
18. 18. ANY SEDIMENT SPILL FROM THE SITE MUST BE REPORTED TO MINISTRY OF ENVIRONMENT AND CLIMATE CHANGE (CALL SPILL ACTION CENTER AT 1 800 268 6060.)

No.	Revision	Date	By	App.
4	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
3	ISSUED FOR ZBA RE-SUBMISSION	2023-09-15	P.R.	F.M.
2	ISSUED FOR ZBA RE-SUBMISSION	2022-12-19	P.R.	F.M.
1	ISSUED FOR ZBA SUBMISSION	2021-03-19	F.M.	B.H.

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LEA

Owner/Client:

DVB REAL ESTATE INVESTMENTS INC.

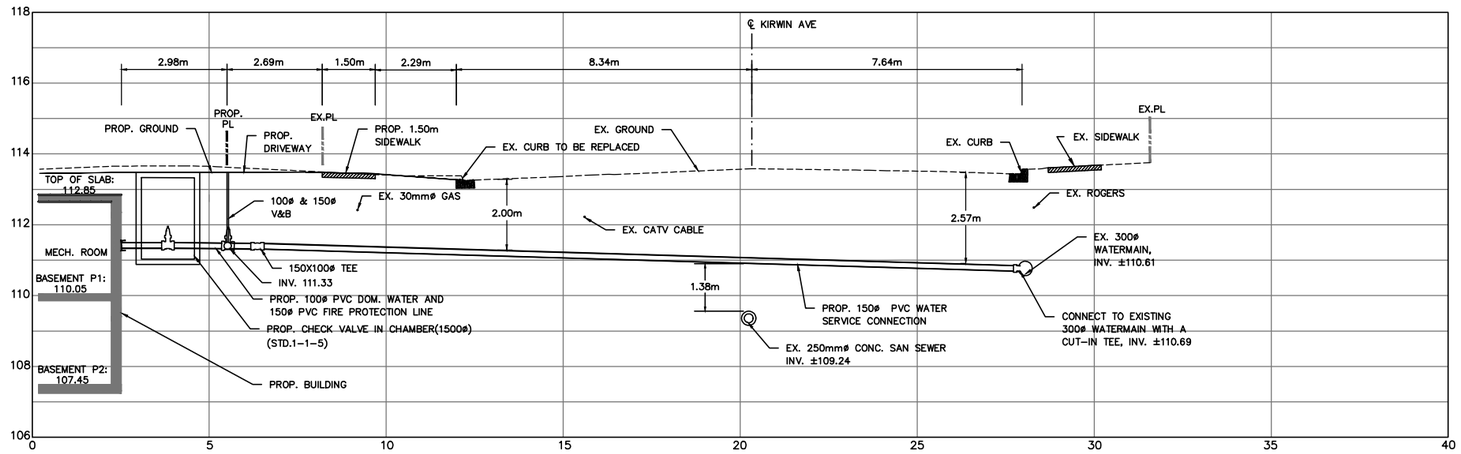
Location:

3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

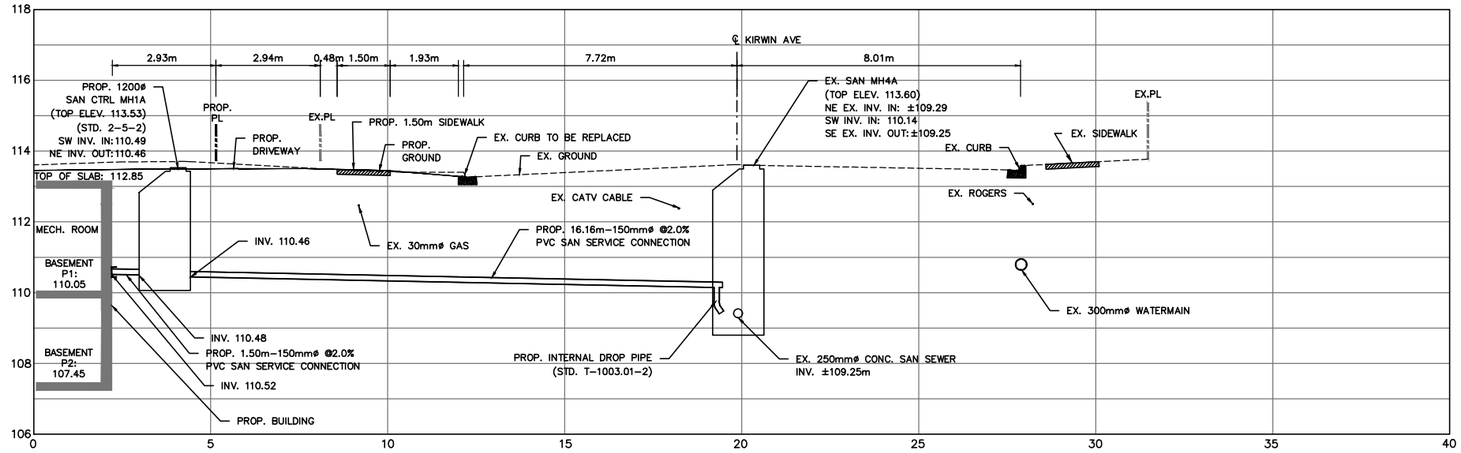
Title:

TEMPORARY EROSION AND SEDIMENT CONTROL PLAN

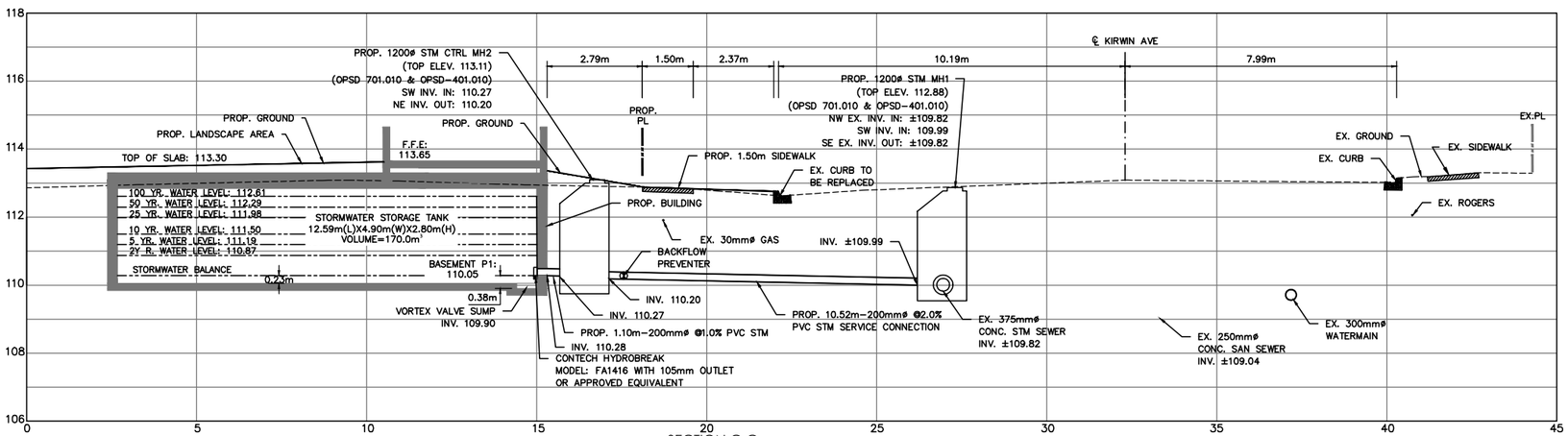
Designed By:	F.M.	Drawn By:	J.W.	Checked By:	F.M.
Scale:	1:250	Date:	FEB., 2021	Drawing No.:	C-04
Project No.:	21111				



SECTION B-B
WATER SERVICE CONNECTION
SC 1:50

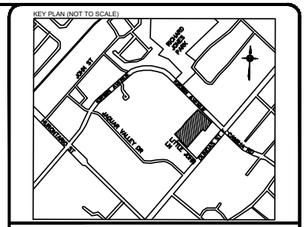


SECTION A-A
SANITARY SERVICE CONNECTION
SC 1:50



SECTION C-C
STORM SERVICE CONNECTION
SC 1:50

KEY PLAN (NOT TO SCALE)



GENERAL NOTES:

1. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM, 1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 793 LOCATED ON THE NORTH FACE AT THE EAST CORNER OF CONCRETE END POST OF BOX CULVERT UNDER DUNDAS STREET EAST ON SOUTH SIDE OF DUNDAS STREET EAST, 1.5M EAST OF JAGUAR VALLEY DRIVE; HAVING A PUBLISHED ELEVATION OF 110.955 METERS.
2. REFER TO DWG C-02 "SITE SERVICING PLAN" AND C-03 "COMPOSITE UTILITY PLAN" FOR LOCATION OF CROSS SECTIONS

No.	Revision	Date	By	Appd.
4	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
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1	ISSUED FOR ZBA SUBMISSION	2021-03-19	F.M.	B.H.

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Fax: (905)470-0030

Owner/Client:

DVB REAL ESTATE INVESTMENTS INC.

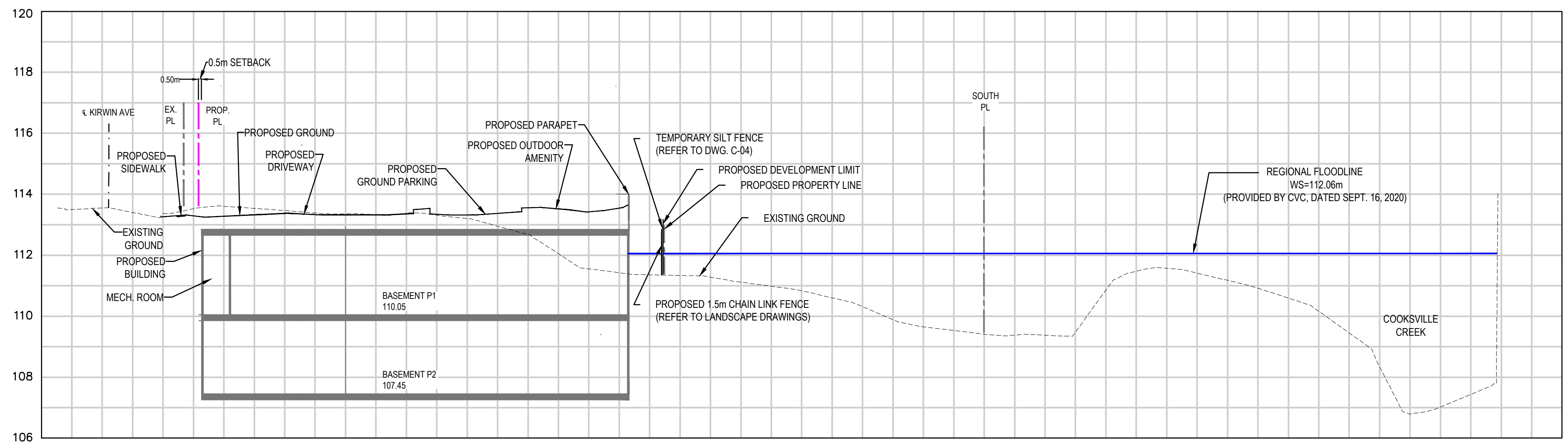
Location:

3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

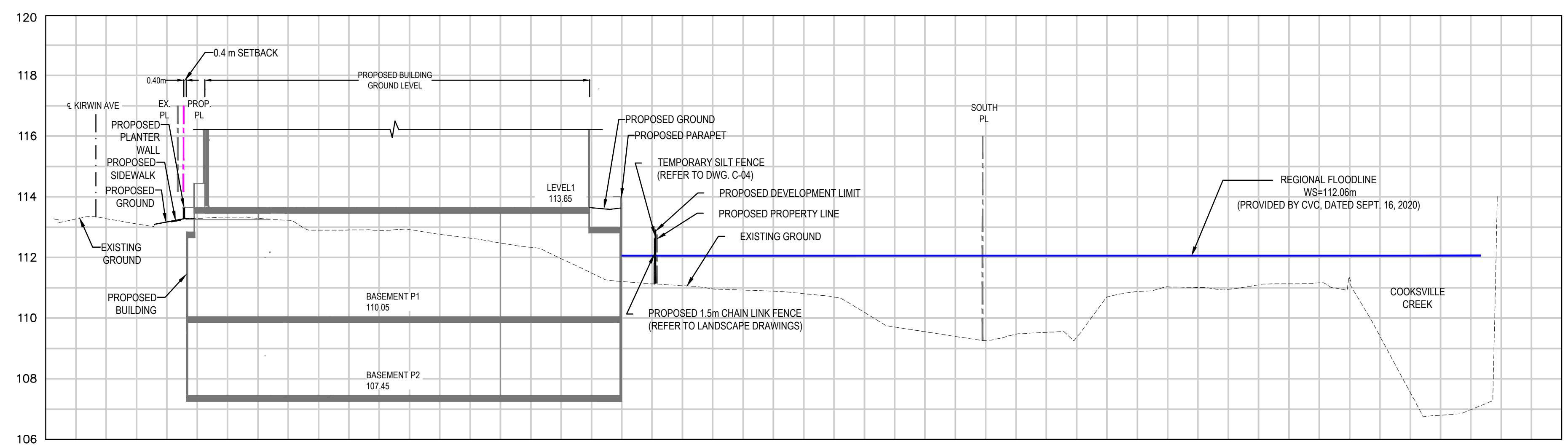
Title:

SERVICING CROSS SECTIONS

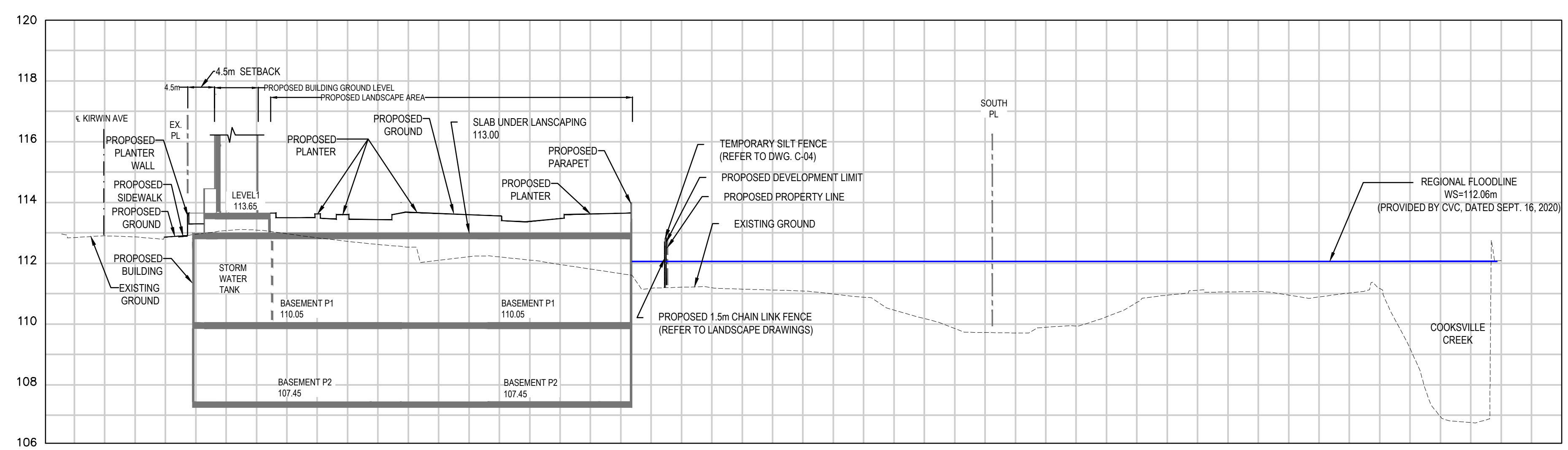
Designed By:	F.M.	Drawn By:	J.W.	Checked By:	F.M.
Scale:	1:50	Date:	FEB., 2021	Drawing No.:	C-05
Project No.:	21111				



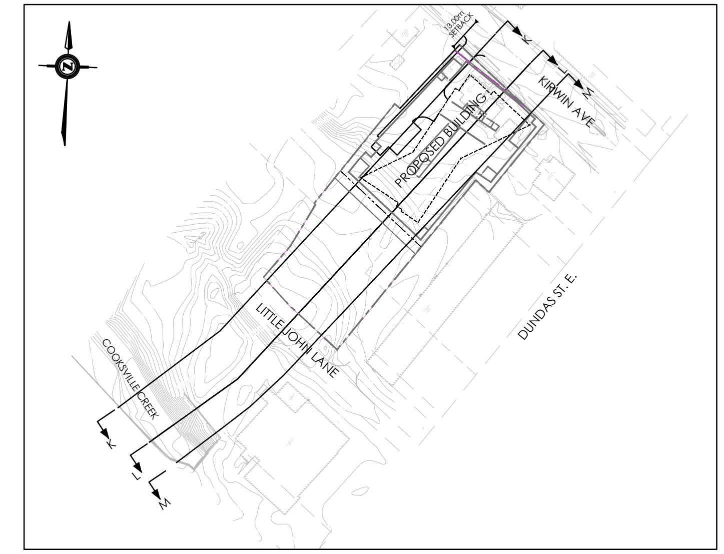
SECTION K-K
SC 1:500



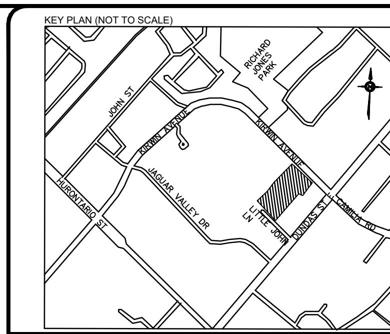
SECTION L-L
SC 1:500



SECTION M-M
SC 1:500



KEY PLAN (NOT TO SCALE)



LEGEND:

- EX. PROPERTY LINE
- PROP. PROPERTY LINE
- REGIONAL FLOODLINE (PROVIDED BY CVC, DATED SEPT. 16, 2020)
- REGIONAL FLOODLINE (PROVIDES BY AMEC, DATED FEB. 11, 2011)
- EXISTING GROUND
- PROPOSED GROUND

GENERAL NOTES:

1. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM, 1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 793 LOCATED ON THE NORTH FACE AT THE EAST CORNER OF CONCRETE END POST OF BOX CULVERT UNDER DUNDAS STREET EAST ON SOUTH SIDE OF DUNDAS STREET EAST, 15M EAST OF JAGUAR VALLEY DRIVE; HAVING A PUBLISHED ELEVATION OF 110.955 METERS.
2. REFER TO DWG C-01 "SITE GRADING PLAN" FOR LOCATION OF CROSS SECTIONS

No.	Revision	Date	By	App.
4	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
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Fax: (905)470-0030

Owner/Client:

DVB REAL ESTATE INVESTMENTS INC.

Location:

3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

Title:

LONGITUDINAL CROSS SECTIONS

Designed By: F.M.	Drawn By: J.W.	Checked By: F.M.
Scale: 1:500	Date: FEB., 2021	Drawing No.: C-06
Project No.: 21111		

GENERAL NOTES

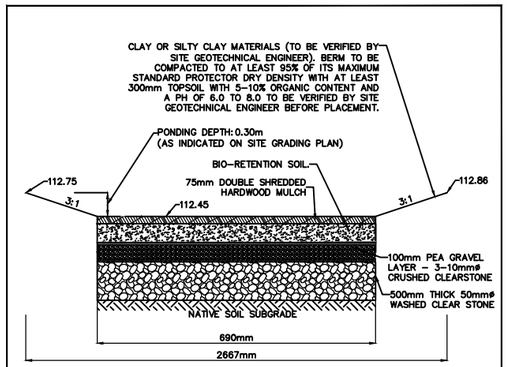
1. ALL SITE LAYOUT INFORMATION, INCLUDING BUILDING DIMENSIONS, SETBACKS, CURBS, DEPRESSED CURB LOCATIONS, SIDEWALKS, PARKING AND LANDSCAPE FEATURES MUST BE REFERENCED FROM THE ARCHITECT'S PLANS.
2. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR MUST VERIFY ALL DIMENSIONS AND LAYOUT INFORMATION. ANY DISCREPANCIES MUST BE REPORTED TO THE CONSULTANT BEFORE RESUMING CONSTRUCTION OPERATIONS.
3. ALL SERVICES MUST BE INSTALLED TO THE CURRENT CITY OF MISSISSAUGA STANDARDS, REGION OF PEEL STANDARDS, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS), AND ONTARIO BUILDING CODE (OBC) UNLESS OTHERWISE SPECIFIED, TO THE SPECIFICATION OF THE CITY AND CONSULTANT.
4. THE REGION OF PEEL AND CITY OF MISSISSAUGA STANDARD DRAWINGS, MATERIAL SPECIFICATIONS AND CONSTRUCTION SPECIFICATIONS, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND ONTARIO PROVINCIAL STANDARD SPECIFICATION (OPSS) SHALL FORM PART OF THE CONTRACT DOCUMENTS.
5. THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. THIS MAY REQUIRE EXCAVATION TO EXPOSE UTILITIES AS REQUIRED BY CONTRACTORS.
6.
7. ALL TRENCHING TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
8. ALL TRENCHES SHALL BE BACKFILLED TO THE CITY'S OF STANDARDS AND IN ACCORDANCE WITH THE GEOTECHNICAL REPORT OR AS OTHERWISE NOTED ON THE DRAWINGS.
9. ALL DIMENSIONS ARE IN METRES(m) AND ALL DIAMETERS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS. ALL SIGNS, ETC. SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS FOR THE CITY AND ONTARIO TRAFFIC MANUAL FOR TEMPORARY CONDITIONS AND MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
11. THE CONTRACTOR SHALL RECTIFY ALL DISTURBED AREAS TO THE ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE CITY.
12. EXISTING STRUCTURES ARE NOT TO BE DISTURBED, NOR ENCROACHMENT ON ADJACENT PROPERTIES UNLESS INSTRUCTED BY THE ENGINEER.
13. DEWATERING, IF REQUIRED, SHALL BE THE RESPONSIBILITY AND SOLE EXPENSE OF THE CONTRACTOR. REFER TO THE GEOTECHNICAL REPORT FOR EXISTING SITE CONDITIONS.
14. CONTRACTOR TO EXPOSE AND VERIFY LOCATION, ELEVATION, AND SIZE OF ALL SERVICE CONNECTIONS PRIOR TO CONSTRUCTION. THE OWNER SHALL BE NOTIFIED IMMEDIATELY OF ANY CONFLICTS WITH EXISTING SERVICES
15. CONTRACTOR SHALL RED-LINE ALL AS CONSTRUCTED INFORMATION ON A SET OF DRAWINGS AND PROVIDE TO THE OWNER AT THE END OF CONSTRUCTION, SEALED BY AN OLS OR P.ENG.
16. CONTRACTOR SHALL SUPPORT AND PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION AS PER OPSD AND CITY OF MISSISSAUGA STANDARDS AND SPECIFICATIONS.
17. THE APPROVAL OF THIS PLAN DOES NOT EXEMPT THE OWNERS CONTRACTOR FROM OBTAINING AND PAYING FOR, BUT NOT LIMITED TO THE FOLLOWING PERMITS, ROAD CUTS, SEWER PERMITS, RELOCATION OF SERVICES, ENCROACHMENT AGREEMENTS, APPROACH APPROVAL PERMITS, ETC. ALL RESTORATION AS PER CITY STANDARDS.
18. THE CONTRACTOR SHALL ENDEAVOR TO PREVENT MUD TRACKING ONTO EXISTING RIGHT-OF-WAYS AND SHALL PROVIDE FOR CLEANUP AT HIS OWN EXPENSE AS DIRECTED BY THE CITY. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO CONTROL DUST ON THE PROJECT AND HE SHALL PROVIDE AT HIS OWN EXPENSE, CONTROLLING MEASURES AS DIRECTED BY THE CITY.
19. FOR ELECTRICAL, ARCHITECTURAL AND MECHANICAL DETAILS BY OTHERS, SEE RESPECTIVE DRAWINGS. WORKS SHOWN ON THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER PLANS.
20. ALL EXISTING SERVICES ARE TO REMAIN IN SERVICE AT ALL TIMES DURING CONSTRUCTION.
21. ITEMS DESIGNATED TO BE REMOVED SHALL BE DISPOSED OFF-SITE.
22. CONSTRUCTION LAYOUT SHALL BE UNDERTAKEN BY CONTRACTOR'S SURVEYOR AT THE CONTRACTOR'S EXPENSE.
23. CONTRACTOR SHALL REVIEW THE GEOTECHNICAL REPORT FOR THE SITE TO CONFIRM EXISTING SOIL CONDITIONS AND TO CONFIRM RECOMMENDED GEOTECHNICAL PROCEDURES FOR THE ADDITION.

REGION OF PEEL STANDARD NOTES

24. ALL MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
25 WATERMAIN AND/OR WATER SERVICES MATERIALS 100MM (4") AND LARGER MUST BE DR18 P.V.C. PIPE MANUFACTURED TO A.W.W.A. SPEC. C900-16 SPEC COMPLETE WITH TRACER WIRE. SIZE 50MM (2") AND SMALLER MUST BE TYPE 'K' SOFT COPPER PIPE PER A.S.T.M. B88-49 SPECIFICATION.
26. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7M (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2M (4') FROM THEMSELVES AND ALL OTHER UTILITIES.
27. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED WITH AT LEAST A 50MM (2") OUTLET ON 100MM (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES FLUSHING OUTLET TO BE 100MM (4") DIAMETER MINIMUM ON A HYDRANT.
28. ALL CURB STOPS TO BE 3.0M OFF THE FACE OFF THE BUILDING UNLESS OTHERWISE NOTED.
29. HYDRANT AND VALVE SET TO REGION STANDARDS 1-6-1 DIMENSION A AND B, 0.7M (2') AND 0.9M (3') AND TO HAVE PUMPER NOZZLE.
30. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
31. WATERMAINS MUST HAVE MINIMUM VERTICAL CLEARANCE OF 0.3M (12") OVER/0.5M (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
32. ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
33. ALL LIVE TAPPING AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED THROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.
34. LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE CONTRACTOR.
35. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
36. THE CONTRACTORS(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTIONS.
37. ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS-CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTION SYSTEM, CONFORMING TO REGION OF PEEL STANDARDS 1-7-7 OR 1-7-8.

SANITARY, STORM AND WATERMAIN NOTES

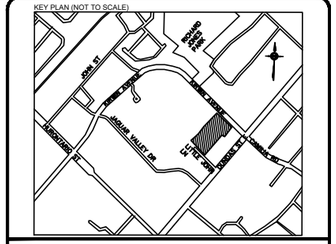
38. FULL LENGTH PERFORATED SUB-DRAIN PIPES OF 150mm DIA. TO BE INSTALLED AROUND THE PERIMETER OF PARKING LOT.
39. ALL UTILITY COMPANIES WILL BE NOTIFIED BY CONTRACTOR FOR LOCATES PRIOR TO THE INSTALLATION OF PROPOSED SERVICE CONNECTIONS.
40. ALL PIPE MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT MANUFACTURERS APPROVED PRODUCT LIST, SANITARY SEWER AND APPURTENANCES.
41. ALL SANITARY MAINTENANCE HOLES SHALL CONFORM TO THE CURRENT MANUFACTURER'S APPROVED PRODUCT LIST, SANITARY SEWER AND APPURTENANCES, REGIONAL STANDARD DRAWING 2-1-1 WHICH MUST BE MODIFIED IN THE FIELD TO PREVENT INFLOW AND INFILTRATION.
42. SANITARY SERVICE CONNECTION MATERIAL MUST BE PVC SDR28.
43. STORM SERVICE CONNECTION MATERIAL MUST BE PVC DR35.
44. ALL MAINTENANCE HOLE ARE TO BE SUPPLIED OR CONSTRUCTED IN ACCORDANCE WITH OPSD 701 SERIES.
45. CATCH BASINS SHALL BE PRECAST AS PER OPSD 705 SERIES.
46. SANITARY SEWERS SHALL BE INSTALLED WITH BEDDING AS PER REGIONAL STANDARD DRAWING 2-3-1.
47. BEDDING FOR PVC STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARD DRAWING NO. 2112.080.
48. SEWER BEDDING SHALL CONFORM WITH OPSS 1010 FOR GRANULAR "A" OR CITY STANDARD DRAWING NO. 2112.100 OR 2112.140.
49. ALL GRANULAR BEDDING AND BACKFILL MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF OPSS 1010 AND MUST NOT CONTAIN RCM/RAP.
50. ALL VALVE 300MM DIAMETER AND SMALLER SHALL BE EQUIPPED WITH VALVE BOXES AND RESTRAINED AND VALVE FITTING WRAPPED IN CORROSION PROTECTION TAPE.
51. ALL APPROVED NATIVE MATERIAL SHALL BE FREE OF FROZEN LUMPS, CINDERS, ASHES, ASPHALT REFUSE, ORGANIC MATTER, ROCKS AND BOULDERS OR OTHER DELETERIOUS MATERIALS.
52. ALL WATERMAIN FITTINGS SHALL BE MECHANICALLY RESTRAINED. DETAILS OF RESTRAINTS SHALL BE DESIGNED, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER AS PART OF SHOP DRAWINGS BY THE CONTRACTOR.
53. THE CONTRACTOR SHALL RETAIN THE SERVICES OF A MOECC LICENSED CONTRACTOR SPECIALIZING IN THE PROVISION OF DISINFECTION SERVICES FOR ALL WATERMAIN TESTING REQUIRED IN THIS CONTRACT.
54. TRACER WIRE IS TO BE INSTALLED ON ALL NEW PVC WATERMAIN PIPES.
55. THE TOP OF VALVE BOX AND CHAMBER COVERS SHALL BE SET FLUSH WITH FINISHED GRADE AND REMAIN ACCESSIBLE AT ALL TIMES.
56. WATER SERVICES, A 12-GAUGE TWU STANDARD COPPER, LIGHT COLORED, PLASTIC COATED TRACER WIRE MUST BE INSTALLED WITH AND ALONG THE PIPE AND BROUGHT TO THE SURFACE AT EACH SERVICE BOX. TRACER WIRE IS TO BE ATTACHED TO THE PIPE AND OUTSIDE OF EACH SERVICE BOX BY MEANS OF TAPE OR RUBBER GROMMET.
57. CHAMBER AS PER REGION STANDARD DRAWING NUMBER 1-1-5.
58. DETECTOR CHECK VALVE AS PER REGION STANDARD DRAWING NUMBER 1-3-1.
59. PROPOSED WATER CONNECTION AS PER REGION STANDARD NUMBER 1-6-4 AND 1-8-3
60. FOR DETAILS OF THE PROPOSED TRENCH DRAIN, ROOF DRAIN, SERVICE CONNECTIONS, WATER METER AND BACKFLOW PREVENTER REFER TO MECHANICAL DRAWING.



TYPICAL CROSS-SECTIONS OF BIO-RETENTION AREA
SCALE: NTS

NOTE:
1. REFER TO DWG. C-01 FOR PLAN OF THE BIO-RETENTION SWALE

KEY PLAN (NOT TO SCALE)



No.	Revision	Date	By	Appd
4	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
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Owner/Client:
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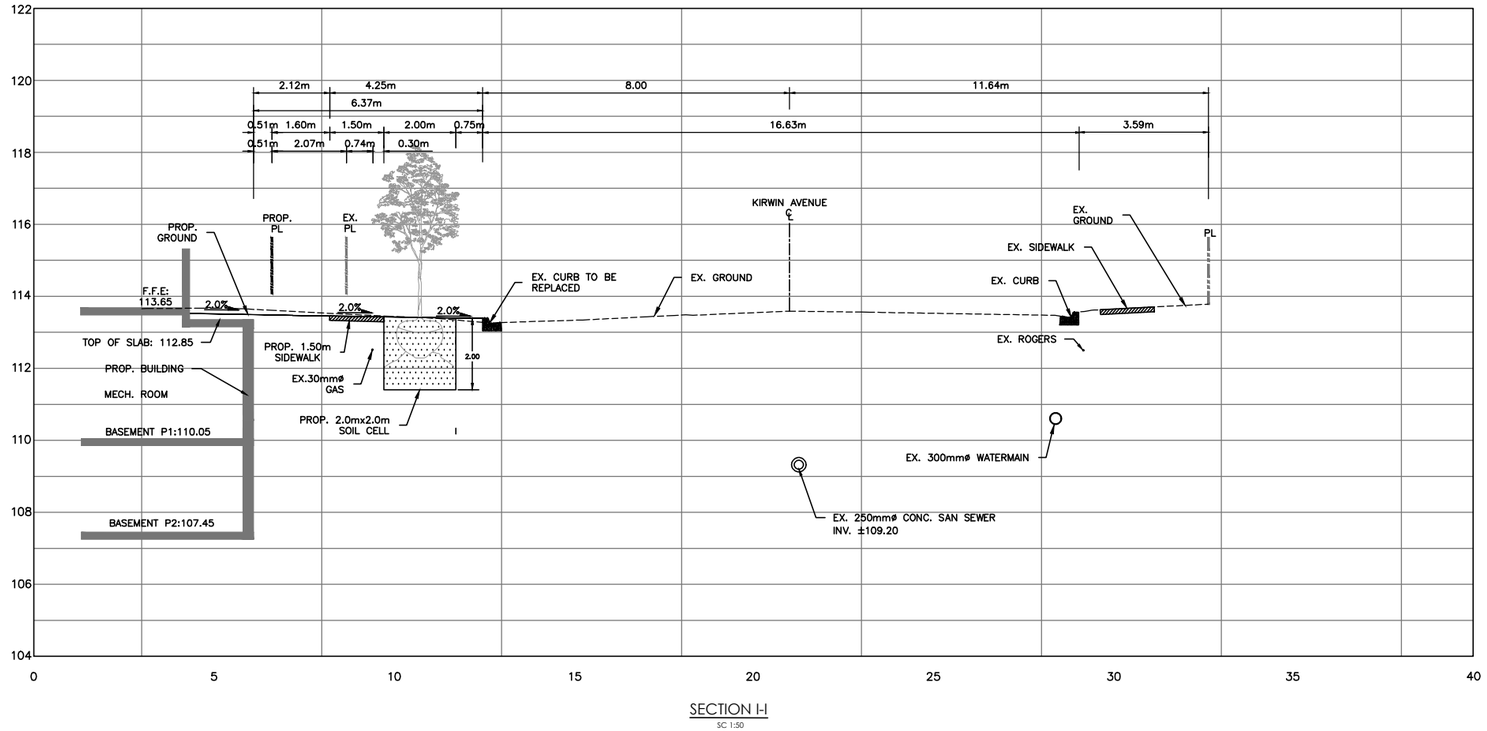
Location:
3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

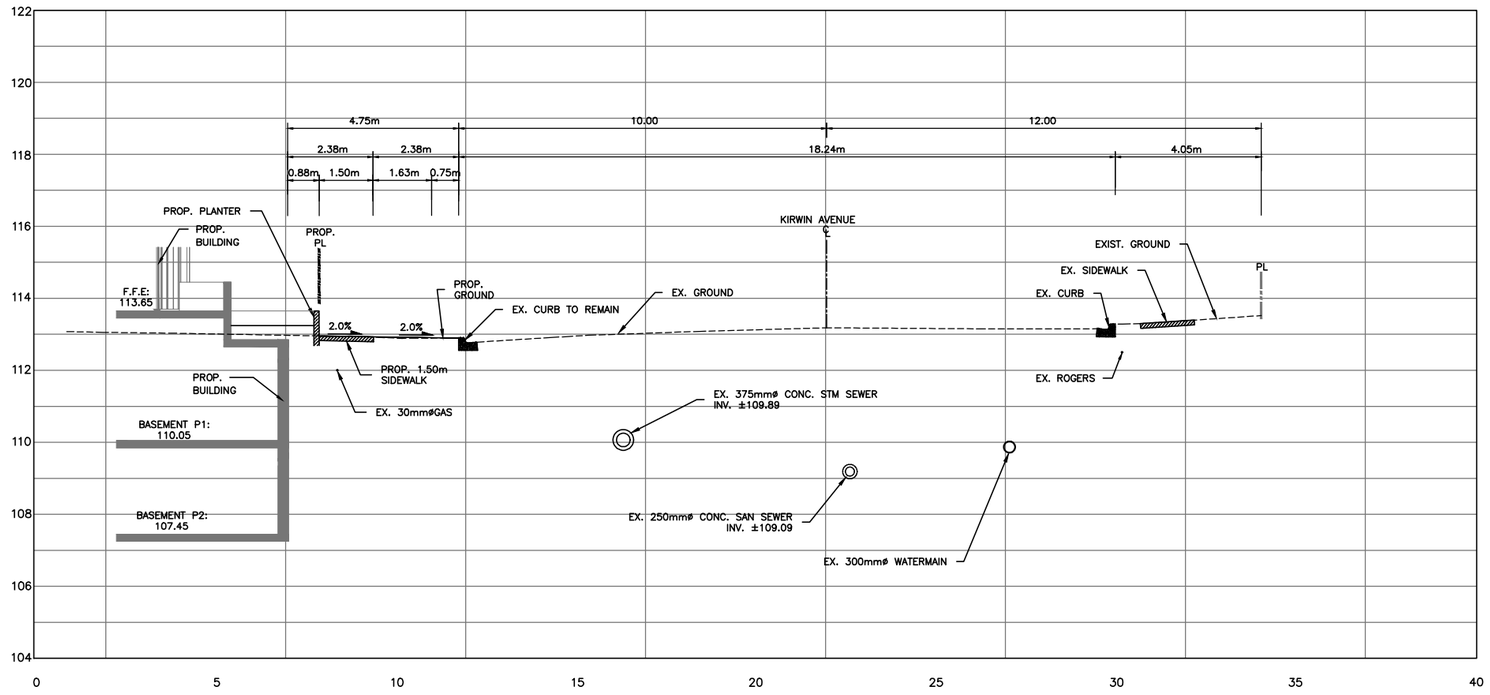
Title:
GENERAL NOTES

Designed By: F.M.	Drawn By: J.W.	Checked By: F.M.	
Scale: NTS	Date: FEB., 2021	Drawing No.: C-07	
Project No.: 21111			



SECTION I-I

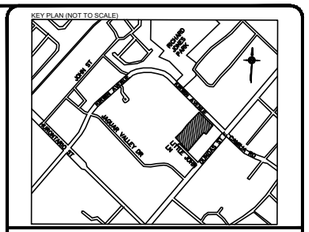
SC 1:50



SECTION J-J

SC 1:50

KEY PLAN (NOT TO SCALE)



GENERAL NOTES:

1. ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC DATUM, 1928 AND WERE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 793 LOCATED ON THE NORTH FACE AT THE EAST CORNER OF CONCRETE END POST OF BOX CULVERT UNDER DUNDAS STREET EAST ON SOUTH SIDE OF DUNDAS STREET EAST, 15M EAST OF JAGUAR VALLEY DRIVE; HAVING A PUBLISHED ELEVATION OF 110.955 METERS.
2. REFER TO DWG C101 "SITE GRADING PLAN " FOR LOCATION OF CROSS SECTIONS

No.	Revision	Date	By	Appd
3	ISSUED FOR 3RD ZBA SUBMISSION	2023-11-07	P.R.	F.M.
2	ISSUED FOR ZBA RE-SUBMISSION	2023-09-15	P.R.	F.M.
1	ISSUED FOR ZBA RE-SUBMISSION	2022-12-19	P.R.	F.M.

625 Cochrane Drive, Suite 900
Markham, Ontario
L3R 9R9, Canada
Tel: (905)470-0015
Fax: (905)470-0030

Owner/Client:

DVB REAL ESTATE INVESTMENTS INC.

Location:

3031 LITTLE JOHN & 3016-3032 KIRWIN AVE DEVELOPMENT

Title:

STREETSCAPE CROSS SECTIONS

Designed By:	F.M.	Drawn By:	J.W.	Checked By:	F.M.
Scale:	1:50	Date:	FEB., 2021	Drawing No.:	C-08
Project No.:	21111				

APPENDIX H

Watertight Foundation Letter and Hydrogeological Report

APPENDIX H-01

Watertight Foundation Letter

DVB Real Estate Investments Inc.
4918 King St., P.O. Box 1194
Beamsville Ont.
L0R 1B0

29/Nov/2022

Attention: Executive Director, Engineering and Construction Services

c/o Manager, Development Engineering

Dear Sir or Madam,

I Francesco Bertola, confirm and undertake that I will construct and maintain all building(s) on the subject lands at 3016, 3020, 3026, 3032 Kirwin Avenue & 3031 Little John Lane in Mississauga in a manner which shall be completely water-tight below grade and resistant to hydrostatic pressure without any necessity for Private Water Drainage System (subsurface drainage system) consisting but not limited to weeping tile(s), foundation drain(s), private water collection sumps(s), private water pump or any combination thereof for the disposal of private water on the surface of the ground or to a private sewer connection directly or indirectly or drainage system for disposal directly or indirectly in a municipal sewer.

A letter from a Professional Engineer confirming the design and implementation of a water-tight structure shall be provided as part of the site plan approval application.

Francesco Bertola - President
Name (printed) and Title

francescob@fbhgroup.ca
Email

DocuSigned by:
C00A12AE11574EB...
Signature

I Francesco Bertola, have the authority to bind the corporation

APPENDIX H-02

Hydrogeological Report

Azure Group

October 24, 2022

Weston Consulting
201 Millway Avenue #19, Concord
ON, L4K 5K8

Attention: Mr. Kaveh Wahdat - Planner

Re: Hydrogeological Assessment
3016-3032 Kirwin Avenue & 3031 Little John Lane
Mississauga, Ontario

Dear Sir:

Azure Group Inc. (Azure) was retained by Weston Consulting (The Client) to conduct a Hydrogeological Assessment at the property located at 3016-3032 Kirwin Avenue & 3031 Little John Lane in Mississauga, Ontario (The Subject Property). Azure thereby retained in partnership Azimuth Environmental Consulting, Inc. (Azimuth) to complete the Hydrogeological Assessment. As indicated in the completed report, the purpose of the Hydrogeological Assessment was to characterize the existing hydrogeological conditions at and in the vicinity of the Site, assess the need for, and options for, groundwater control in association with the proposed construction, evaluate potential impacts to the local groundwater regime resulting from the proposed construction, and identify appropriate mitigative measures, as warranted.

At the time of the site visit(s), the Site was vacant land covered with bushes, shrubs and trees. Vehicular access to the Site was from a gravel paved driveway off of Kirwin Avenue and Little John Lane, located on the northern and southern boundaries of the property. The Site had a total area of approximately 6,609 m² (1.6 acres). Azure retained Altech Drilling & Investigative Services Ltd., Ontario to complete the drilling program and Azure's representatives were on-site from April 6th, 2022 to April 8th, 2022 to conduct the field work. The scope of work consisted of the drilling of ten (10) boreholes (BH1 to BH10) to a maximum depth of approximately 9.0 metres (m) below grade or until refusal. Boreholes BH1, BH2, BH3, BH101 and BH106 were completed as groundwater monitoring wells. Representative soil samples were retrieved from each borehole and submitted for analyses of moisture content and grain size analysis. All figures showing the approximate location of the boreholes are included in the following report completed by Azimuth.

CLOSURE

This report has been prepared for the benefit of Weston Consulting (The Client), and their clients.

Any other person or entity without the express written consent of Azure Group Inc. (Azure) and the client may not rely upon the report. Any use that a party makes of this report, or any reliance on decisions made based on it, are the responsibility of such parties. Azure accepts no liability and no responsibility whatsoever for damages, if any, suffered by any party as a result of decisions made or actions based on this report.

An environmental site characterization is a limited sampling of a site. The conclusions given herein are based on information gathered at the specific locations and can only be extrapolated to an undefined limited area around these locations. The extent of the limited area depends on the soil and groundwater conditions, as well as the history of the subject property reflecting natural, construction, and other activities. In addition, analyses have been carried out for a limited number of chemical parameters, and it should not be inferred that other chemical species are not present.

Due to the nature of the investigation and the limited data available, Azure cannot warrant against undiscovered environmental liabilities. No other warranty or representation, either expressed or implied, is included or intended in this report. Should any conditions at the site be encountered, which differ from those at the sampling locations and/or additional site information become available, Azure requests that this information be brought to our attention so that we may re-assess the conclusions presented herein. It should also be noted that current environmental Regulations, Guidelines, Policies, Standards, Protocols and Objectives are subject to change, and such changes, when put into effect, could alter the conclusions and recommendations noted throughout this report.

We trust this is satisfactory. Should any queries arise, please feel free to contact this office.

Yours truly,

AZURE GROUP INC.

Preliminary Hydrogeological Assessment

3016 – 3032 Kirwin Ave., Mississauga, Ontario

Prepared for:
Azure Group

Prepared by:
Azimuth Environmental
Consulting, Inc.

October, 2022

AEC 22-056

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

Environmental Assessments & Approvals

October 24, 2022 AEC 22-056

Azure Group
6751 Professional Court, Suite 201
Mississauga, Ontario
L4V 1Y3
Attention: Samantha Desgrosseilliers

Re: **Preliminary Hydrogeological Assessment:**
3016 – 3032 Kirwin Ave., Mississauga, Ontario

Dear Samantha,

Azimuth Environmental Consulting, Inc. (Azimuth) is pleased to provide our Preliminary Hydrogeological Assessment for the property 3016 – 3032 Kirwin Ave., within the City of Mississauga (the "Site"). This evaluation focused on the existing soil and ground water regime underlying the Site and the potential for the proposed eight (8) story residential building and associated parking development to impact the existing conditions.

Should you have any questions or wish to discuss the report in greater detail, please do not hesitate to contact the undersigned.

Yours truly,

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

PROFESSIONAL GEOSCIENTIST
COLIN ROSS
PRACTISING MEMBER
2055
ONTARIO

Brendan MacNaughton, B.Sc (Hons), EP.
Environmental Scientist

Colin Ross, B.Sc, P.Geo.
Senior Hydrogeologist

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1.0 INTRODUCTION

Azimuth Environmental Consulting Inc. (Azimuth) has been retained by the Azure Group to conduct a Preliminary Hydrogeological Assessment for the property 3016-3032 Kirwin Avenue within the City of Mississauga (the "Site") (Figure 1).

The purpose of this assessment is to characterize the existing hydrogeological conditions at the Site, and determine any potential constraints to the proposed development plan. This assessment also addresses Source Water Protection policies developed under the *Clean Water Act* as they pertain to water quantity and quality issues.

1.1 Background

The Site is rectangular in shape, 6,385 m^2 (0.6 hectares (ha)) in size and is to be redeveloped as an 8 storey residential building with Underground parking. The Site is located on the south side of Kirwin Avenue; a small cleared area remains from the historical residential dwellings at the Site along the east of the site. As per the proposed development plans provided, the development will be accessed from Kirwin Avenue and will include two (2) below grade parking levels extending approximately 7 m below grade. The proposed Site development plans are provided in Appendix B.

The purpose of this assessment is to characterize the existing physical geological and hydrogeological conditions at the Site and the potential for the proposed development to impact the existing environmental / hydrogeological conditions. The report follows a standard format addressing typical requirements of both the City of Mississauga and Credit Valley Conservation Authority for hydrogeological submissions within the Credit Valley source water protection zone.

2.0 ENVIRONMENTAL SETTING

2.1 Soil

The Soil Map of Peel County (Report No. 18) (Hoffman, et al., 1953) defines the surficial soil for the Site as part of the Cooksville Series; however the Site sits just north of the divide between the Fox Series which uses the location of Dundas Street in the 1950's as the divide. Based on the mapping, the region is also crosscut with Alluvial fans (Alluvial Series) spreading north from the Lake Ontario shoreline. For the purposes of this investigation we will assume that the location of Dundas Road has not significantly moved and the Site sits within the Cooksville Series. The Cooksville Series is described as shallow or very shallow surficial dark grey clay laden loams overtop of shallow grey shale. Cooksville clay Loams are classified within Soil Group D. Group D soils represent material with very high runoff potential and restricted to highly restrictive

infiltration rates. Of note Soils within Group D can have high shrink/swell potentials. This soils description is line with the physical investigation done onsite.

2.2 Physiography

The Ontario Geologic Survey (Chapman and Putnam 1984) describes the Site area as being located within the Iroquois Plain physiographic region. This region extends from the Trent River approximately 300 km to the Niagara River. The Iroquois Plain is subdivided into 8 regions; the Subject Site sits within the Hamilton to Toronto region, a thin region defined by the current and ancient shoreline of Lake Iroquois. This section is represented by multiple sand and gravel alluvial outwash sections and the flat, smoothed historic fine grained bedding of Lake Iroquois.

2.3 Topography and Drainage

The topographic relief at the Site is quite limited with elevations ranging from approximately 113 masl in the north along Kirwin Avenue to a low of 110 masl in the south west along Little John Lane. The current Site drainage is expected to follow the local topographic dip to the southwest towards Cooksville Creek, located approximately 70 m west of the Site, although any surface runoff exiting the Site is expected to be captured by the municipal drainage system in the area. Run on to the Site is not expected from the surrounding developments based on the topographic setting and curb and gutters present along the upslope side of the Site.

2.4 Bedrock Geology

The underlying bedrock geology has been described by the Ontario Geologic Survey (OGS) as being composed of grey calcareous shale of the Georgian Bay Formation of (Ontario Geologic Survey , 2011). The formation is Upper Ordovician in age. Based on the thickness mapping surrounding the site the Site, bedrock can be expected somewhere between 3 and 8 mbgs (Gao, et al., 2006), which is in agreement with the results of the boreholes advanced on Site. Shallow bedrock was identified in BH1, 2 and 3, all having weathered shale identified within the soil samples in the lower section of each log.

2.5 Quaternary Geology

The Quaternary Soil Map of Ontario (Onatrio Geological Survey, 2003) defines the local surficial soils in the vicinity of the Site as Paleozoic in age comprised of undifferentiated carbonate and clastic sedimentary rock, which is exposed at surface or covered by a discontinuous, thin layer of drift. This area also borders on an area characterized as the Halton Till, which consists predominantly of a silt to silty clay matrix. The Halton Till is texturally variable but is generally a sandy silt to clayey silt till interbedded with silt, clay, sand and gravel. In some areas it is very clay-rich where the Ontario Ice Lobe has

overridden glaciolacustrine deposits of the Lake Ontario basin. The Halton Till is typically 3 to 6 m thick but locally it can exceed 15 to 30 m in thickness in the western part of the study area.

Based on the Site specific soils data provided by the Azure Group subsurface investigation the Site is underlain by a thin topsoil layer (10 cm) overtop of a fill mixture consisting of sand, silt and clay of different compositional percentages to a depth of around 3.5 mbgs. Below this level the boreholes intersect a native Silty-Clay layer to the upper contact of the underlain Weathered Shale bedrock which was encountered in five (5) of the advanced boreholes below 7 mbgs, all of the boreholes all indicate a content of weathered Shale fragments below ~6.5 mbgs. The inclusion of the fragments indicate that the bedrock interface is very close to this depth, which is in agreement with both afore mentioned mapped Quaternary description and the drift thickness mapping results. Based on the observed Site soils, it is likely these material represent Halton Till.

For reference, the borehole locations are illustrated on Figure 2, while the borehole logs are provided in Appendix C.

2.6 Hydrogeology

The Ontario Ministry of Environment, Conservation, and Parks (MECP) Water Well Records were referenced for any recorded well information within the vicinity of the Site (500 m) (MECP, 2021). The Site and surrounding area is likely to be serviced with water and sewer utilities; however well records can be used to gain subsurface information which can provide insight into shallow geological formation within the area. The well records found in the vicinity of the Site that are pertinent to this assessment are summarized in Table 1 and are shown on Figure 3. The thirty-six (36) surrounding wells in the MECP well record database indicate that one (1) was a decommission record, one was completed in 1952 and is the only record of a potable water supply well (No. 4902211). The remaining thirty-four (34) well records were for advanced as test holes in the area. The wells were drilled to depths between 3 and 15 m. Nine of the well records were not available online. The remaining records have been included in Appendix C. The well records indicate that the grey /blue shale bedrock surface is quite limited, between 2 and 5 mbgs in fourteen of the well records. The overburden soils identified in these records were primarily clay and silt with some sand and or gravel, which matches the geological literature outlined above, as well as the Site specific soils identified the drilling program. Given the age of the wells and the fact the area has been municipally serviced for many years, it is unlikely that the supply well is still in use.

Table 1: MECP Water Well Database Summary (500 m radius from Site)

Well ID	Date Completed	Depth (m)	Depth to Bedrock (m)	Distance to Site (m)	Direction to Site
4902211	1958-11-12	15.5	5.2	201	N
4909841	2005-06-30	7.6	7.6	201	NNE
7107988	2008-06-02	6.1		215	SW
7140001	2010-01-20	6.7	6.1	233	E
7144432	2010-03-22	3.7		201	E
7145320	2010-04-28	4.8	2.5	467	NE
7148379	2010-06-21	3.1		262	NW
7148380	2010-06-21	3.4		260	NW
7148381	2010-06-21	0		415	NW
7196498	2012-10-09	7.6		115	SW
7202168	2012-11-20	6.09		200	SE
7210777	2013-10-11	5.5		60	S
7210806	2013-10-11	4.9		61	S
7210807	2013-10-11	4.7		62	S
7263541	2016-04-11	5.2	4.3	260	W
7263542	2016-04-11	5.2	3.7	265	W
7263543	2016-04-11	5.2	4.3	280	W
7263544	2016-04-24	1.4		285	W
7277547	2016-11-18	3		290	W
7277548	2016-11-17	3	3.0	430	SW
7278591	2016-11-25	5.3	2.5	360	NW
7296547	2017-09-12	4		425	SSW
7296548	2017-09-12	4		430	SSW
7296549	2017-09-12	4.3	3.0	420	SSW
7306688	2017-09-13	7.6		0	Onsite
7330071	2018-12-17	4		445	S
7332231	2019-04-08	4.5	2.1	350	NW
7345861	2019-07-03	3.7		326	NW
7345862	2019-07-03	3.7		325	NW
7358771	2020-04-24	0		410	SW
7358772	2020-04-24	0		400	SW
7358773	2020-04-24	0		400	SSW
7361501	2020-03-12	0		351	NW
7378766	2020-12-09	6.7	4.6	0	Onsite
7378767	2020-12-09	6.7	4.6	0	Onsite
7378768	2020-12-09	6.7	4.6	0	Onsite

3.0 SOURCE WATER PROTECTION

A review of the Source Water Protection Areas as identified on the MECP Source Protection Information Atlas website indicates the Site is contained within South Peel Drinking Water Intake Protection Zone (IPZ) 2, as well as within a Highly Vulnerable Aquifer Area (HVA). However, it is not within a Significant Ground Water Recharge Area (SGRA), Wellhead Protection Area (WHPA-D), WHPA-Q2, Issues Contributing Area (ICA). Given the IPZ, consideration may need to be given for stormwater control measures at the Site.

4.0 MONITORING

4.1 Previous Site Investigations

Azure Group Inc. completed a geotechnical drilling program at the Site in 2022 and it is also understood that a previous Phase II Environmental Site Assessment (ESA) as completed which included drilling and installation of monitoring wells on Site. These reports were not available at the time of report issuance: however, the borehole logs for the current monitoring wells on Site were provided and utilized in this assessment. The details of which are summarized in subsequent sections.

4.1.1 Site Drilling & Monitoring Well Installations

A drilling program was undertaken by Azure as part of the above mentioned geotechnical between April 1st and April 8th 2022. Ten (10) boreholes were advanced across the site, three (3) were then completed as ground water monitoring wells for the Site as illustrated on Figure 4, with borehole logs and a location plan included in Appendix D. It is noted that a collection of 3 additional historic wells are present at the Site from an Azure site investigation in December 2020 as well as two (2) additional wells, the history and construction details are not known, these are assumed to be related to the wells installed in 2017 (Appendix C record number 7306688). The onsite wells are summarized Table 2 below.

4.2 Ground Water Level Monitoring

As part of assessment, ground water levels were monitored on the May 11th 2022 by Azimuth staff. The ground water measurements have been included within Table 2 below and used to create Figure 4 with the inferred groundwater flow direction.

Currently the base of the underground parking level has been established at 6.7 mbgs such that the building foundation will encroach into the water table by up to ~1.5 m. As such, these seasonally high ground water elevations need to be considered in the building design such that proper waterproofing is being incorporated within the basement level.

The inferred ground water flow direction is illustrated on Figure 4, which shows a south flow pattern, which matches the direction of a buried section of the Cooksville Creek.

Table 2: Ground Water Elevation Data

Ground Water Elevation Table												
Azimuth Project Number			22-056									
Project Site			Kirwin Ave									
Town/Region			Mississauga, Peel									
			GPS (Zone 17)									
Well ID	Easting	Northing	Elevation (MRD)	Stick Up	Elevation of Screen Bottom (mASL)	Elevation of Screen Top (mASL)	Date	Depth to Water (mBTOP)	Depth to Bottom (mBTOP)	Depth to Water (mBGS)	Depth to Bottom (mBGS)	Groundwater Elevation (mASL)
BH1	612103	4826454	113.31	0.85	106.69	109.74	05-11-2022	5.06	7.47	4.21	6.62	109.10
BH2	612080	4826562	112.56	0.65	104.97	108.02	05-11-2022	5.94	8.24	5.29	7.59	107.27
BH3	612091	4826465	113.31	1.10	106.68	109.73	05-11-2022	5.36	7.73	4.26	6.63	109.05
BH101	612090	4826483	113.39	1.04	107.11	110.16	05-11-2022	5.75	7.32	4.71	6.28	108.68
BH106	612033	4826412	110.78	0.92	105.28	108.33	05-11-2022	3.87	6.42	2.95	5.50	107.83
Unknown 1*	612108	4826460	113.0*	0.79	105.34	108.39	05-11-2022	4.96	8.45	4.17	7.66	108.83
Unknown 2*	612101	4826439	112.5*	0.68	104.97	108.02	05-11-2022	4.75	8.21	4.07	7.53	108.43

GPS Location based on hand held device and is not a Surveyed location.
Elevations are in metres above sea level (mASL) Provided by Azure
*BH with unknown origin on site close to locations of BH 102 and 103, no known elevation was surveyed

4.3 Hydraulic Conductivity Testing

In order to understand the hydraulic characteristics of the underlying overburden, transient hydraulic tests were performed on the Site monitoring wells following the 2022 drilling program. The transient test involves the instantaneous injection or withdrawal of a volume or slug of water or solid cylinder of known volume. This is accomplished by adding or displacing a known volume to/from a well and measuring water level response time to return to equilibrium. Water level measurements were recorded both manually and with automatic dataloggers, which were programmed to record the pressure of water above the data logger every second. Data was analyzed using the Hvorslev Method (1976) for unconfined aquifers, which assumes a homogeneous, isotropic medium in which soil and water are incompressible. Hydraulic testing results are summarized in Table 3 (below).

The soil transmissivity for the Site is varied by an order of magnitude. Based on the local geology reported from both the borehole logs and from the surrounding water well records this is what was expected. The result of the slug test is included in Appendix E. The measured hydraulic conductivity is within the published range for a silty clay material (Freeze & Cherry, 1979).

Table 3: Hydraulic Testing Results

Hydraulic Test Results				
Azimuth Project Number		22-056		
Project Site		Kirwin Avenue		
Town/Region		Mississauga, Peel Region		
Well	Test Date	Screen Interval (MRD)	Screen Material	Hydraulic Conductivity (m/sec)
BH/MW106	2022-04-08	108.3-105.2	Clay/Silt	5.56E-09
BH/MW2	2022-04-08	108.2-104.9	Clay/Silt	2.28E-08
Site Average				1.42E-08
Site Max				2.28E-08

4.4 Water Quality

A water quality sample was taken from one onsite well location to provide some insight to the requirements of dewatering water treatments. The results of which are included in Appendix F. The results are compared to the Provincial Water Quality Standards as the discharge point is unknown at this time; the City of Mississauga has both storm and sanitary sewers in the area, as well as a watercourse to the south (Cooksville Creek). The PWQO Standards were chosen as they are more stringent than that of the sewer bylaw standards. Of the tested parameters Total Phosphorous exceeded the PWQO standard. The total phosphorus concentrations are significantly elevated, but this along with the metal constituents are interpreted to be sourced from the elevated sediment load in the sample; this is evidenced by the elevated turbidity at these locations (181 NTU). The nutrient analysis was completed on water that was unfiltered, and therefore contained high concentration of sediment particles. The increased phosphorus is therefore likely attributed to the excess nutrients that are bound to the sediment grains in suspension and dissolved within the acidified nutrients bottle. As such, discharge of any potential dewatering effluent into storm sewer or natural environment would not likely represent any impact assuming proper sediment controls are in place for any dewatering discharge. To confirm the effluent discharge into the storm sewer system, a secondary sample meeting all of the requirements of The City By-Law would need to be collected, which can be confirmed ahead of any potential construction dewatering.

5.0 WATER BALANCE

In order to determine the potential changes to the natural ground water recharge conditions, a pre- and post-development water balance assessment has been completed using the Thornthwaite and Mather method (1957). This method evaluates evapotranspiration based on precipitation and temperature. Residual soil saturation is a function of topography and soil type. Monthly data are tabulated from daily average

temperature and precipitation, and the water budget is a continuous calculation over the period of record. To clarify, the method and the approach used by many individuals in examining infiltration resets annual conditions (moisture deficit, snow storage, etc) over the winter months because of the general lack of infiltration during the frost period. However, we maintain those records and carry them forward from month to month during the entire period of record.

Values were determined on a monthly basis, compiled from daily Environment Canada meteorological data station located in Toronto Leaster B. Pearson International Airport (Station 6158733), Ontario between 1950 and 2021. The calculations are based on the average conditions during this period; the average precipitation was 779 mm, rainfall was 632 mm, evapotranspiration was 490 mm and the surplus was 289 mm.

5.1 Land Use

5.1.1 Pre-Development

The pre-development Site area was classified according to land use/vegetation type. Approximate pre-development land use classification areas are provided in Table 4.

Table 4: Pre-Development Area Classification

Land Use	Land Area (m^2)
Forest	4,300
Landscaped Grass	2,085
TOTAL	**6,385**

Land within the pre-development scenario is considered 0% impervious

5.1.2 Post-Development

The land classification in the post-development scenario was classified based on the Site Development Plans (Appendix B). Post-development land use classification areas are provided in Table 5:

Table 5: Post-Development Area Classification

Land Use	Land Area (m^2)
Impervious(building/driveway)	3,433
Pervious (landscaped/undeveloped)	502
Parkland Dedication	**2,450**
TOTAL	**6,385**

Land within the post-development scenario is considered 54% impervious. The post-development areas are illustrated in Appendix B.

It is noted that impervious areas included landscaped areas atop the below grade parking structure and any infiltration in these areas will likely be required to be drained to sewer or discharged to surface via a sump pump such that no infiltration would be expected.

5.2 Infiltration

Infiltration is generated one of two ways: (1) directly from rainfall impact or snowmelt on pervious surfaces; and (2) indirectly when runoff from impervious surfaces is diverted into adjacent naturalized areas.

Infiltration factors for the Site were estimated based on the underlying soil, local topography, and ground cover as per Table 2 of the Ministry of Environment and Energy (MOEE) Hydrogeological Technical Information Requirements for Land Development Applications (1995).

The soil variable factor was determined by taking into account information obtained from the regional geologic mapping and the field work programs completed for the Site. This information suggests that the surficial material at the Site is primarily composed of a silty clay. The infiltration factors utilized in the water balance assessment are summarized in Table 6 below.

Table 6: Summary of Pervious Land Infiltration Factor

Scenario	Land Use	Infiltration Factor	Assumption
Pre-Development	Landscaped Grass	0.4	Flat Land (0.2), Clay/silt (0.1), Maintained Grass Cover (0.1)
	Forest	0.5	Flat Land (0.2), Clay/silt (0.1), Woodland cover (0.2)
Post-Development	Landscaped Grass	0.4	Flat Land (0.2), Clay/silt (0.1), Maintained Grasses (0.1)
	Dedicated Parkland	0.5	Flat Land (0.2), Clay/Silt (0.1), Woodland Cover[1] (0.2)

1- Dedicated Parkland surficial cover is assumed to be a mix of treed space to match the John C. Price Parklkand existing adjacent to the dedication lands.

5.2.1 Pre-Development Infiltration

Pre-development direct infiltration was determined by multiplying the annual average surplus amount, the area of each land use, and the infiltration factor for each land use. The pre-development annual infiltration is therefore 862 m^3/year (Appendix D).

5.2.2 Post-Development Infiltration

Post-development infiltration (without mitigation) was determined by multiplying the annual average surplus amount, the area of each land use, and the infiltration factor for each land use. The post-development annual direct infiltration is therefore 412 m^3/year. There is therefore a decrease in infiltration of 450 m^3/year from pre- to post-development without mitigation measures employed.

5.3 Water Balance Summary

Using the climate model data and calculations mentioned above, the water balance was completed for pre-development and post-development without mitigation (Appendix D) as no stormwater drainage plans were available at the time of reporting.

The pre-development infiltration volume is 862 m^3/year. This assumes the Site is vacant as it sits today. The post-development without mitigation infiltration volume is 412 m^3/year, which is a deficit of 450 m^3/year. This is based on the proposed development as described in Section 1.0 of this report and illustrated in Appendix B (Site Development Plans).

6.0 DEWATERING ASSESSMENT

As noted above, the proposed development and associated underground parking and servicing, have been shown to be positioned below the water table. In this area, ground water elevations are represented by the installed monitoring wells. Based on the monitoring completed on the wells, the high ground table sits at 109.10 mASL, and the estimated base of the two (2) level underground parking slab proposed to be at 6.7 mbgs (107.45 mASL). Given these elevations place the foundation approximately 3.6 m into the water table (approximately 2m below the slab), for a dry working area at the base of the excavation, a construction dewatering plan will be needed.

Since the required drawdown is greater than 1.5 m, the use of shallow well points or educator systems may be required. The exact dewatering methodology will depend on site-specific conditions and will be determined by the dewatering contractor.

Dewatering discharge is assumed to be handled on-site with discharge ultimately being into either the municipal stormwater or sanitary infrastructure assumed to run along Kirwin Avenue.

6.1 Drawdown Conditions

The details utilized for this assessment are derived from the KEA design drawings (Appendix B). These details including location, width, length and base elevations for the

proposed building were utilized to determine the maximum drawdown required for construction in relation to the water table conditions for the Site as illustrated in Figure 4 appended.

Although the water table contouring illustrated on Figure 4 shows a decline to the south, for the purposes of the dewatering assessment, it has been assumed a high water table elevation of 109.10 mASL (BH/MW1) extends across the entire site area. In reality, there is a likely decline as illustrated in the contours toward the southeast which could limit the drawdown requirements for the south section of the excavation; however, this conservancy is utilized to address the limited ground water elevation points in this area as monitoring well coverage is limited on the Site. Regardless, based on the measured high ground water table (109.10 mASL) and the excavation base elevations (105.45), ground water lowering during construction will be approximately 3.6 m. This is based on the following assumptions:

- Construction ground water lowering will target a depth of 2 m below the base of the P2 slab to ensure dry working conditions within the utility trenching needed below the slab and footings;
- To be conservative, the hydraulic conductivity value referenced (2.28×10^{-7} m/sec) in this assessment has been increased from the high-end estimate of the overburden aquifer single well response testing (SWRT) included in Appendix G a order of magnitude. This was done to account for potential higher permeable horizons than what was tested;
- The most elevated ground water elevation / depth of ground water was assumed to apply to the area; and
- The entire proposed building is assumed to be constructed as single dewatering undertaking installed at one time. If the dewatering was done in sections, then the volumes and Zone of Influence would be reduced;

The actual drawdown will depend on construction timing.

6.2 Approximate Dewatering Volumes

For the dewatering a rectangular configuration where the relationship of length/width is greater than 1.5, calculations for the dewatering rate / volume were completed using the steady state method from Powers, *et al*. (1992) for estimating radial flow to an excavation in an unconfined aquifer.

The following equation was used:

$$Q = \frac{\pi K(H^2 - h^2)}{ln(\frac{R_o}{R_s})} + 2(\frac{LK(H^2 - h^2)}{2L})$$

Based on Equation 6.12 in systems where l/w> 1.5 (Powers, P.E., 1992) Where:

Q (m^3/Day)

K - Hydraulic Conductivity (m/Day)

H – Distance from Static water level to bottom of Aquifer (m)

h – lowest water level needed from static (m)

R_o- Radius of conical depression (m) (Taken from Equation 6.14(Powers, P.E., 1992))

$$Ro = 3(H - h)\sqrt{k}$$

Where

K- Hydraulic Conductivity (m/Sec)

R_s – Equivalent Radius (m)

$$R_s = \frac{l + w}{\pi}$$

l- Length of excavation/trench

w- width of trench

in systems where l/w> 1.5

The full dewatering assessment can be found in Appendix G

Based on the information provided, the dewatering required for construction is 27,720 L/day. A 3x safety factor can then be applied to each of the above volumes for a conservative estimate (83,160 L/day). These values are based on worst case spring season ground high ground water table depths. The dewatering volume could be lower during the summer and fall months.

Any construction dewatering between 50,000 L/day and 400,000 L/day can be completed after registration under the Environmental Activity and Sector Registry (EASR). Any active construction dewatering above 400,000 L/day requires a Permit To Take Water (PTTW). As noted above, the magnitude of dewatering required will vary on the timing of construction and less dewatering could be needed in the summer drought conditions. Peak ground water elevation typically occurs between mid April and the end of May. Based on the calculations, it is likely that construction dewatering would be above the 50,000 L/day but below the threshold of 400,000 L for a PTTW, as such an EASR will be required. Potential dewatering requirements can be minimized if work is completed during the drier summer months.

Not included in the calculations above is the influx of stormwater from single 24 hour storm events. These numbers are estimated based on the Ministry of Transportation (Ministry) Intensity Duration Frequency (IDF) curves. Using the numbers provided by the Ministry, if the Site experiences a five (5) year storm event (56 mm across 24 hours) during the excavation an additional 289 m^3 (219,000 L) into the excavation, in this event, pumping could continue under the registered EASR. Any of the larger less frequent (10

yr, 25 yr, 100 yr) storm events would require a staged approach where the excavation could be pumped at the 400,000 L/day over two (2) days to facilitate the removal of the storm water without exceeding the threshold of requiring a PTTW registration.

6.3 Post Construction Dewatering

It is our understanding that although the finished floor elevation of the building foundation encroaches into the water table by approximately 1.6 m, the planned waterproofing of the foundation will limit potential concerns with respect to the ground water at the Site with regards to permanent dewatering of the Site.

However, if the foundation is not waterproofed and the same assumptions as above are used, substituting the final floor elevation would be utilized for the dewatering depth (107.45 mASL) establishing a dewatering requirement of approximately 18 m^3/day. A 3x safety factor can then be applied to the above volumes for a conservative estimate of 54 m^3/day (54,000 L/day). This volume will make the registration of PTTW required for the permanent dewatering of the foundation.

6.4 Impact Assessment

Based on the information calculated, the largest zone of influence is 60 m from the edge of the dewatering zone; however this is the maximum distance where any measurable water table decline would be observed. However, more significant decline in ground water levels (2 m) will be contained within approximately 57 m of the Site

As the area is municipally serviced, there are not anticipated to be any private wells located within the radius of influence. There is a creek located approximately 70 m south west of the Site; however this is located at the very extent of the zone of influence, and is not expected to be affected by the dewatering process. Further to this if the creek was used as the discharge point, any minimal drawdown would be negated by the discharge.

The site is located within the Intake Protection Zone 2 for the South Peel Drinking Water intake which identifies that the site is within approximately two (2) hours surface water travel time to the point of the intake. This will have to be taken into account when considering the design of the dewatering discharge treatment.

7.0 SUMMARY AND CONCLUSIONS

Azimuth was retained by the Azure Group to conduct a Preliminary Hydrogeological Assessment for the property located along Kirwin Avenue inclusive of 3016-3032 within the City of Mississauga. The purpose of this assessment is to characterize the existing preliminary hydrogeological conditions at the Site and the potential for the proposed

development to impact the existing environmental / hydrogeological conditions. The report also addresses many of the CVC and Source Water Protection policy requirements.

The Site is rectangular in shape, 6,385 m^2 (0.6 hectares (ha)) in size and is to be redeveloped as an 8 storey residential building with underground parking. The Site is located on the south side of Kirwin Avenue; a gravel driveway and small paved area in the south side of the property remain from historical residential dwellings at the Site. As per the proposed development plans, the development will be accessed from Kirwin Avenue and will include two (2) below grade parking levels extending approximately 7 m below grade.

The Site is found at an elevation ranging between approximately 110 masl to 113 masl at with a slight southern slope. The existing Site drains via overland flow towards the existing City of Mississauga infrastructure along Little John Lane. Site native soils are composed of mostly silts and clays.

The inferred ground water flow direction is shown to be in a southern direction, which matches the direction of a buried section of the Cooksville Creek. Water table conditions fluctuated across the area ranging between 2.9 and 5.2 mbgs, this fluctuation is assumed to be based on the elevation of the bedrock in the area, which consists of a shallow weathered shale.

Hydraulic conductivity testing was completed at a number of the Site monitoring wells indicating the hydraulic conductivity of the site is ranging between 5 x 10^{-9} to 2 x10^{-8} m/s.

The pre-development infiltration volume is 862 m^3/year. This assumes the Site is currently not landscaped and vacant. The post-development without mitigation infiltration volume is 412 m^3/year, which is a deficit of 450 m^3/year.

At the time of report issuance, no formal storm water plans were developed, such that it is uncertain as to whether any LID's will be included in the development plan to mitigate any of the ground water infiltration loss. However, given the limited size of the Site and presence of underground parking structure, there will not likely be sufficient area to implement such measures.

The overall deficit is considered large; however, the area is municipally serviced such that there is unlikely any private supply wells in the area, while surface water features are limited to a creek approximately 70 m southeast of the Site. The limited permeability of

the soils would also indicate that the Site likely has little ground water infiltration capacity such that influence on the adjacent creek will not likely be impacted.

The proposed development will include the construction underground car parking with associated underground servicing (water, sewer, storm water). It is assumed that new service connections to Kirwin Avenue will be established as part of the proposed development. Based on the current development plan, dewatering will be required across the entire site due to the underground parking area. The assessment is based on the measured water table depths during the May, 2022 monitoring event; however water table conditions could vary seasonally. However, it is noted that the dewatering volumes are quite low such that even an increase in water table will not have a significant impact on water taking volumes. Consideration needs to be given to the quality of the dewatering discharge, which may require treatment prior to discharge city's storm water network or the local surface water creek. It is assumed that this will require obtaining a discharge permit from the city prior to initiation of any dewatering activities at the Site. Additional water quality samples may be required to confirm dewatering discharge quality.

As per Ontario Regulation 903 requirements, all existing monitoring wells which are no longer utilized at the Site will need to be properly decommissioned as per O.Reg. 903 (Wells Regulation) prior to commencement of building construction.

As the building foundation encroaches well into the water table, the planned waterproofing of the foundation will limit potential concerns with respect to the ground water at the Site. Dewatering will be required to facilitate construction; however, the dewatering assessment would indicate that the radius of influence does not extend to the closest natural feature which is a creek located 60 m south east of the Site. Similarly, the area is municipally serviced for water such that there is no expectation that any private wells exist within the area of influence.

8.0 REFERENCES

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Ontario Geologic Survey . 2011. *1:250000 Scale Bedrock Geology of Ontario.* s.l. : Queens Printer, 2011.

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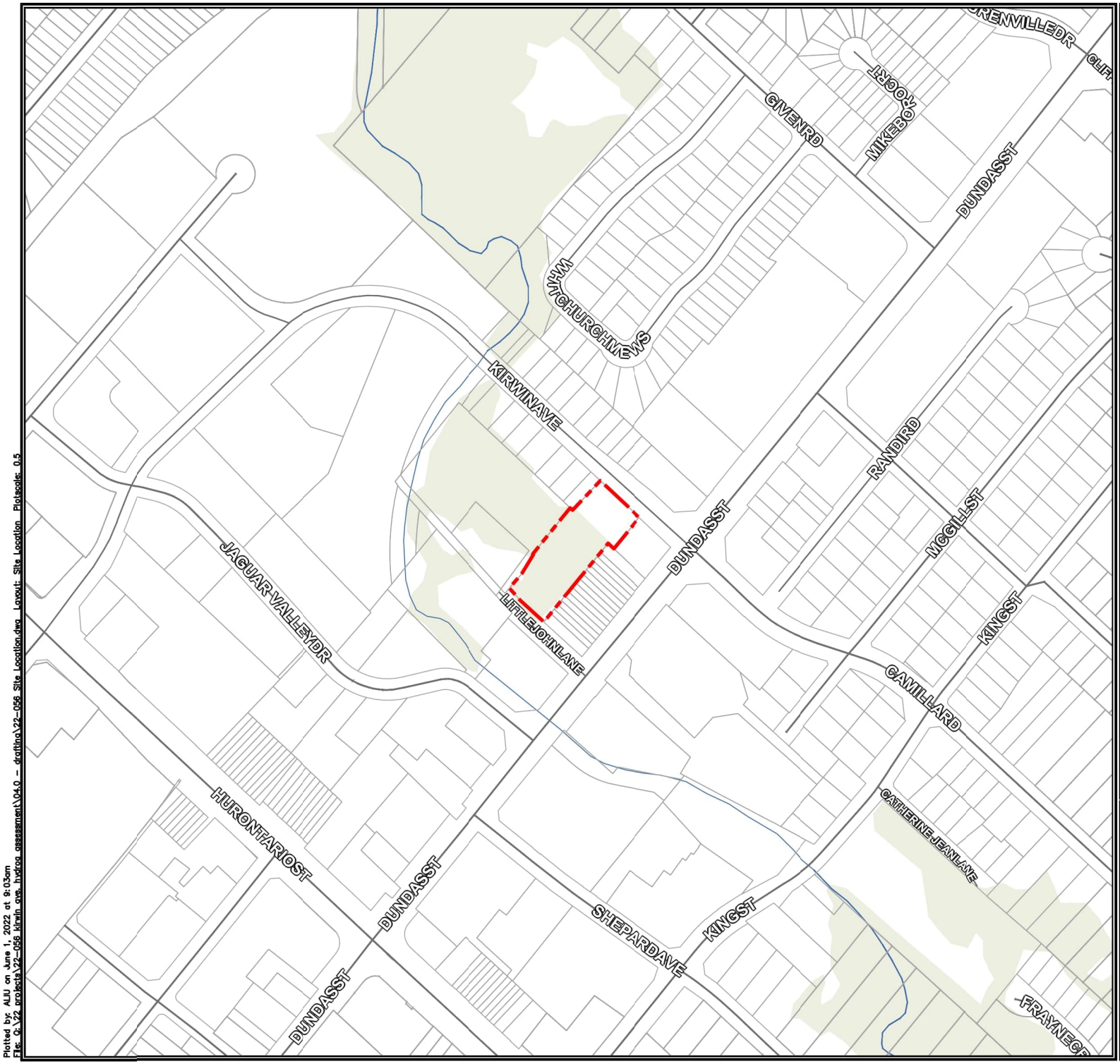
APPENDICES

Appendix A: **Figures**
Appendix B: **Proposed Development Plan**
Appendix C: **MECP Well Records & Site Borehole Logs**
Appendix D: **Water Balance Summary Tables**
Appendix E: **Hydraulic Conductivity Testing**
Appendix F: **Water Quality Data**
Appendix G: **Dewatering Calculations**

APPENDIX A

Figures



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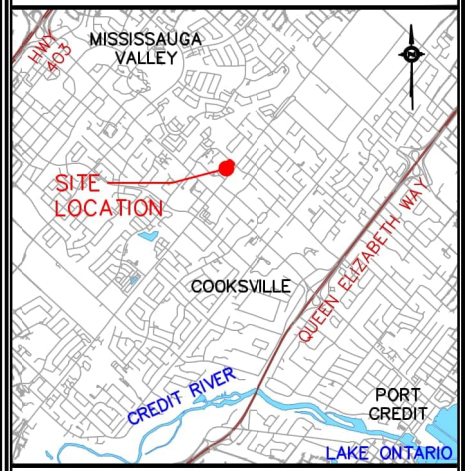


REGIONAL MAP

SCALE 1:100000

0 125.0 250.0

HORIZONTAL SCALE 1:5000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.

ENVIRONMENTAL ASSESSMENTS & APPROVALS

SITE LOCATION

3016-3032 KIRWIN AVE.
MISSISSAUGA, ON

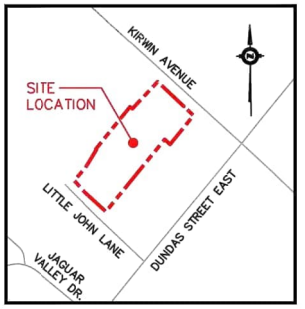
DATE ISSUED: *JUNE 2022*	Figure No.
CREATED BY: *A.L.*	
PROJECT NO.: *22-056*	1
REFERENCE: *CITY OF MISSISSAUGA*	

Plotted by: ALU on June 1, 2022 at 9:03am
File: Q:\22 projects\22-056 kirwin ave. hydrog assessment\04.0 - drafting\22-056 Site Location.dwg Layout: Site Location Plotscale: 0.5

LEGEND:

APPROX. PROPERTY BOUNDARY

100.00 0.5m CONTOURS (masl; GTA DEM 2002)



LOCATION PLAN

0 12.50 25.0

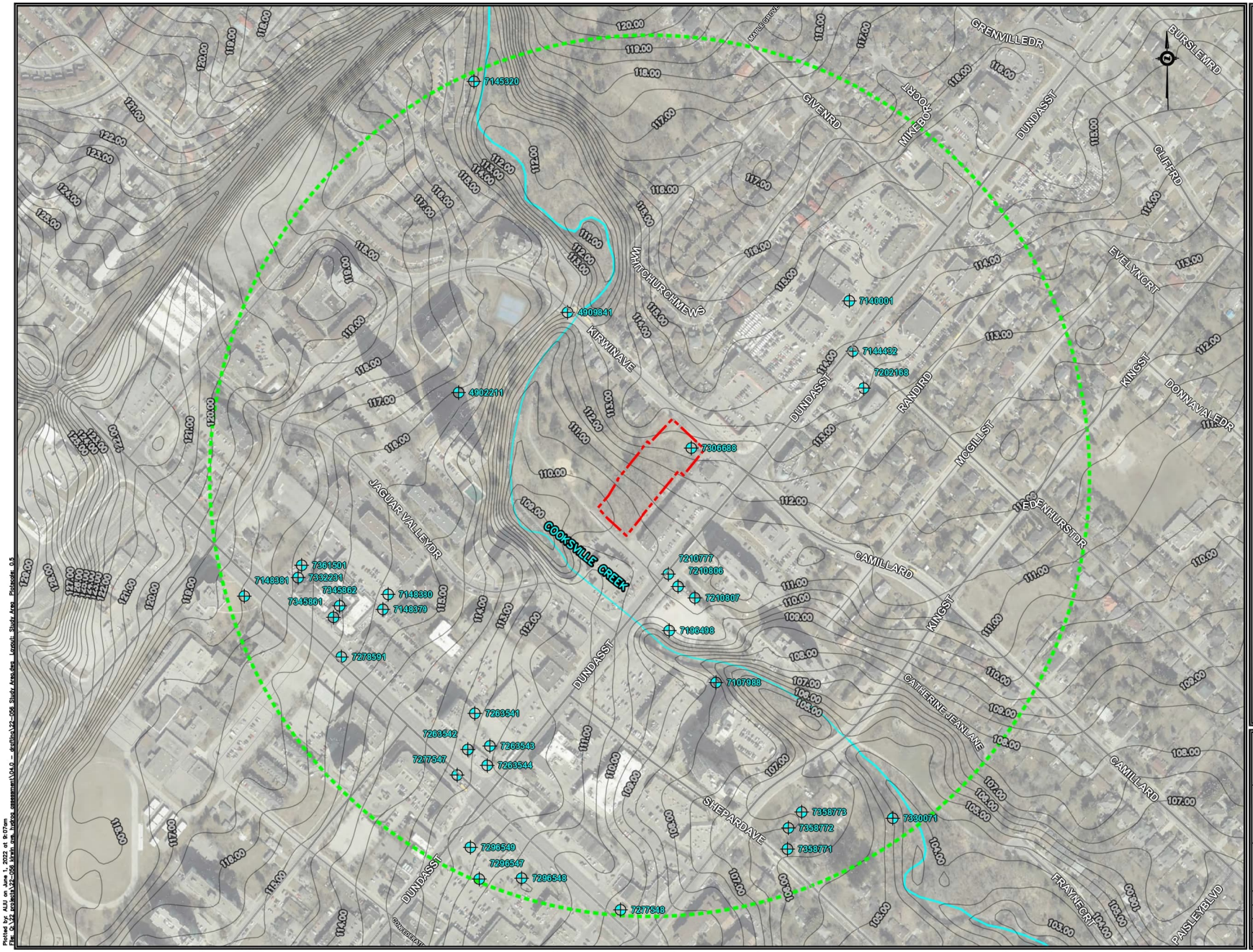
HORIZONTAL SCALE 1:500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
ENVIRONMENTAL ASSESSMENTS & APPROVALS

SITE LAYOUT

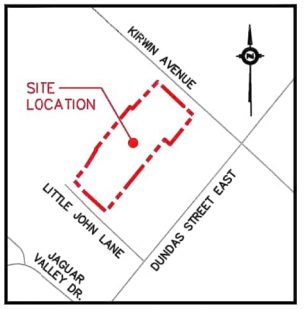
3016-3032 KIRWIN AVE.
MISSISSAUGA, ON

DATE ISSUED:	JUNE 2022	Figure No.
CREATED BY:	A.L.	2
PROJECT NO.:	22-056	
REFERENCE:	CITY OF MISSISSAUGA	



LEGEND:

- APPROX. PROPERTY BOUNDARY
- 500m RADIUS STUDY AREA
- WATERCOURSE (NDMNRF, 2021)
- 100.00 — 0.5m CONTOUR (masl; GTA DEM 2002)
- # — WATER WELL LOCATIONS / I.D. (MECP, 2022)



LOCATION PLAN

0 100.00 200.0

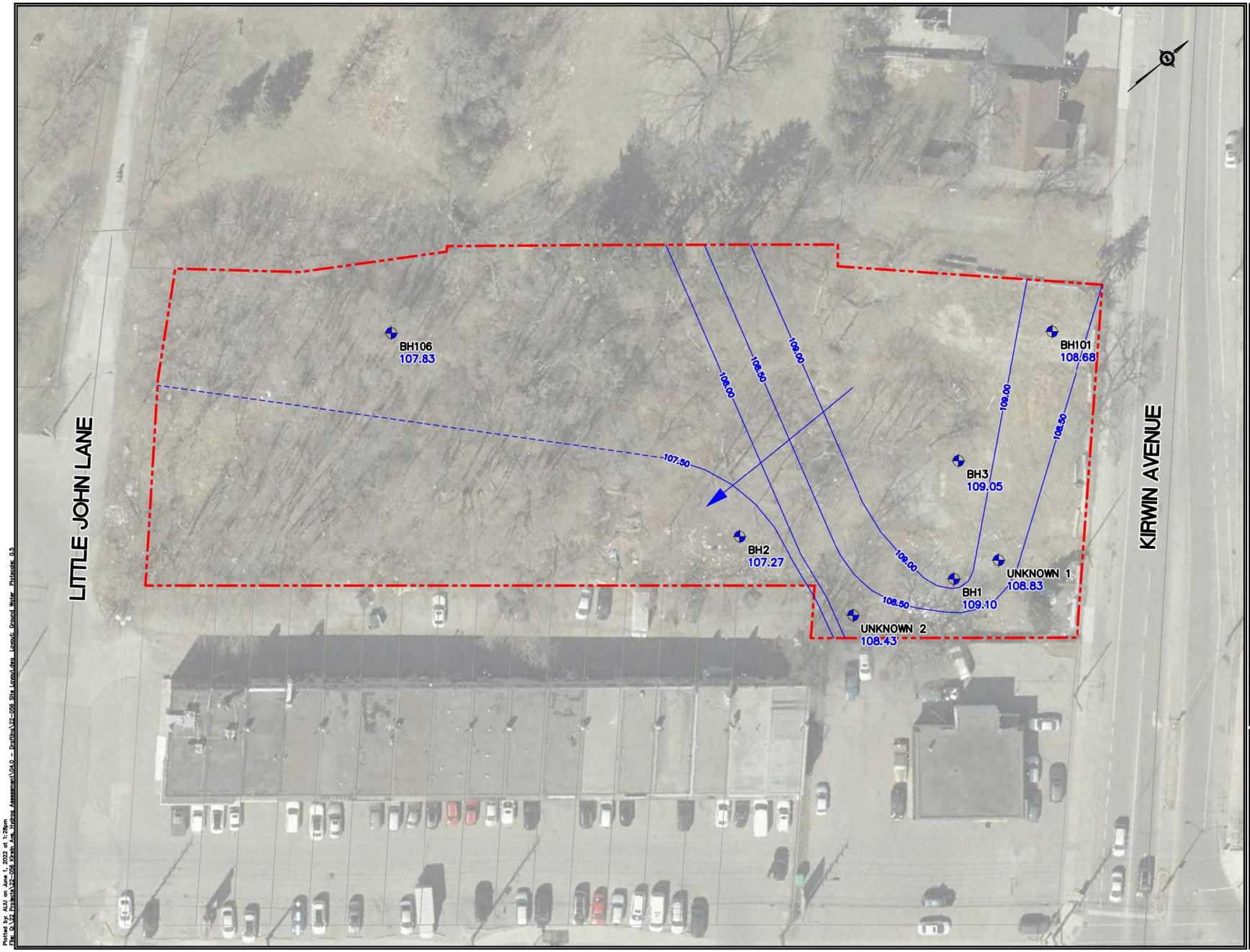
HORIZONTAL SCALE 1: 4000

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
ENVIRONMENTAL ASSESSMENTS & APPROVALS

NATURAL FEATURES AND SURROUNDING WELLS

3016-3032 KIRWIN AVE. MISSISSAUGA, ON

DATE ISSUED:	JUNE 2022	Figure No.
CREATED BY:	A.L.	3
PROJECT NO.:	22-056	
REFERENCE:	CITY OF MISSISSAUGA	



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- APPROX. PROPERTY BOUNDARY
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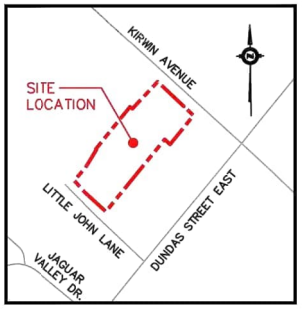
- INFERRED DIRECTION OF GROUND WATER FLOW



LOCATION PLAN

0 12.50 25.0

HORIZONTAL SCALE 1:500

AZIMUTH ENVIRONMENTAL CONSULTING, INC.
ENVIRONMENTAL ASSESSMENTS & APPROVALS

GROUND WATER CONTOURS

3016-3032 KIRWIN AVE.
MISSISSAUGA, ON

DATE ISSUED:	JUNE 2022	Figure No.
CREATED BY:	A.L.	4
PROJECT NO.:	22-056	
REFERENCE:	CITY OF MISSISSAUGA	

Plotted by: ALU on June 1, 2022 at 1:28pm
File: Q:\Projects\22-056 Kirwin Ave. Hydros Assessment\Q&G - Profiles\22-056 Site Layout&Area Layouts Ground Water Plotsplot 8.5

APPENDIX B

Proposed Development Plan

PROPOSED 8 STOREY RENTAL BUILDING

3016 -3022 KIRWIN AVE, MISSISSAUGA, ON, CANADA

DRAWING LIST:

Sheet Number	Sheet Name
A000	COVER PAGE
A001	SITE PLAN & STATS
A101	PARKING GARAGE LEVEL 2
A102	PARKING GARAGE LEVEL 1
A103	GROUND FLOOR
A104	2ND FLOOR PLAN
A105	3RD FLOOR PLAN
A106	4TH FLOOR PLAN
A107	5TH FLOOR PLAN
A108	6TH FLOOR PLAN
A109	7TH FLOOR PLAN
A110	8TH FLOOR PLAN
A111	MECHANICAL FLOOR PLAN
A112	ROOF PLAN
A201	EAST ELEVATION
A202	WEST ELEVATION
A203	NORTH ELEVATION
A204	SOUTH ELEVATION
A205	SECTION 1 E/W
A206	SECTION 2 N/S

CONSULTANTS:

ARCHITECT:

KFA ARCHITECTS + PLANNERS INC.

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TORONTO, ON
M5T 2C8

TEL: 416 633 6226

PLANNING:

WESTON CONSULTING

268 BERKELEY ST
TORONTO, ON
M5A 2X5

TEL: 905-738-8080

ACOUSTIC:

VALCOUSTICS

30 WERTHEIM CT
RICHMOND HILL, ON
L4B 1B9

TEL: 416-633-6226 EXT. 222

LANDSCAPE:

MSLA

170 THE DONWAY WEST, SUITE 206
NORTH YORK, ON
M3C 2G3

TEL: 416-492-9966 EXT. 26

ARBORIST / ENVI.

BEACON ENVIRONMENTAL

80 MAIN ST N
MARKHAM, ON
L3P 1X5

TEL: 519-835-6455

WIND:

THEAKSON ENVIRONMENTAL

GLENGARRY CRESCENT
FERGUS, ON
N1M 3E2

TEL: 519-787-2910

TRANSPORTATION:

LEA CONSULTING

425 UNIVERSITY AVENUE, SUITE 400
TORONTO, ON
M5G 1T6

TEL: 905-470-0015 ext. 245

CIVIL ENGINEER:

LEA CONSULTING

425 UNIVERSITY AVENUE, SUITE 400
TORONTO, ON
M5G 1T6

TEL: 905-470-0015 ext.328

3016
KIRWIN AVE

3016-3022 Kirwin Avenue
Mississauga - ON - Canada

No.	Description	Date
1	Issued for Review	2020/07/27
2	Issued for Review	2020/09/29
3	Issued for Review	2020/12/17
4	Issued for Review	2021/02/04
5	ISSUED FOR OPA/ZBA	2021/03/10

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

DVB Real Estate
Investaments Inc.

KFA architects + planners inc.

PROJECT NO: 20009

SCALE:

DATE: Feb. 04, 2020

DRAWN BY: FC, LF

DRAWING TITLE

COVER PAGE

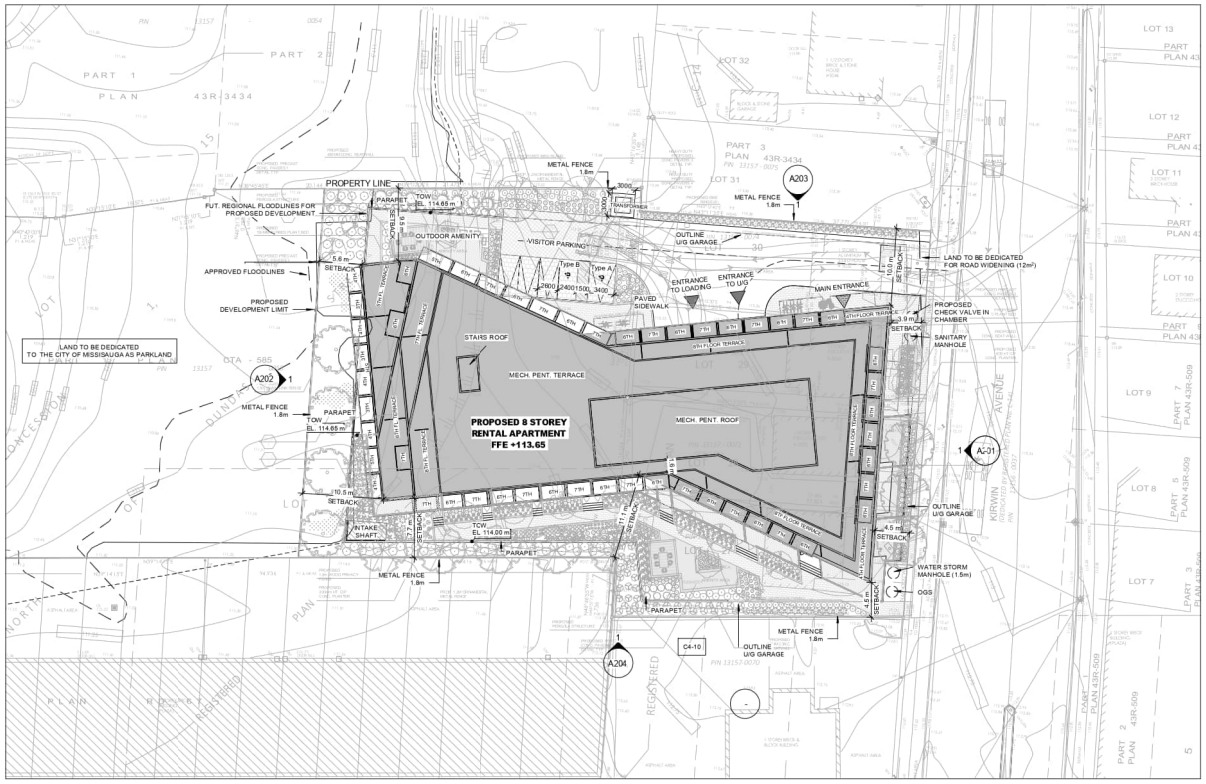
DRAWING NO

A000


TOPOGRAPHIC SURVEY OF
ALL OF LOTS 27 TO 30
REGISTERED PLAN No. C-14
AND
PART OF LOT 5
REGISTERED PLAN TOR-12
AND
PART OF LOT 15
CONCESSION 1,
NORTH OF DUNDAS STREET
(GEOGRAPHIC TOWNSHIP OF TORONTO, COUNTY OF PEEL)
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL
SCALE 1 : 200
VAN HARTEN SURVEYING INC.
SURVEYOR'S CERTIFICATE
BENCHMARK
PROPERTY DESCRIPTION
LINETYPES
SYMBOLS
BEARING AND COORDINATE NOTE
BEARING COMPARISONS
LEGEND
CALL BEFORE YOU DIG
METRIC
REVISION SCHEDULE
Van Harten SURVEYING INC.
LAND SURVEYORS and ENGINEERS
www.vanharten.com
info@vanharten.com
ASSOCIATION OF ONTARIO LAND SURVEYORS
DUNDAS STREET EAST
KIRWIN AVENUE
JAGUAR VALLEY DRIVE
LITTLE JOHN LANE
KNOWN AS
LOT 27
LOT 28
LOT 29
LOT 30
LOT 31
LOT 32
LOT 33
LOT 34
LOT 1
LOT 2
LOT 3
LOT 4
LOT 7
LOT 8
LOT 9
LOT 10
LOT 11
LOT 12
LOT 13
REGISTERED PLAN
REGISTERED PLAN RD - 67
REGISTERED PLAN TOR-12
PART 1 PLAN 43R-3434
PART 2 43R-3434
PART 3 PLAN 43R-3434
PART 1 PLAN 43R-509
PART 2 PLAN 43R-509
PART 3 PLAN 43R-509
PART 5 PLAN 43R-509
PART 7 PLAN 43R-509
PART 9 PLAN 43R-509
PART 11 PLAN 43R-509
PART 13 PLAN 43R-509
PART 15 PLAN 43R-509
PART 1 PLAN 43R-15
LOT 15 CONCESSION 1 NORTH OF DUNDAS STREET
PART 1 PLAN CTA-585
BLOCK F
BLOCK B REGISTERED PLAN 637
BLOCK E
ASPHALT AREA

1. SATELLITE AERIAL VIEW

2. TOPOGRAPHIC AERIAL VIEW



3. SITE PLAN / 1:300

3016-3022 Kirwin Ave

Review: February 04th, 2021

Legal Description

ALL OF LOTS 27 TO 30 REGISTERED PLAN No. C-11 AND PART OF LOT 5 REGISTERED PLAN TOR-12 AND PART OF LOT 15 CONCESSION I, NORTH OF DUNDAS STREET CITY OF MISSISSAUGA REGIONAL MUNICIPALITY OF PEEL

Site

Gross Site Area		**6,286.0** m²	68,730 sf
Parkland Dedication		2,460.0 m²	26,372 sf
Road Widening Area		12.0 m²	129 sf
Net Site Area		**3,923.0** m²	42,228 sf
Lot Frontage		59.3 m	
Lot Depth		131.4 m	

Building proposal

Building Footprint		1,703.0 m²	
Building Height		25.5 m	*Mech. Pent. Excluded*
Gross Floor Area	*(Based on GFA - Apartment Zone)*	11,120.0 m²	
Lot Coverage (%)	*(Based on Gross Site Area)*	27%	
Lot Coverage (%)	*(Based on Net Site Area)*	43%	
FSI	*(GFA / Gross Site Area)*	**1.74**	
FSI	*(GFA / Net Site Area)*	**2.83**	

Proposed Areas	Floor	**GCA** (m²)**	**GFA* (m²)**	*Total (ft²)*
	Ground Floor	1,583.0	930.0	*10,011*
	TH 2nd Floor	600.0	600.0	*6,459*
	2nd Floor	1,586.0	1,525.0	*16,415*
	3rd Floor	1,703.0	1,628.0	*17,524*
	4th Floor	1,508.0	1,448.0	*15,587*
	5th Floor	1,427.0	1,367.0	*14,715*
	6th Floor	1,370.0	1,297.0	*13,961*
	7th Floor	1,311.0	1,265.0	*13,617*
	8th Floor	1,106.0	1,060.0	*11,410*
	Total GFA	12,193.0	11,120.0	*119,699*
Total Proposed GFA			**11,120.0 m²**	*119,699 ft²*

***Gross Floor Area (GFA)** - Apartment Zone means the sum of the areas of each storey of a building above or below established grade, measured from the exterior of outside walls of the building including floor area occupied by interior walls but excluding any part of the building used for mechanical floor area, stairwells, elevators, motor vehicle parking, bicycle parking, storage lockers, below-grade storage, any enclosed area used for the collection or storage of disposable or recyclable waste generated within the building, common facilities for the use of the residents of the building, a day care and amenity area.*

****Gross Construction Area (GCA)** - The total enclosed area of a floor or building measured to the outside surface of the permanent exterior walls of the building or structure or to a predetermined surface, or plane as in the case of overhangs and projections to the outside surface of the building.*

Unit Count	Units	1 Bed	2 Bed	3 Bed
Ground Floor	10			
2nd Floor	20			
3rd Floor	23			
4th Floor	22			
5th Floor	20			
6th Floor	19			
7th Floor	18			
8th Floor	16			
Total Units	**148**	113	32	3
		76.4%	21.6%	2.0%

Vehicular Parking

Parking Required	UNITS		PARKING	RATIO
Rental 1 Bed @1.18 per unit	113		133	*1.18*
Rental 2 Bed @1.36 per unit	32		44	*1.36*
Rental 3 Bed @1.5 per unit	3		5	*1.50*
		Tot:	**181**	
Rental Visitors @ 0.15 per unit	148		22	*0.15*
Total Vehicular Parking Required		**Tot:**	**204**	

Parking Provided (estimated)

	At Grade	P1 Level	P2 Level	Sub Total	*Ratio*
Residential	0	64	93	157	*1.06*
Residential Visitor	5	16	0	21	*0.14*
	5	80	93	178	
Total Vehicular Parking Provided			**Tot:**	**178**	**1.20**

Bicycle Parking

Required	Ratio		
Short Term Residential	*0.08 x unit*		12
Long Term Residential	*0.7 x unit*		104
		Tot:	**116**

Provided (estimated)	At Grade	P1 Level	
Short Term Residential	14	0	
Long Term Residential	0	101	
		Tot:	**116**

Landscaped Area

Soft Landscaping	912.0 m²	23%
Hard Landscaping	760.0 m²	19%
Green Roof	466.0 m²	12%
Total Landscape	**2138.0 m²**	54%

Amenity Area

Amenity Area Required		
5.6 m² per unit	828.8 m²	
Total Amenities Required	**828.8 m²**	

Amenity Area Provided (estimated)			
1) **Indoor**			
	Ground Floor	330.0 m²	
2) **Outdoor**			
	Ground Floor	100.0 m²	
	Roof	450.0 m²	
Total Amenities		**880.0 m²**	*5.9 sqm x unit*

3016 KIRWIN AVE

3016-3022 Kirwin Avenue
Mississauga - ON - Canada

No.	Description	Date
1	Issued for Review	2020/07/27
2	Issued for Review	2020/09/29
3	Issued for Review	2020/12/17
4	Issued for Review	2021/02/04
5	ISSUED FOR OPA/ZBA	2021/03/10

11x17 FORMAT
HALF SCALE

North Arrow

N

Stamp

KFA architects + planners inc.
197 SPADINA AVE - SUITE 300
TORONTO - ON - M5T 2C8
416.633.6226
www.kfarchitecture.com

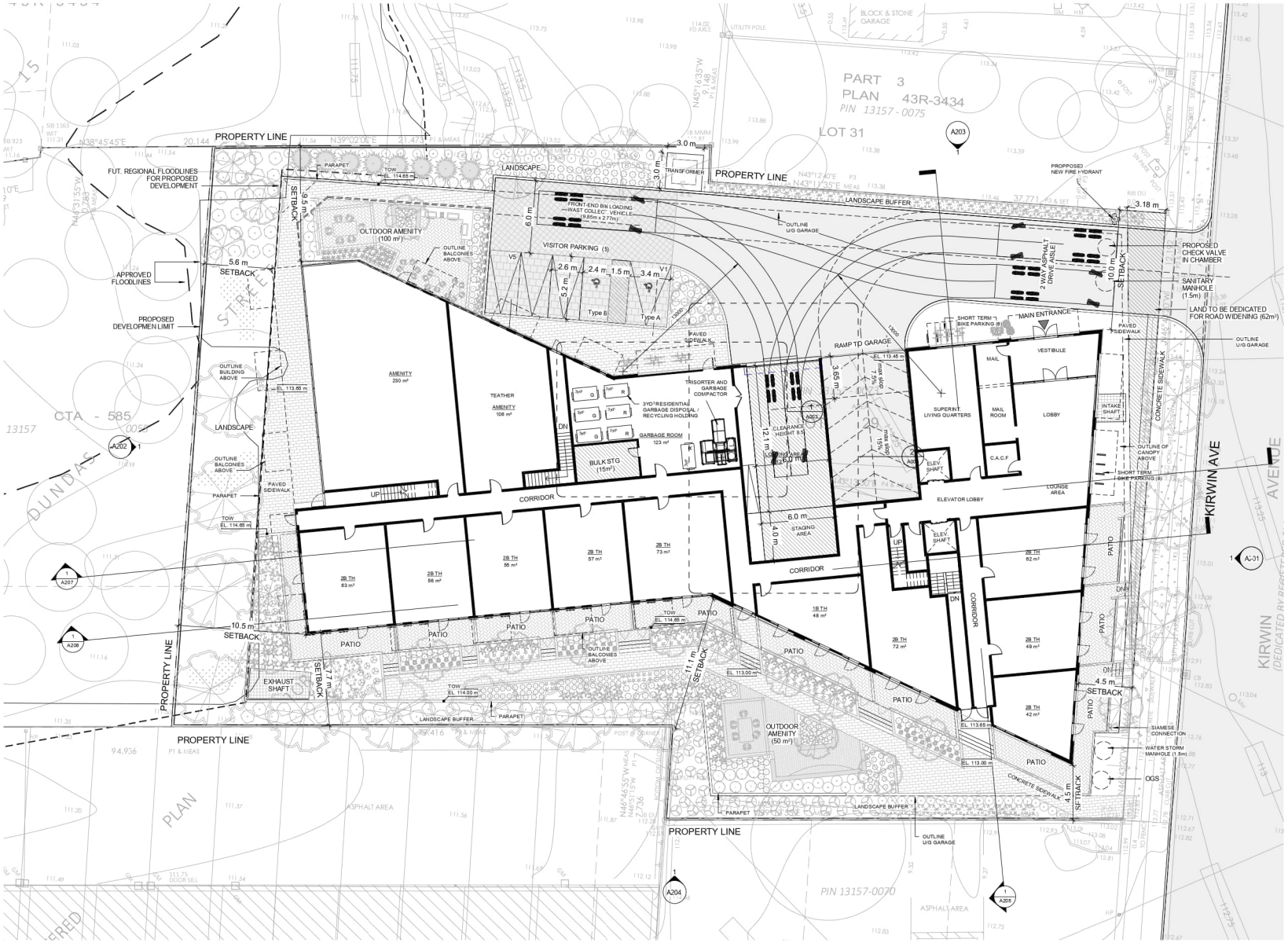
Project No:	20009
Scale:	1 : 300
Date:	Feb. 04, 2020
Drawn by:	FC

Drawing Title

SITE PLAN & STATS

Drawing Number

A001



3016 KIRWIN AVE

3016-3022 Kirwin Avenue
Mississauga - ON - Canada

No.	Description	Date
1	ISSUED FOR OPA/ZBA	2021/03/10
2	ISSUED FOR OPA/ZBA	2022/01/21
8	Issued for Coordination	2022/07/27
9	Issued for Coordination	2022/08/22

North Arrow

Stamp

KFA architects + planners inc.
197 SPADINA AVE - SUITE 500
TORONTO - ON - M5T 2C8
416.633.6226
www.kfarchitecture.com

Project No:	20009
Scale:	1 : 150
Date:	Feb. 04, 2020
Drawn by:	FC

Drawing Title

GROUND FLOOR

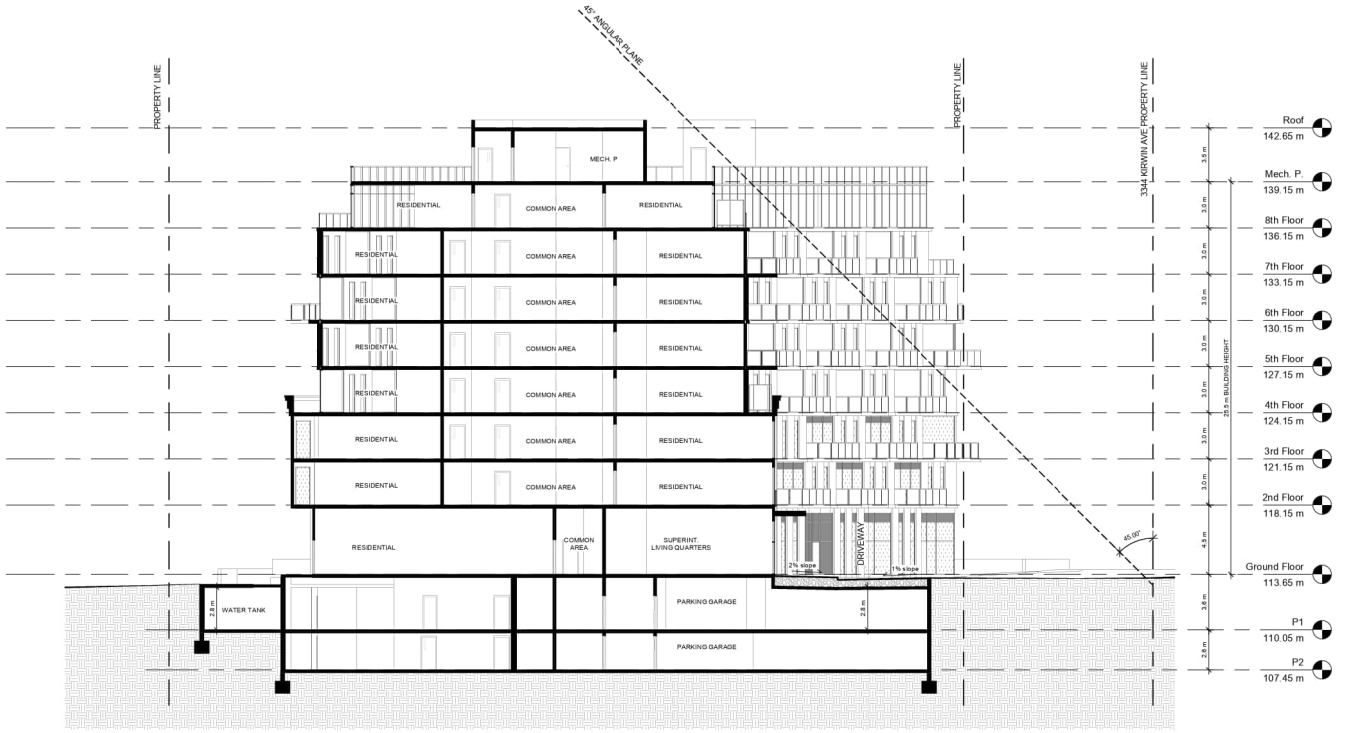
Drawing Number

A103

3016
KIRWIN AVE

3016-3022 Kirwin Avenue
Mississauga - ON - Canada

No.	Description	Date
1	ISSUED FOR OPA/ZBA	2021/03/10
2	ISSUED FOR OPA/ZBA	2022/01/21
8	Issued for Coordination	2022/07/27
9	Issued for Coordination	2022/08/22



KFA architects + planners inc.
197 SPADINA AVE - SUITE 500
TORONTO - ON - M5T 2C8
416.633.6226
www.kfarchitecture.com

Project No:	20009
Scale:	1 : 150
Date:	Feb. 04, 2020
Drawn by:	FC

Drawing Title

SECTION 1 E/W

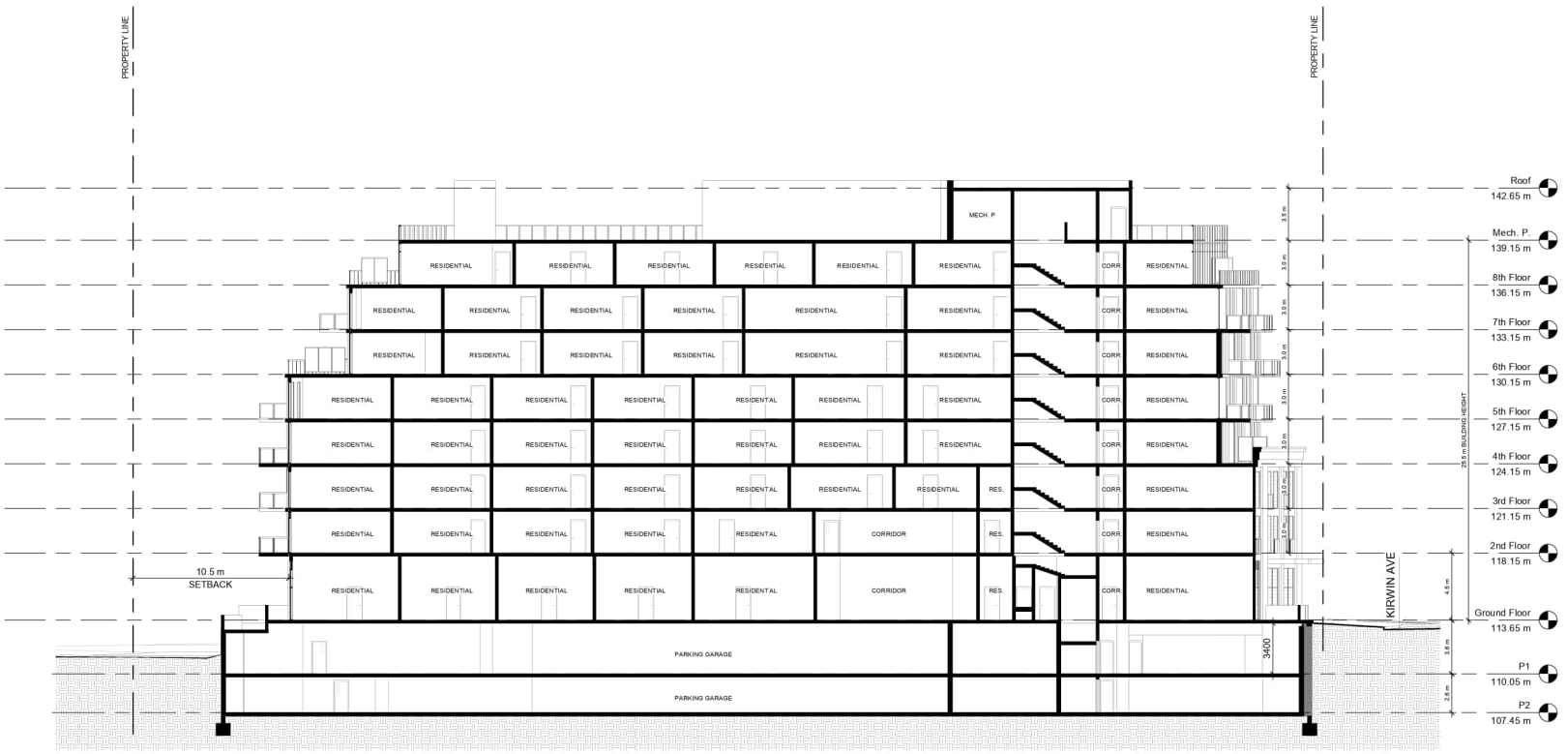
Drawing Number

A205

3016
KIRWIN AVE

3016-3022 Kirwin Avenue
Mississauga - ON - Canada

No.	Description	Date
1	ISSUED FOR OPA/ZBA	2021.03.10
2	ISSUED FOR OPA/ZBA	2022.01.21
8	Issued for Coordination	2022.07.27
9	Issued for Coordination	2022.08.22



KFA
architects + planners inc.
197 SPADINA AVE - SUITE 500
TORONTO - ON - M5T 2C8
416.633.6226
www.kfarchitecture.com

Project No:	20009
Scale:	1 : 150
Date:	Feb. 04, 2020
Drawn by:	FC

Drawing Title

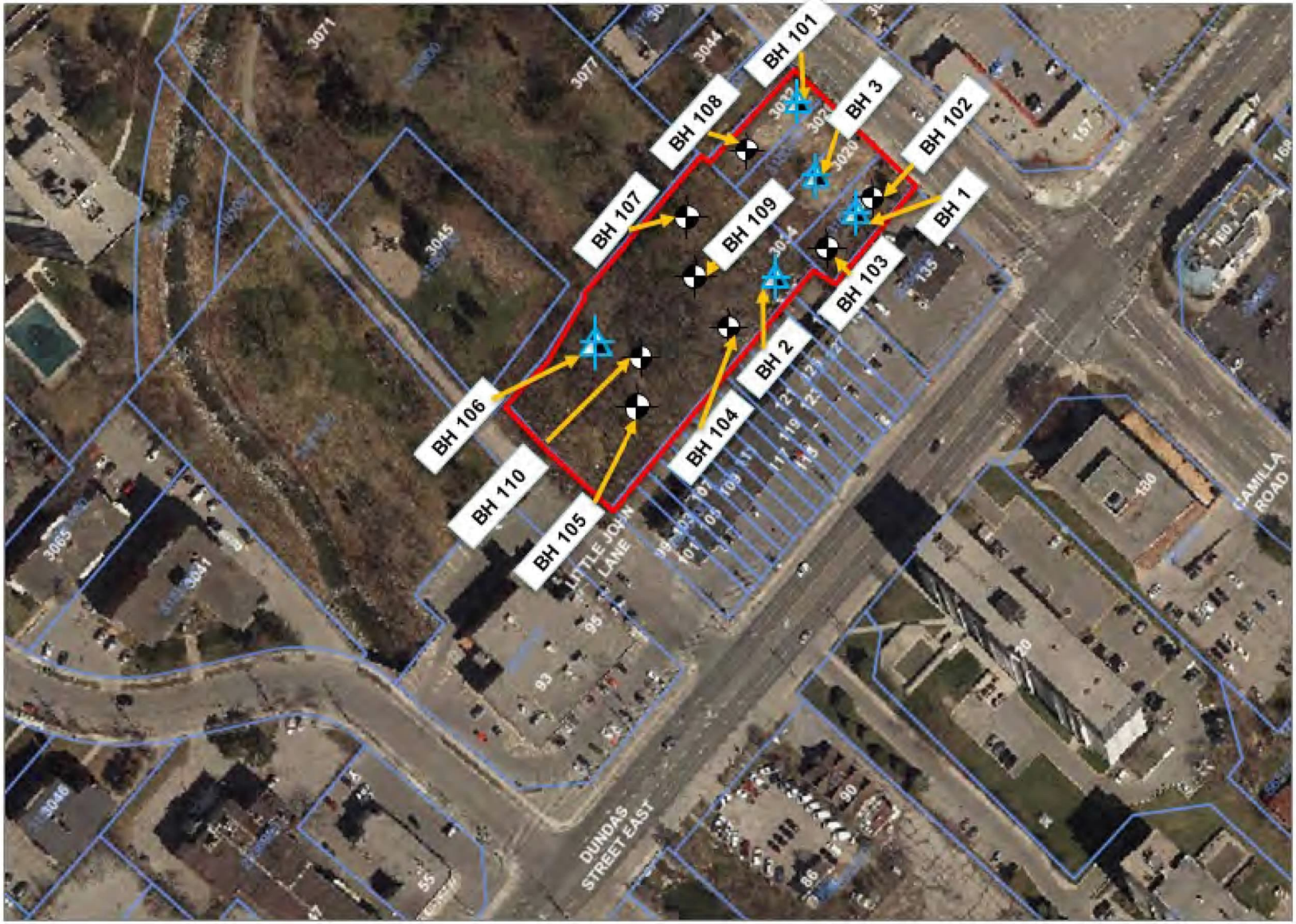
SECTION 2 N/S

Drawing Number

A206

APPENDIX C

MECP Well Records & Site Borehole Logs



Approximate location Subject Property

Approximate location of Boreholes

Approximate Location of Monitoring Well

0 20 40m

Source: City of Mississauga Interactive Maps
© 2022 City of Mississauga

Title	Project	Project No.	Scale	Date	Figure No.
Borehole Location Plan	3016, 3020, 3026 & 3032 Kirwin Avenue and 3031 Littlejohn Lane City of Mississauga, Ontario	2202-001	As drawn	April, 2022	4

BH1

PROJECT NUMBER: 2012-001
PROJECT NAME: Phase Two ESA
CLIENT: DBV Real Estate Investments Inc.
ADDRESS: 3031 Littlejohn Ln and 3016, 3020, 3026, 3032 & 3034 Kirwin Av, Mississauga

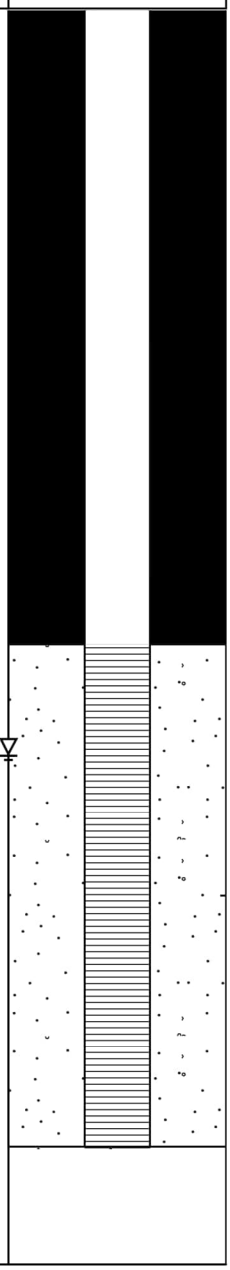
UTM COORD. (m) 17 T611938 m E 4826562 m N
HOLE SIZE/SAMPLING METHOD: 50 mm /SS
RIG MODEL: Diedrich D-120
DRILLING METHOD: Spilt Spoon, Hollow Stem A
SAMPLING LENGTH: 0.762 m

TOTAL WELL DEPTH: 6.8 mbgs
SURFACE ELEVATION: 113.13 masl
WELL SCREEN: 3.05 m; #10 Slot Screen
WATER LEVEL: 4.46 mbgs

COMMENTS : masl: meter above sea level - SS: Split-Spoon

LOGGED BY ST
CHECKED BY AT

Elevation (masl)	Depth (m)	Soil Sample ID	Sample Type	% Recovery (0–100)	Soil Lab Analyses	Material Description	HSVC as Isobutylene (ppm)	HSVC as Hexane (ppm)
113	0					100 mm Topsoil		
	0.5	1	SS			SILTY CLAY FILL, brown, some gravel, moist-wet, no odours & stains	0	0.0
112.5								
	1	2	SS		PAHs, M&I		0	0.0
112								
	1.5	3	SS			SILTY SAND FILL, brown, some gravel & cobbles, dry, no odours & stains	0	0.0
111.5	2							
111		4	SS				0	0.0
	2.5							
110.5	3	5	SS				0	0.0
110								
	3.5						0	0.0
109.5	4	6	SS		PHC, VOC, DUP-S1	SILTY CLAY, brown-grey, moist, some gravel & rocks, firm - stiff	0	0.0
109								
	4.5							
108.5	5	7A	SS				0	0.0
108		7B				- grey, stiff to hard, weathered shale fragments		
	5.5	8	SS				0	0.0
107.5	6							
107		9	SS				0	0.0
	6.5							
106.5	7							
106								



BH2

PROJECT NUMBER: 2012-001
PROJECT NAME: Phase Two ESA
CLIENT: DBV Real Estate Investments Inc.
ADDRESS: 3031 Littlejohn Ln and 3016, 3020, 3026, 3032 & 3034 Kirwin Av, Mississauga

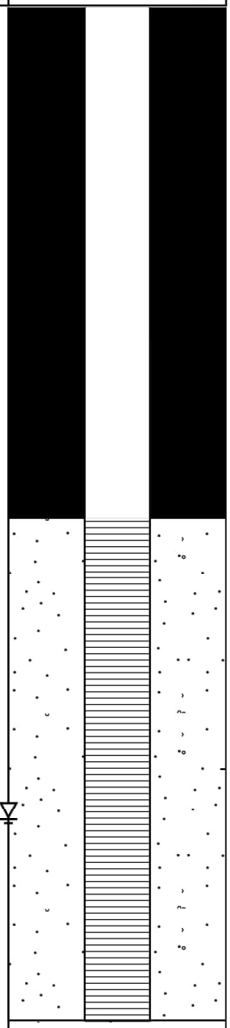
UTM COORD. (m) 17 T611938 m E 4826562 m N
HOLE SIZE/SAMPLING METHOD: 50 mm /SS
RIG MODEL: Diedrich D-120
DRILLING METHOD: Spilt Spoon, Hollow Stem A
SAMPLING LENGTH: 0.762 m

TOTAL WELL DEPTH: 6.06 mbgs
SURFACE ELEVATION: 112.56 masl
WELL SCREEN: 3.05 m; #10 Slot Screen
WATER LEVEL: 4.86 mbgs

COMMENTS : masl: meter above sea level - SS: Split-Spoon

LOGGED BY ST
CHECKED BY AT

Elevation (masl)	Depth (m)	Soil Sample ID	Sample Type	% Recovery	Soil Lab Analyses	Graphic Log	Material Description	HSVC as Isobutylene (ppm)	HSVC as Hexane (ppm)
112.5	0	1	SS				Topsoil and Asphalt		
112	0.5						SILTY SAND FILL, brown, some gravel & cobbles, dry, no odours & stains	0	0.0
111.5	1	2	SS		M&I			0	0.0
111	1.5	3	SS					0	0.0
110.5	2	4	SS					0	0.0
110	2.5	5A	SS					0	0.0
109.5	3	5B						0	0.0
109	3.5	6	SS		PHC, VOC		SILTY CLAY, grey, some organic, moist, soft-firm	0	0.0
108.5	4	7	SS				- stiff to hard	0	0.0
108	4.5	8	SS				- weathered shale fragments	0	0.0
107.5	5								
107	5.5								
106.5	6								
106	6.5								
105.5	7								



BH3

PROJECT NUMBER: 2012-001
PROJECT NAME: Phase Two ESA
CLIENT: DBV Real Estate Investments Inc.
ADDRESS: 3031 Littlejohn Ln and 3016, 3020, 3026, 3032 & 3034 Kirwin Av, Mississauga

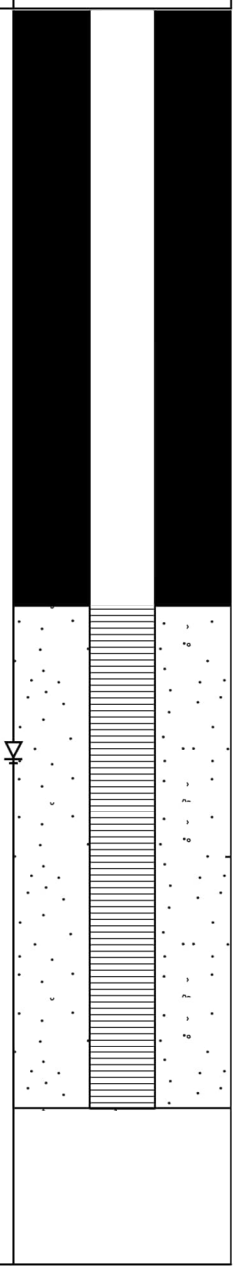
UTM COORD. (m) 17 T611938 m E 4826562 m N
HOLE SIZE/SAMPLING METHOD: 50 mm /SS
RIG MODEL: Diedrich D-120
DRILLING METHOD: Spilt Spoon, Hollow Stem A
SAMPLING LENGTH: 0.762 m

TOTAL WELL DEPTH: 6.57 mbgs
SURFACE ELEVATION: 113.31 masl
WELL SCREEN: 3.05 m; #10 Slot Screen
WATER LEVEL: 4.48 mbgs

COMMENTS : masl: meter above sea level - SS: Split-Spoon

LOGGED BY ST
CHECKED BY AT

Elevation (masl)	Depth (m)	Soil Sample ID	Sample Type	% Recovery	Soil Lab Analyses	Graphic Log	Material Description	HSVC as Isobutylene (ppm)	HSVC as Hexane (ppm)
113	0	1	SS				100 mm Topsoil		
	0.5						SILTY SAND FILL, brown, some gravel & cobbles, dry, no odours & stains	0	0.0
112.5									
	1	2	SS		M&I			0	0.0
112									
	1.5	3	SS					0	0.0
111.5	2								
		4	SS					0	0.0
111	2.5								
		5	SS					0	0.0
110.5	3								
		6	SS				SILTY CLAY, brown-grey, moist, some gravel & rocks, firm - stiff	0	0.0
110	3.5								
109.5	4								
		7A	SS				- grey	0	0.0
109	4.5								
		7B					- weathered shale fragments		
108.5	5							0	0.0
		8	SS						
108	5.5							0	0.0
107.5	6								
		9	SS					0	0.0
107	6.5								
106.5	7								
106									



AZURE GROUP DRAWING NO. 2

JOB NUMBER 2202-001BH101

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa)	G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content

Temperature: 5°C

Started/Date April 1,2022Time: 8.55 am **Sheet 1of 1**
Finished/Date April 1,2022Time: 5:30 pm
Azure Rep: AmitPalAuger Type: 150 mm Open
G. S. El: 113.399 m G.W. Depth: 5.4 m G.W. Elevation: 107.13 mApril13, 2022Time: 1 pm

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	113.4	250 mm Topsoil	SS	1	6			
		Soft to firmdark brown silty clay/clayey silt trace sand, gravel, and organics						
.75	112.7		SS	2	5			
1.5	111.9		SS	3	5			
2.25	111.2	Compact SILTY SAND/SANDY SILT trace gravel, moist below 2.2 m	SS	4	37			
3.0	110.4		SS	5	36			
		Loose below 3.0 m, wet						
4.6	108.8	Stiff to very grayish brown stiff SILTY CLAY/CLAYEY SILT trace sand and gravel, wet below 4.0 m	SS	6	19			
							5.4 m	
6.1	107.9		SS	7	55			
		Hard grey CLAYEY SILT trace to some shale fragmentsbelow 6.0 m						
7.6	105.8		SS	8	>80			
8.2	105.2	Refusal at 8.2 m			>80			

EOB

AZURE GROUP DRAWING NO. 3

JOB NUMBER 2202-001BH102

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa) | *G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content*

Temperature: 5°C

Started/Date April 8, 2022Time: 8.55 am Sheet 1of 1
Finished/Date April 8,2022Time: 5:30 pm
Azure Rep: AmitPalAuger Type: 150 mm Open
G. S. El: 113.094 m G.W. Depth: G.W. Elevation: Time:

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u(kPa)	G.W.T	Remark
0	113.1	250 mm Topsoil Soft to firmdark brown silty clay/clayey silt trace sand, gravel, and organics, moist	SS	1	8			
.75	112.4	Trace gravel, possible cobbles, moist below 0.7 m	SS	2	8			
1.5	111.6	Compact SILTY SAND/SANDY SILT trace gravel, moist below 1.8 m	SS	3	15			
2.25	110.9	Very dense SAND & GRAVEL below 2.2 m, moist (possible boulder)	SS	4	>80			
3.0	110.1	Very dense SAND & GRAVEL, moistbelow 3.0 m, possible cobbles	SS	5	66			
4.6	108.5	Compact SAND & GRAVEL trace clay, wet below 4.0 m	SS	6	22			
6.1	105.5	Hardgrey SILTY CLAY/CLAYEY SILT trace shale fragments, wet below 6.0 m	SS	7	52			
7.6	105.5	Hard grey SILTY CLAY/CLAYEY SILT with SHALE fragments below 7.0 m Hard weathered shale Below 9.0 M	SS	8	>80			
9.8	103.3	Refusal at 9.8 m	SS	9.8	>80			

EOB

AZURE GROUP DRAWING NO. 4

JOB NUMBER 2202-001BH103

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa) | *G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content*

Temperature: 5°C

Started/Date April 8, 2022 **Time:** 4.45 am **Sheet** 1of 1
Finished/Date April 8,2022 **Time:** 6:30 pm
Azure Rep: AmitPal **Auger Type:** 150 mm Open
G. S. El: 112.5 m **G.W. Depth:** **G.W. Elevation:** **Time:**

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	112.5	250 mm Topsoil Dark brown silty clay/clayey silt trace sand, gravel, and organics	AS	1				
.75	111.8		AS	2				
1.5	111.0		AS	3				
2.25	110.3	SILTY SAND/SANDY SILT trace gravel, moist below 2.2 m	AS	4				
3.0	109.5		AS	5				
4.6	107.9	Stiff to very stiff SILTY CLAY/CLAYEY SILT trace sand and gravel, wet below 4.0 m	SS	6				
6.1	106.4	Hard CLAYEY SILT/SILTY CLAY trace gravel, wet below 6.0 m	SS	7	50			
7.6	104.9	Hard CLAYEY SILT/SILTbelow 7.0 m	SS	8	>80			
9.2	103.3	Refusal at 8.2 m	SS	9	>80			

EOB

AZURE GROUP DRAWING NO. 5

JOB NUMBER 2202-001BH104

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa) | *G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content*

Temperature: 5°C

Started/Date April 7, 2022 **Time:** 3.10 am **Sheet** 1of 1
Finished/Date April 7,2022 **Time:** 6:30 pm
Azure Rep: Amit Pal **Auger Type:** 150 mm Open
G. S. El: 112.1 m **G.W. Depth:** **G.W. Elevation:** **Time:**

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	112.1	250 mm Topsoil Dark brown silty sand/sandy silt trace clay, gravel, and organics	AS	1				
.75	111.4	Dark brown SILTY CLAY trace gravel and organics below 0.7 m	AS	2				
1.5	110.6	Light brown CLAYEY SILT trace gravel below 1.5 m	AS	3				
2.25	109.9	SILTY CLAY/CLAYEY SILT, trace gravel, wet below 2.2 m	AS	4				
3.0	109.1	Hard CLAYEY SILT/SILTY CLAY below 3.0 m	AS	5				
4.6	107.5		AS	6				
6.1	106.0		SS	7	>80			
		Hard grey CLAYEY SILT/SILTY trace sand and gravel, wetbelow 6.0 m						
7.6	104.5		SS	7	>80			
9.2	102.9		SS	8	>80			
		Hard CLAYEY SILT with SHALE trace gravel below 9. M						
9.8	102.3	Refusal at 9.8 m	SS	9	>80			

EOB

AZURE GROUP DRAWING NO. 6

JOB NUMBER 2202-001BH105

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa) | *G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content*

Temperature: 5°C

Started/Date April 8, 2022 **Time:** **Sheet 1of 1**
Finished/Date April 8,2022 **Time:**
Azure Rep: AmitPal **Auger Type: 150 mm Open**
G. S. El: 110.8 m **G.W. Depth:** **G.W. Elevation:** **Time:**

Depth/Elev. (m)		Soil Description	Type/No			C_u(kPa)	G.W.T	Remark
0	110.8	250 mm Topsoil Dark brown silty sand/sandy silt trace clay, gravel, and organics	AS	1				
.75	110.1	Sand trace clay and gravel below 0.75 m, moist to wet	AS	2				
1.5	109.3	SAND/SILTY SAND trace clay & GRAVEL, Wetbelow 1.5 m	AS	3				
2.25	108.6		AS	4				
3.0	107.8		AS	5				
4.6	106.2	Grey CLAYEY SILT, SILT trace sands below 4.6 m, wet	AS	6				
6.1	104.7	Very dense SILTY SAND/SANDY SILTtrace Gravel and clay, wet below 6.0 m	SS	7	>80			
7.6	103.2		SS	8	>80			
9.2	101.6	Hard CLAYEY SILT with weathered SHALE below 9.0 m	SS	9	>80			
9.8	101.0	Refusal at 9.8 m	SS	10	>80			

EOB

AZURE GROUP DRAWING NO. 7

JOB NUMBER 2202-001BH(MW)106

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa) | *G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content*

Temperature: 5°C

Started/Date April 8, 2022 **Time:** **Sheet 1of 1**
Finished/Date April 8,2022 **Time:**
Azure Rep: Amit Pal Auger Type: 150 mm Open
G. S. El: 110.78 m G.W. Depth: 2.69 m G.W. Elevation: 108.09m Time:

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	110.8	250 mm Topsoil Dark brown SILTY SAND/SANDY SILT trace clay, gravel, and organics	SS	1				
.75	110.1		SS	2				
1.5	109.3	CLAYEY SILT trace clay & GRAVEL, Wet below 1.5 m	SS	3				
2.25	108.6		SS	4				
							2.7 m	
3.0	107.8		SS	5				
4.6	106.2	Grey CLAYEY SILT trace gravel below, wet below4.6 m	SS	6		225.0		
6.1	104.7	Hard grey CLAYEY SILT trace to some shale fragments, wet below 6.0 m	SS	7	>80	225.0		
7.6	103.2		SS	8	>80	225.0		
9.2	101.6	Hard grey CLAYEY SILT with weathered SHALE below 9.0 m, wet	SS	9	>80			
9.8	101.0	Refusal at 9.8 m	SS	10	>80			

EOB

AZURE GROUP DRAWING NO. 8

JOB NUMBER 2202-001BH(MW)107

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa) | *G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content*

Temperature: 5°C

Started/Date April 8, 2022 **Time:** 11:45 **Sheet** 1of 1
Finished/Date April 8,2022 **Time:**
Azure Rep: Amit Pal **Auger Type:** 150 mm Open
G. S. El: 113.26 m **G.W. Depth:** **G.W. Elevation:** **Time:**

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	113.3	50 mm Asphalt	SS	1	5			
		Looseto very loosedark brown silty sand/sandy silt trace to some organics, gravel,and clay, moist						
.75	112.6		SS	2	7			
1.5	111.8	Compactbelow 1.5 m	SS	3	18			
2.25	111.1	Very dense below 2.2 m , possible boulders	SS	4	80			
3.0	110.3	Dense below3.0 m, wet	SS	5	43			
4.6	108.7	Dense SILTY SAND/SAND possible boulders, wet below 4.0 m	SS	6	47			
6.1	107.2	Hard grey SILTY CLAY/CLAYEY SILT trace gravel, wet below 5.0 m	SS	7	47			
7.6	105.7	Hard grey weathered SHALE with hard SILTY CLAY	SS	8	>80			
9.2	104.1	Grey Weathered SHALE below 9.2 m	SS	9	>80			
10.7	102.6		SS	10	>80			
11.0	102.3	Refusal at 7.8 m	SS	11	>80			

EOB

AZURE GROUP DRAWING NO. 9

JOB NUMBER 2202-001BH108

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa)	G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content

Temperature: 5°C

Started/Date April 8, 2022 **Time:** 8:00 am **Sheet** 1of 1
Finished/Date April 8,2022 **Time:**
Azure Rep: AmitPal **Auger Type:** 150 mm Open
G. S. El: 113.28 m **G.W. Depth:** **G.W. Elevation:** **Time:**

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	113.3	250 mm Topsoil Dark brown SILTY SAND/SANDY SILT trace clay, gravel, and organics	AS	1				
.75	112.6		AS	2				
1.5	111.8	Light brown SILTY SAND,trace clay and gravel, moist below 1.5 m,	AS	3	7			
2.25	111.1		AS	4				
3.0	110.3	Brown SILTY SAND with GRAVEL, moist below 3.0 m	AS	5	28			
4.6	108.7	Light brown SILTY SANDY/SANDY SILT trace to some clay and gravel, moist below 4.0 m	AS	6	25			
6.1	107.2	Hard CLAYEY SILTSILTY CLAY trace to some shale fragments, wet below 6.0 m	SS	7	45			
7.6	105.7	Grey weathered SHALE with SILTY CLAYtrace gravel, moist below 7.0 m	SS	8	75			
9.2	104.1	Grey weathered SHALE with SILTY CLAY trace gravel, moist below 9.0 m	SS	9	>80			
10.7	102.6		SS	10	>80			
11.3	102.0	Refusal at 11.3 m	SS	11	>80			

EOB

AZURE GROUP DRAWING NO. 10

JOB NUMBER 2202-001BH109

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa)	G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content

Temperature: 5°C

Started/Date April 8, 2022 **Time:** 8:50 am **Sheet** 1of 1
Finished/Date April 8,2022 **Time:**
Azure Rep: Amit Pal **Auger Type:** 150 mm Open
G. S. El: 112.5 m **G.W. Depth:** **G.W. Elevation:** **Time:**

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	112.5	250 mm Topsoil Dark brown SILTY SAND/SANDY SILT trace clay, gravel, and organics	AS					
.75	111.8		AS					
1.5	111.0	CLAYEY SILT trace clay &gravel, wet below 1.5 m	AS					
2.25	110.3		AS					
3.0	109.5		AS					
4.6	109.5	Grey CLAYEY SILT trace gravel below 4.6 m, wet below 4.0 m	AS					
6.1	106.4	Hard CLAYEY SILT/SILTY CLAY trace shale fragments, wet below 6.0 m	SS		>80			
7.6	104.9		SS		>80			
9.2	103.3	Hard CLAYEY SILT with weathered SHALE below 9.0 m, wet	SS		>80			
9.8	102.7	Refusal at 9.8 m	SS		>80			

EOB

AZURE GROUP DRAWING NO. 11

JOB NUMBER 2202-001BH110

PROJECT LOCATION: 3016 – 3032 Kirwin Avenue &3031 Little John Lane, Mississauga, Ontario

Client: Black Creek Group

C_u = Shear Strength (kPa) | *G%= Gravel, S% = Sand, F% = Fines (Silt and Clay), M = Moisture Content*

Temperature: 5°C

Started/Date April 8, 2022 **Time:** Sheet 1of 1
Finished/Date April 8,2022 **Time:**
Azure Rep: AmitPal **Auger Type:** 150 mm Open
G. S. El: 110.88 m **G.W. Depth:** **G.W. Elevation:** **Time:**

Depth (m)	Elev. (m)	Soil Description	Type	No	N	C_u (kPa)	G.W.T	Remark
0	110.9	250 mm Topsoil Dark brown SILTY SAND/SANDY SILT trace clay, gravel, and organics	AS	1				
.75	110.2		AS	2				
1.5	109.4	CLAYEY SILT trace sand&gravel, wet below 1.5 m	AS	3				
2.25	108.7		AS	4				
3.0	107.9	SILTY SAND/SANDY SILT, wet below 3.0 m	AS	5				
4.6	106.3	Grey CLAYEY SILT trace gravel below 4.6 m, wet below 4.0 m	AS	6		225.0		
6.1	104.8	Hard CLAYEY SILT trace to some gravels, wet below 6.0 m	SS	7	>80	225.0		
7.6	103.3	Hard grey CLAYEY SILT trace shale fragments below 7.5 m	SS	8	>80			
9.2	101.7	Hard grey CLAYEY SILT with weathered SHALE below 9.0 m, wet	SS	9	>80			
9.8	101.1	Refusal at 9.8 m	SS	10	>80			

EOB

7296549

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below) A199313 A199313

Tag#: A199313

Well Record

Regulation 903 Ontario Water Resources Act

S-20827 Page ____ of ____

ROYAL BANK OF CANADA

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2 Dundas Street West			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	1 7	6 1 1 6 9 2	4 8 2 6 1 2 7		WKQ-010354 A 0 - A 02

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Blk	asphalt			0	3"
Brown	Clay	silt		3"	10'
Grey	Shale			10'	14'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	6"	Concrete	
6"	3'	Bentonite	
3'	14'	Sand	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	.225	0	4'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25	PVC	10	4'	14'

Status of Well

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	14'	6"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Map "C"

Comments: General contractor: Pinchin Environmental

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
Ontario	L3R 8V2	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Vanderkooy, Andrew

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3616	Andrew Vanderkooy	20170929

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☒ No		Audit No. Z270105
	Date Work Completed 20170912	OCT 05 2017 Received

0506E (2014/11) Ministry's Copy

S - 20827

*03-C "WP03-C"
added
17 T 611692 4826127
43.57974°N -79.61661°E
Elevation= 112.4m

*02-B "WP02-B"
added
17 T 611750 4826092
43.57942°N -79.61590°E
Elevation= 111.1m

*01-A "WP01-A"
added
17 T 611702 4826091
43.57942°N -79.61650°E
Elevation= 112.0m

**all waypoints removed...

C-7241
Z270105

OCT 05 2017

Map data ©2017 Google Imagery ©2017 , DigitalGlobe, First Base Solutions

SOIL ENGINEERS - 1709-5004

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A223241

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	NYX CAPITAL CORP.		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1131A LESLIE ST., STE. 201	TORONTO	ONTARIO	M3C3L8	4165485590

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
3032 KIRWIN DR.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	MISSISSAUGA	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	611943	4826580		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Earth Fill, silty Clay and Sand	Some Silt	Loose - Compact	0	12.5
Brown	Fine - Medium Sand	Tr. Silt, Some Grav	Compact	12.5	15
Grey	Silty Clay, Till	Some Sand, Tr. Gravel, Occ. Silt layers, Cobbs/Boulders	Hard	15	25

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	13	Bentonite	2.31

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2	PVC	1/8	0	15

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2 1/8	PVC	10	15	25

Status of Well

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

Water Details

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

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	25	6

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

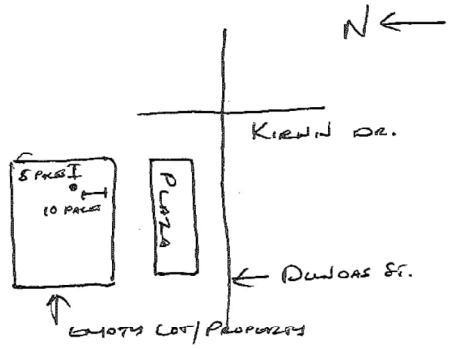
Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.



Comments: 3 WELL CLUSTER

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
STRONG SOIL SEARCH INC.	7247

Business Address (Street Number/Name)	Municipality
5265 SIDELINE 16	CLAREMONT

Province	Postal Code	Business E-mail Address
ONTARIO	L1Y1A7	strongsoilsearchinc@bellnet.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9056491115	NETO, NELSON

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3174		2018/02/28

Well owner's information package delivered: ☐ Yes ☑ No

Date Package Delivered: YYYY MM DD

Date Work Completed: 2017 09 13

Ministry Use Only

Audit No. Z272465

MAR 02 2018

Received

0506E (2014/11)

Ministry's Copy

7330071

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A252016

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

CITY OF MISSISSAUGA [redacted]

County/District/Municipality | City/Town/Village: Mississauga | Province: Ontario | Postal Code

UTM Coordinates: NAD 8 3 | Zone | Easting: 17 612 17 | Northing: 4826 160 | 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	Depth (m/ft) To
Brown	Top Soil			0	2'
Brown	Clay	Silt		2'	5'
Grey	Silt	Clay		5'	13'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	0.5'	concrete	
0.5'	2'	Holeplug	
2'	13'	Sand	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	0.125"	0	3'

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) From	Depth (m/ft) To
2.25"	PVC	10	3'	13'

Water Details

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

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	13'	6"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MW1

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Strata Soil Sampling | Well Contractor's Licence No.: 7241

Business Address (Street Number/Name): 185 Shields Court | Municipality: Markham

Province: ON | Postal Code: L3R 9W2 | Business E-mail Address: wrecords@stratasoil.com

Bus. Telephone No. *(inc. area code)* | Name of Well Technician (Last Name, First Name): Walker, Jonathon

Well Technician's Licence No.: 13833 | Signature of Technician and/or Contractor | Date Submitted: 2019/03/15

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered

Date Work Completed: 2019/02/27

Ministry Use Only

Audit No. Z304914

Received MAR 15 2019

0506E (2014/11) Ministry's Copy

S-23002.

Geoplaner V2.8 - [in English | auf deutsch]

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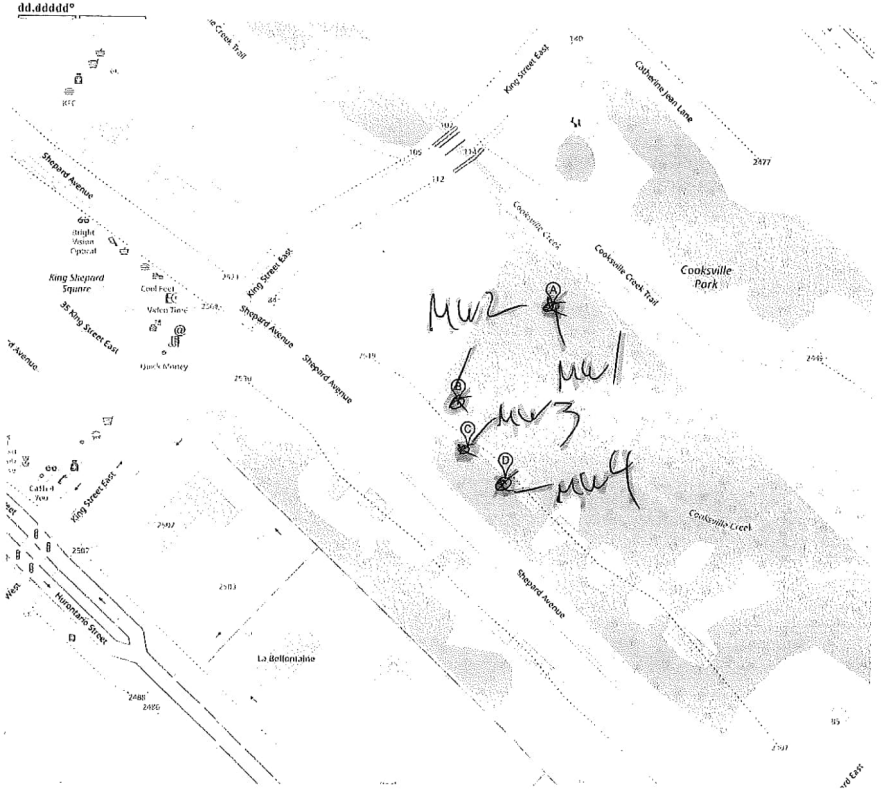


MAR 15 2019

23-4914

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 246265

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☑ Metric ☐ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
[redacted]	
Organization: EQUITY THREE HOLDINGS INC./EOB LTD.	Email Address: [redacted]

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
		[redacted]	

Country	Province	Postal Code	Telephone Number
CANADA	ONTARIO	[redacted]	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	3085	HURONTARIO ST.	

Lot	Concession	County/District/Municipality
		PEEL

City/Town	Province	Postal Code
MISSISSAUGA	Ontario	L5A 4E4

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	611496	4826433	Test UTM in Map	

Other: BH 2

3. Overburden and Bedrock Material *

Well Depth * 4.5 (m)

General Colour	Most Common Material	Other Materials	General Description	Depth From (m)	Depth To (m)
Black		Asphalt		0	0.1
Grey	Gravel			0.1	0.3

Brown	Sand			0.3	1.5
Brown	Silt	Clay		1.5	2.1
Grey	Shale		Weathered	2.1	4.5

4. Annular Space *

Depth From (m)	Depth To (m)	Type of Sealant Used (Material and Type)	Volume Placed (cubic metres)
0	0.3	CONCRETE	0.01
0.3	2.7	BENTONITE CHIPS	0.08

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☑ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☑ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (cm)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (m)	Depth To (m)
5.1	Plastic	0.65	0	3

9. Construction Record - Screen

Outside Diameter (cm)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (m)	Depth To (m)
6.4	Plastic	10	3	4.5

10. Water Details

Water found at Depth (m)	☐ Gas	Kind of Water	☐ Fresh	☑ Untested	☐ Other (specify)

11. Hole Diameter

Depth From (m)	Depth To (m)	Diameter (cm)
0	4.5	21

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (L/min)

Draw down *

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (m)														

Recovery *

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (m)													

After test of well yield, water was

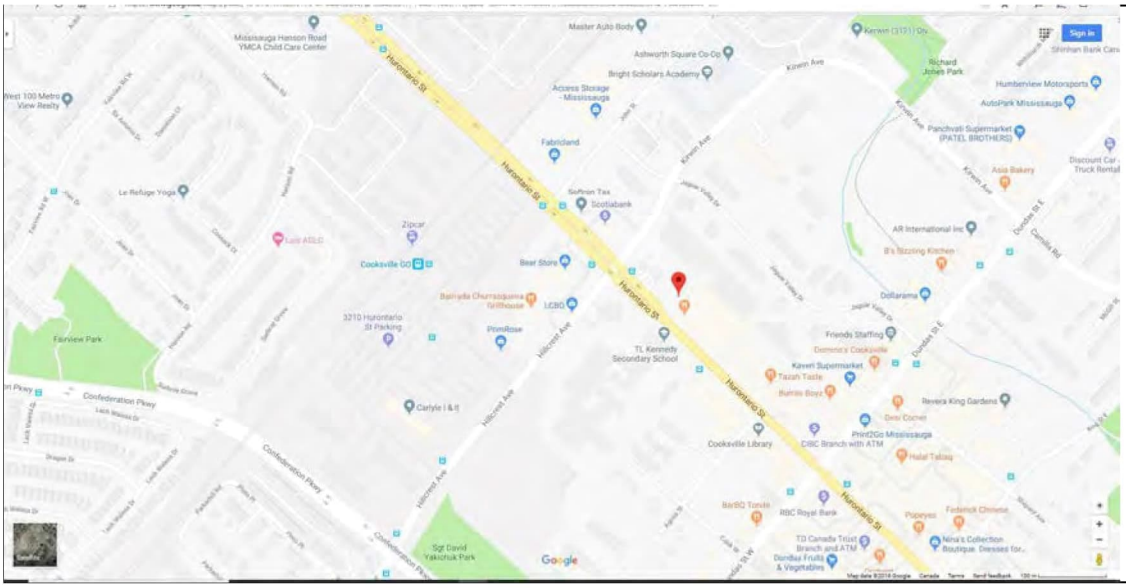
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (m)	Pumping rate (L/min)	Duration of pumping hrs + min	Final water level end of pumping (m)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (m)	Recommended pump rate (L/min)	Well production (L/min)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2019/04/08

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Geo-Environmental Drilling Inc.	6607

Business Address

Unit Number	Street Number	Street Name *
	1	Mansewood Court

City/Town/Village *	Province	Postal Code *
Halton Hills	Ontario	L7J 0A1

Business Telephone Number	Business Email Address
905-876-3388	dgunn@geo-environmentaldrilling.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
PAQUETTE	JEFF	2386

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
PAQUETTE	JEFF	romana@geo-environmentaldrilling.com

Signature		Date Submitted (yyyy/mm/dd)
Jeff Paquette	Digitally signed by Jeff Paquette Date: 2019.05.09 14:56:02 -04'00'	2019/05/09

17. Ministry Use Only

Audit Number

BALY VF8S

Ontario — Ministry of the Environment, Conservation and Parks

5-25112

Well Record

Well Tag No. (Place Sticker and/or Print Below) A291838 Tag#:A291838

...ion 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☑ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	City of Mississauga		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
300 City Centre Dr	Miss	ON	L5B3C1	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2515 Shepard ave			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	L5A2H7

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	612062	4826167		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand			0	3'
Brown	Silt	Sand		3'	14'
Grey	Silt	Sand		14'	18'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.5'	concrete	
.5'	7'	hole plug	
7'	18'	Sand	

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	.125	0	8'

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) From	Depth (m/ft) To
2.25"	PVC	10	8'	18'

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	18'	6"

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MWC

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling	7241

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
129 Ringwood Drive	Stouffville	ON	L4A8C1	wrecord@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
9059407919	Kyle Fitter	3459		2020/04/30

Comments:

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2020/04/24

Ministry Use Only

Audit No. Z334740

MAY 20 2020

Received

0506E (2018/12)

Ministry's Copy

Google Maps 2515 Shepard Ave

C-2411
733440

MAY 2 0 2023

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

Notice of Collection of Personal Information

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 308294

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
[redacted]	
Organization	Email Address
Emblem Developments	[redacted]

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
		[redacted]	

Country	Province	Postal Code	Telephone Number
		[redacted]	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	90	Dundas Street East	

Lot	Concession	County/District/Municipality

City/Town	Province	Postal Code
Mississauga	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	611907	4826370	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 20 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Fill		Loose	0	15
Grey	Clay	Till	Packed	15	20

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	9	Bentonite	1.5
9	20	Sand Pack	1.8

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☑ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	0.2	0	10

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2.5	Plastic	10	10	20

10. Water Details

Water found at Depth (ft)	☐ Gas	Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	20	7.5

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

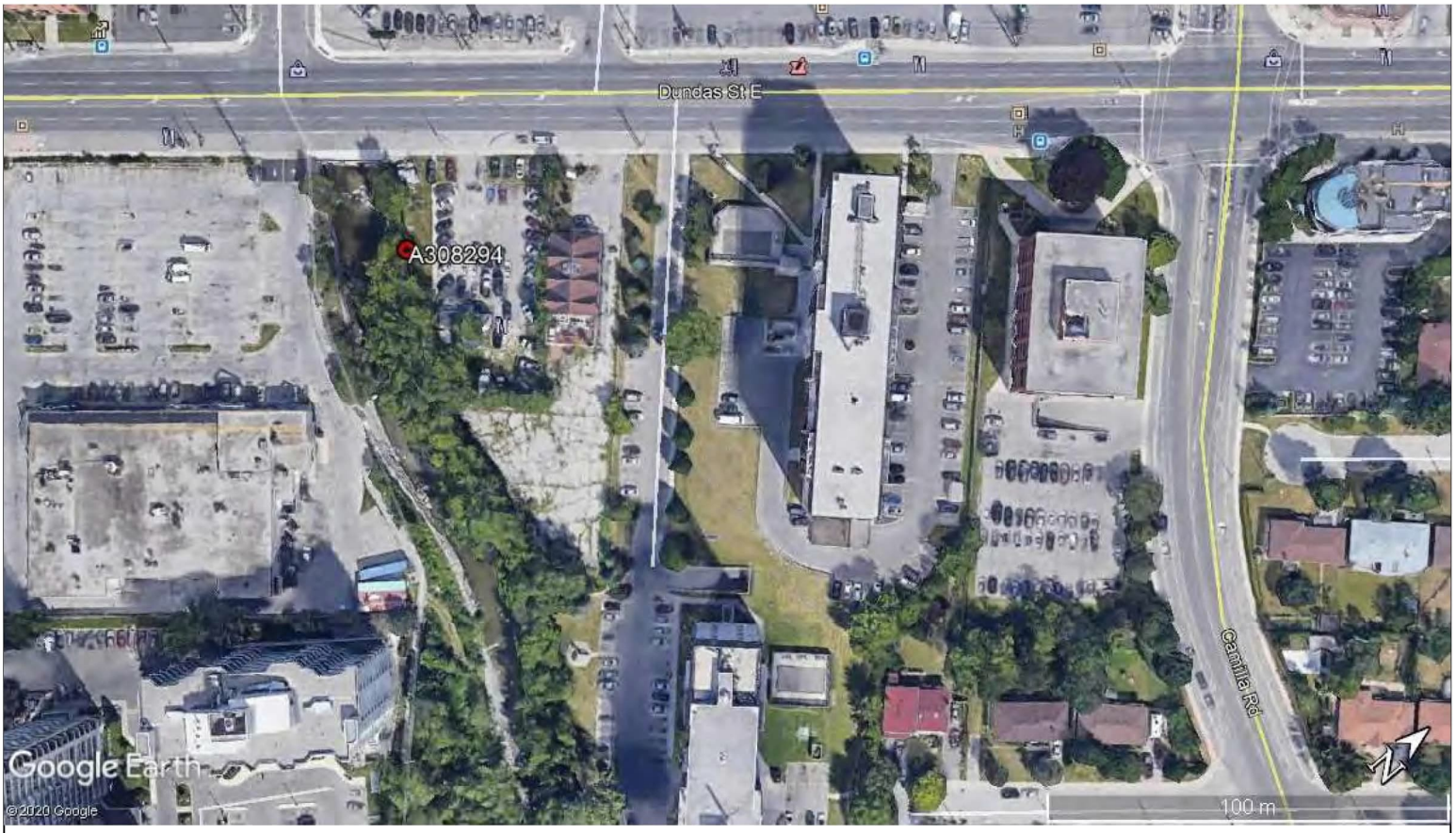
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? * ☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☑ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☑ No		2020/10/22

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Davis Drilling Ltd	7472

Business Address

Unit Number	Street Number	Street Name *
	873	Nipissing Rd

City/Town/Village *	Province	Postal Code *
Milton	ON	L9T 4Z4

Business Telephone Number	Business Email Address
905-299-6915	davisdrilling@bellnet.ca

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Borsellino	Nicholas	3579

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
Borsellino	Nicholas	davisdrilling@bellnet.ca

Signature	Date Submitted (yyyy/mm/dd)
Nicholas Borsellino Digitally signed by Nicholas Borsellino Date: 2020.11.23 08:27:50 -05'00'	2020/11/23

17. Ministry Use Only

Audit Number

OTWV PHOK

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

Notice of Collection of Personal Information

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 307705

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
[redacted]	
Organization	Email Address
DBV Real Estate Investments Inc.	[redacted]

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
		[redacted]	

Country	Province	Postal Code	Telephone Number
	Ontario	[redacted]	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	3026	Kirwin Ave	

Lot	Concession	County/District/Municipality

City/Town	Province	Postal Code
Mississauga	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	611938	4826579	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 22 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Gravel	Sand		0	15
Blue	Shale		Weathered	15	22

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	11	Bentonite Chip	3.52
11	22	No. 2 Sand	3.52

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☑ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	0.15	0	12

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2.3	Plastic	10	12	22

10. Water Details

Water found at Depth 17.5 (ft)	☐ Gas	Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	22	8

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

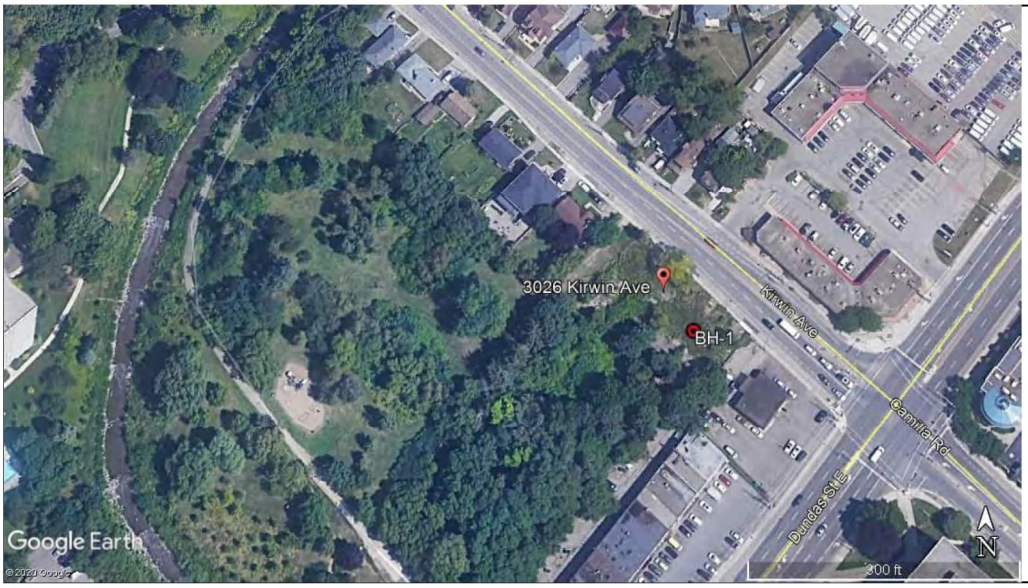
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? * ☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☑ Yes ☐ No	2021/01/25	2020/12/09

Comments
56946-bh1

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Altech Drilling & Investigative Services	7282

Business Address

Unit Number	Street Number	Street Name *
	410	Pinebush Road

City/Town/Village *	Province	Postal Code *
Cambridge	Ontario	N1T 1Z6

Business Telephone Number	Business Email Address
519-650-5557	

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Stranz	Brandon	4021

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
Stranz	Brandon	bstranz@altechworld.com

Signature		Date Submitted (yyyy/mm/dd)
Brandon Stranz	Digitally signed by Brandon Stranz Date: 2021.01.25 08:12:40 -05'00'	2021/01/25

17. Ministry Use Only

Audit Number
KCE2 XI4N

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

Notice of Collection of Personal Information

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 307718

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
[redacted]	

Organization	Email Address
DBV Real Estate Investments Inc.	[redacted]

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	[redacted]		

Country	Province	Postal Code	Telephone Number
	Ontario	[redacted]	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	3026	Kirwin Ave	

Lot	Concession	County/District/Municipality

City/Town	Province	Postal Code
Mississauga	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	611926	4826559	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 19 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Gravel	Sand		0	15
Blue	Shale		Weathered	15	19

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	8	Bentonite Chip	2.56
8	19	No. 2 Sand	3.52

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☑ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	0.15	0	9

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2.3	Plastic	10	9	19

10. Water Details

Water found at Depth (ft)	☐ Gas	Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	19	8

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? * ☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger

14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☑ Yes ☐ No	2021/01/25	2020/12/09

Comments
56946-bh2

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Altech Drilling & Investigative Services	7282

Business Address

Unit Number	Street Number	Street Name *
	410	Pinebush Road

City/Town/Village *	Province	Postal Code *
Cambridge	Ontario	N1T 1Z6

Business Telephone Number	Business Email Address
519-650-5557	

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Stranz	Brandon	4021

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
Stranz	Brandon	bstranz@altechworld.com

Signature		Date Submitted (yyyy/mm/dd)
Brandon Stranz	Digitally signed by Brandon Stranz Date: 2021.01.25 08:11:31 -05'00'	2021/01/25

17. Ministry Use Only

Audit Number
22K9 P6LU

Ontario

Ministry of the Environment, Conservation and Parks

Well Record - Regulation 903

Ontario Water Resources Act

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 307719

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name
[redacted]	
Organization	**Email Address**
DBV Real Estate Investments Inc.	[redacted]

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
		[redacted]	

Country	Province	Postal Code	Telephone Number
	Ontario	[redacted]	

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	3026	Kirwin Ave	

Lot	Concession	County/District/Municipality

City/Town	Province	Postal Code
Mississauga	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	611933	4826568	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 22 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Gravel	Sand		0	15
Blue	Shale		Weathered	15	22

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	11	Bentonite Chip	3.52
11	19	No. 2 Sand	3.52

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☑ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	0.15	0	12

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2.3	Plastic	10	12	22

10. Water Details

Water found at Depth (ft)	☐ Gas	Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	22	8

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

Time (min)	Static Level	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)														

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

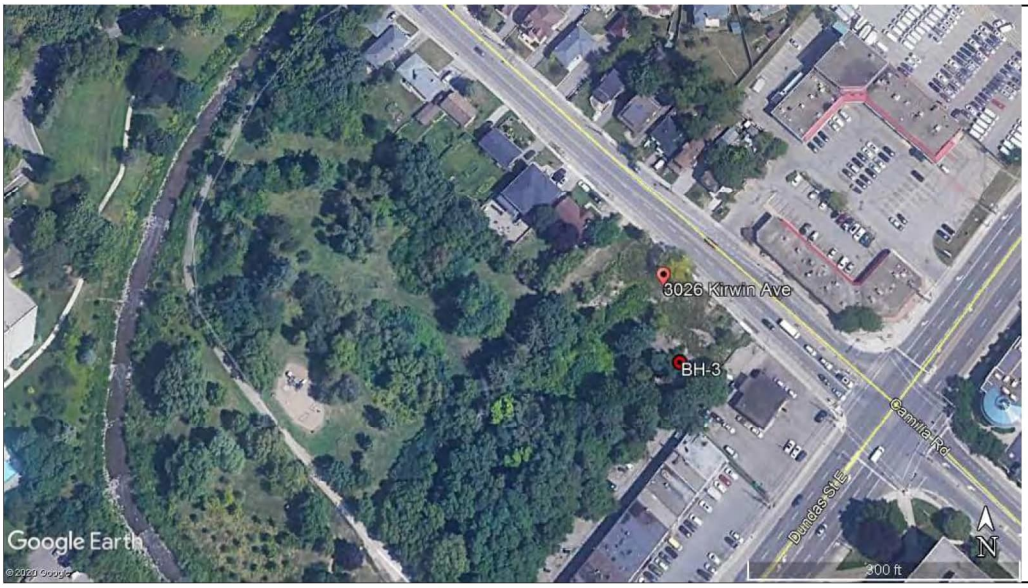
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? * ☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☑ Yes ☐ No	2021/01/25	2020/12/09

Comments
56946-bh3

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Altech Drilling & Investigative Services	7282

Business Address

Unit Number	Street Number	Street Name *
	410	Pinebush Road

City/Town/Village *	Province	Postal Code *
Cambridge	Ontario	N1T 1Z6

Business Telephone Number	Business Email Address
519-650-5557	

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Stranz	Brandon	4021

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
Stranz	Brandon	bstranz@altechworld.com

Signature		Date Submitted (yyyy/mm/dd)
Brandon Stranz	Digitally signed by Brandon Stranz Date: 2021.01.25 08:07:21 -05'00'	2021/01/25

17. Ministry Use Only

Audit Number
KK5G 2P5X

UTM 17 Z 611664 E
5 R 4826420 N

Elev. DUNDAS ST N.

Basin C 24F

LOT 15

49 No. 2211

GROUND WATER BRANCH
JAN 8 1959
ONTARIO WATER RESOURCES COMMISSION

The Ontario Water Resources Commission Act, 1957

WATER WELL RECORD

County or District PEEL Township, Village, Town or City MISSISSAUGA

[redacted] completed 12 (day) NOV (month) 58 (year)

[redacted] ess

Casing and Screen Record

Inside diameter of casing 6"
Total length of casing 22 FT
Type of screen
Length of screen
Depth to top of screen
Diameter of finished hole 6"

Pumping Test

Static level 10 FT
Test-pumping rate 10 G.P.M.
Pumping level 10
Duration of test pumping 4 HRS
Water clear or cloudy at end of test CLEAR
Recommended pumping rate 10 G.P.M.
with pumping level of 10

Well Log

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	No. of feet water rises	Kind of water (fresh, salty, sulphur)
BROWN SAND & GRAVEL	0	17			
BLUE SHALE	17	51	40	41	FRESH

Water Record

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

Is well on upland, in valley, or on hillside?
UPLAND

Drilling Firm D. HYSERMAN & SONS

Address 494 LAKESHORE RD
MIMICO

Licence Number 113

Name of Driller J.P. [illegible]

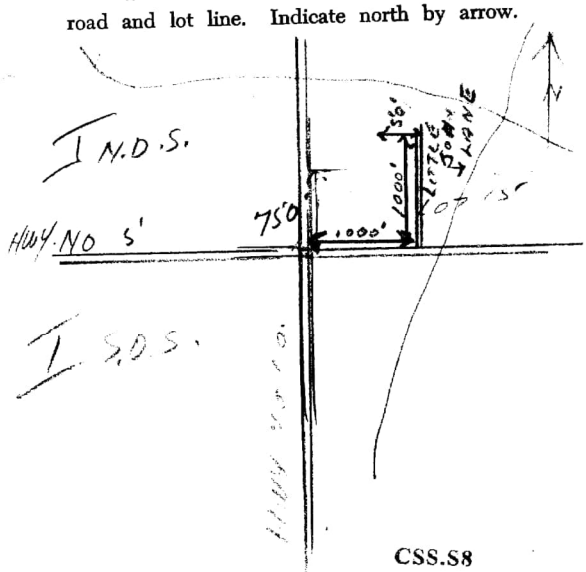
Address

Date Dec 2/58

(Signature of Licensed Drilling Contractor)

Location of Well

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



Form 5
15M-58-4149

CSS.S8

Ontario Ministry of the Environment

Well A027603 (tag number below)

A027603

NAYLOR 0506116
VANESSA
June 30/05

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

First Name	Last Name	Mailing Address (Street Number/Name, RR, Lot, Concession)
CITY OF	MISSISSAUGA	300 CITY CENTRE DRIVE

County/District/Municipality	Township/City/Town/Village	Province	Postal Code	Telephone Number (include area code)
PEEL	MISSISSAUGA	Ontario	L5B 3C1	905-896-5136

Address of Well Location (County/District/Municipality)	Township	Lot	Concession
PEEL			

RR#/Street Number/Name	City/Town/Village	Site/Compartment/Block/Tract etc.
KIRWIN AVE	MISSISSAUGA	

GPS Reading: NAD 83 | Zone 17 | Easting 611802 | Northing 4826734 | Unit Make/Model: MAGELLAN | Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
GREY	SILT		CLAY & STONE FRAGMENTS	0	7.6

Hole Diameter

Depth From (Metres)	Depth To (Metres)	Diameter (Centimetres)
0	7.6	15

Water Record

Water found at Metres	Kind of Water		
4.5 m	☒ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:
___ m	☐ Fresh	☐ Sulphur	☐ Gas
	☐ Salty	☐ Minerals	☐ Other:

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

Chlorinated ☐ Yes ☒ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
1.9	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	.4	0	4.5
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam		Slot No.		
2.7	☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete ☐ Galvanized	10	4.5	7.6
No Casing or Screen				
	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4		4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	.3	CONCRETE	
.3	4.0	BENTONITE	

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☒ Boring ☐ Driving

Water Use

☐ Domestic ☐ Industrial ☐ Public Supply ☒ Other TEST
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☒ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor	Well Contractor's Licence No.
GEO ENVIRONMENTAL DRILLING	6607

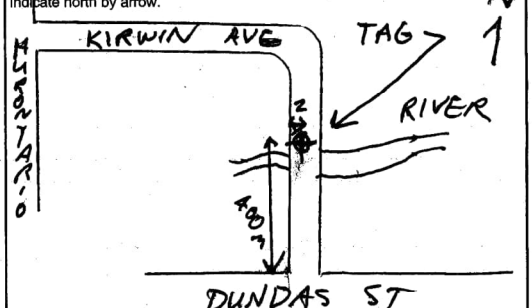
Business Address (street name, number, city etc.): 340 MARKET DR. MILTON ON

Name of Well Technician (last name, first name)	Well Technician's Licence No.
BAILEY, RYAN	T-3111

Signature of Technician/Contractor: x [signature] Date Submitted: 2005 06 30

Location of Well

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



Audit No. Z 32255

Date Well Completed: 2005 06 30

Was the well owner's information package delivered? ☐ Yes ☐ No

Date Delivered

Ministry Use Only

Data Source	Contractor 6607
Date Received JUL 22 2005	Date of Inspection
Remarks	Well Record Number

0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☐ Well Owner's Copy ☐ *Cette formule est disponible en français*

Ontario Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)*
A 068177
A068177

Well Record
Regulation 903 Ontario Water Resources Act
Page 1 of 1

Well Owner's Information
[redacted]

60 DUNDAS STREET | Mississauga
County/District/Municipality: Peel | City/Town/Village: Mississauga | Province: Ontario | Postal Code: L5A1W4

UTM Coordinates NAD 83 | Zone | Easting | Northing | GPS Unit Make | Model | Mode of Operation
2) 17 611971 4826314 | GARMIN | ETREX | ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
black	asphalt		Packed	0	.05
brown	gravel	medium, coarse sand	Packed	.05	.25
grey	silt	fine sand, gravel	Dense	.25	6.10
	wells GPS	2) 17/611981/4826271			
		3) 17/612170/4826252			
Consultant	Construction	Control			

Annular Space/Abandonment Sealing Record

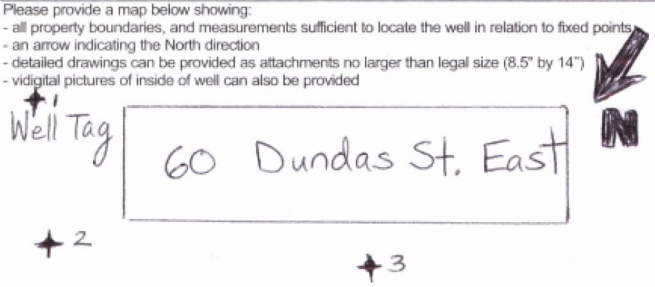
Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Placed (Cubic Metres)
0	.30	concrete	
.30	1.50	bentonite	

Method of Construction
☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Rotary (Air) ☐ Digging
☐ Air percussion ☒ Boring
☐ Other, specify

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

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

Location of Well
Please provide a map below showing:
- all property boundaries, and measurements sufficient to locate the well in relation to fixed points,
- an arrow indicating the North direction
- detailed drawings can be provided as attachments no larger than legal size (8.5" by 14")
- vidigital pictures of inside of well can also be provided



Dundas St. East

Date Well Completed (yyyy/mm/dd)	Was the well owner's information package delivered?	Date the Well Record and Package Delivered to Well Owner (yyyy/mm/dd)
2008/06/02	☐ Yes ☒ No	

Well Contractor and Well Technician Information
Business Name of Well Contractor: Atcost Soil Drilling | Well Contractor's Licence No.: 6032
Business Address (Street No./Name, number, RR): 2160 Hwy 7 | Municipality: Concord
Province: Ont | Postal Code: L4K1W6 | Business E-mail Address:
Bus. Telephone No. (inc. area code): 9056691253 | Name of Well Technician (Last Name, First Name): Green Wayne
Well Technician's Licence No. | Signature of Technician: Wayne Green | Date Submitted (yyyy/mm/dd): 2008/06/09

Results of Well Yield Testing
Check box if after test of well yield, water was:
☐ Clear and sand free
☐ Cannot develop to sand-free state

If pumping discontinued, give reason:
Pumping test method
Pump intake set at (Metres)
Pumping rate (Litres/min)
Duration of pumping ____ hrs + ____ min
Final water level end of pumping (Metres)
Recommended pump type ☐ Shallow ☐ Deep
Recommended pump depth ____ Metres
Recommended pump rate (Litres/min)
If flowing give rate (Litres/min)

	Draw Down Time (Min)	Draw Down Water Level (Metres)	Recovery Time (Min)	Recovery Water Level (Metres)
Static Level			Static Level	
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Water Details

Water found at Depth	Kind of Water
____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
____ Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Casing Used
☐ Galvanized ☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete

Screen Used
☐ Galvanized ☐ Steel ☐ Fibreglass ☒ Plastic ☐ Concrete

No Casing and Screen Used
☐ Open Hole
Disinfected? ☐ Yes ☐ No

Casing and Well Details
Diameter of the Hole (Centimetres): 10
Depth of the Hole (Metres): 6.10
Wall Thickness (Metres): Sch 40
Inside Diameter of the Casing (Metres): .05
Depth of the Casing (Metres): 2.13

Ministry Use Only
Audit No.: z69137 | Well Contractor No.:
Date Received (yyyy/mm/dd): JUL 11 2008 | Date of Inspection (yyyy/mm/dd):
Remarks:

0506E (11/2006)
Ministry's Copy

Ontario Ministry of the Environment

Well Tag No. *(Place Sticker and/or Print Below)* A046214

Well Record

Regulation 903 Ontario Water Resources Act

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
225 Dundas St. E.			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga.	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	611212	4824674		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Fill	Rock, Sand	moist	0'	5'
Brown	silt	sand	moist - dry	5'	18'
Gray	silt		moist	18'	20'
Gray	weathered shale		moist	20'	22'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
22'	11'	Sand.	
11'	1'	Bentonite	
1'	0'	Sand, casing, concrete	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	Plastic	Sch.40	12'	0'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2"	Plastic	10	22'	12'

Status of Well

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
22'	0'	9"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

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

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

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Attached.

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Profile Drilling Inc.	7215

Business Address (Street Number/Name)	Municipality
149 Norfinch Dr.	North York

Province	Postal Code	Business E-mail Address
Ont.	M3N1K2	jason@profiledrilling.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
4166504144	Slocki, Jason

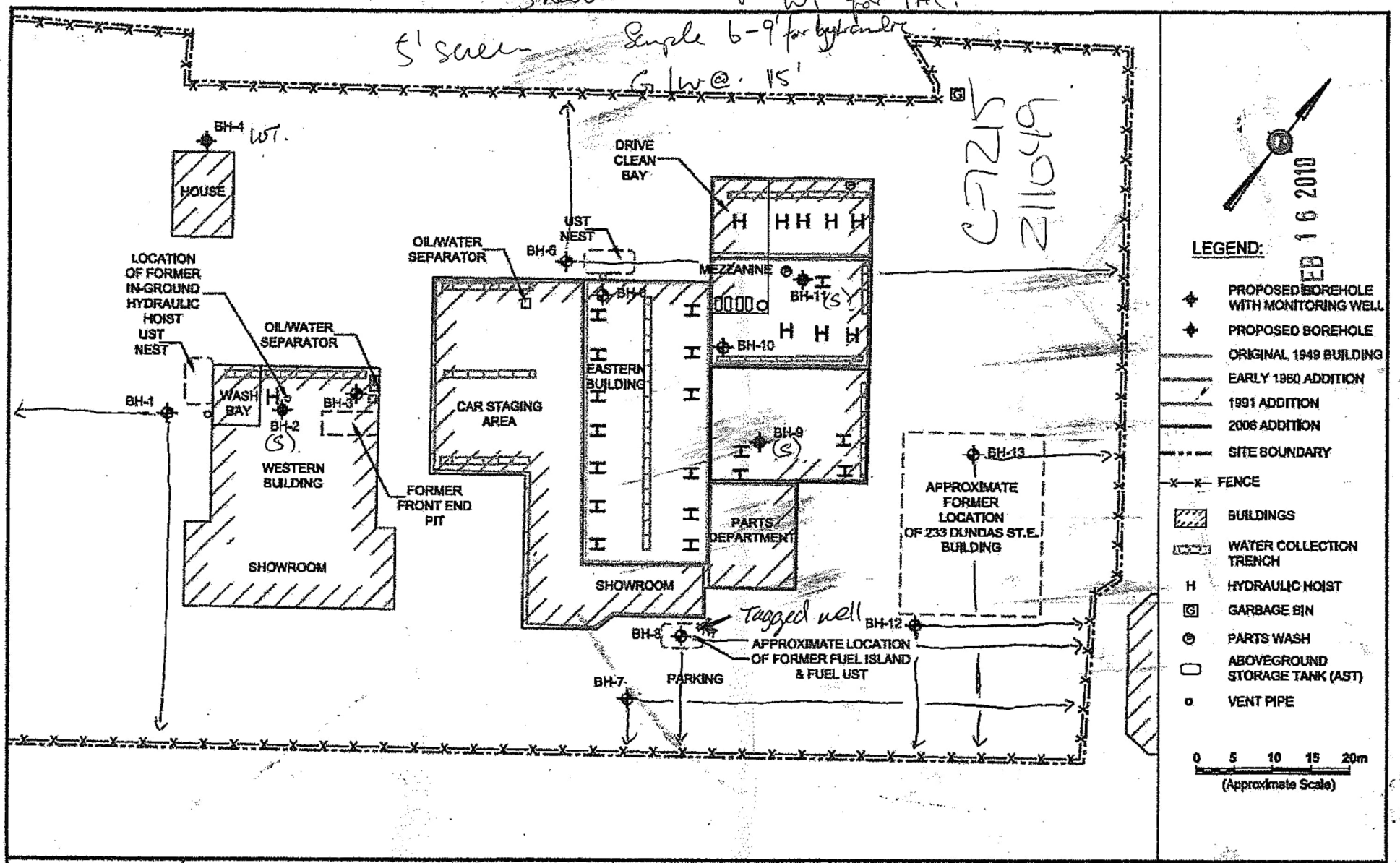
Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2978		2010/02/01

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2010/01/20

Ministry Use Only

Audit No. Z110049

Received FEB 16 2010



CLIENT LOGO	CLIENT: HAWLEY PONTIAC BUICK CADILLAC LTD.	DWN BY: MM CHK'D BY: MR	PROJECT: PHASE II ESA	REV. NO.: A DATE: DECEMBER 2009
AMEC Earth & Environmental 160 Traders Boulevard East Mississauga, Ontario L4Z 3K7		DATUM: PROJECTION: SCALE: AS SHOWN	TITLE: PROPOSED BOREHOLE LOCATION PLAN 225 DUNDAS STREET EAST MISSISSAUGA, ONTARIO	PROJECT NO: PROPOSAL 1216 FIGURE No. FIGURE 1

P:\DECOM\Proposals\2009\1216 Hawley Pontiac 225 Dundas St W, Mississauga Phase II ESA\PI ESA\T091059-Figure 3-Detailed Site Plan.dwg — Layout1 — Dec. 14, 2009 1:40pm — michael.macaraeg

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A095349

Well Record

Regulation 903 Ontario Water Resources Act

Page _____ of _____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
225 Dundas St E			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	L5A 1W8

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	612126	4826690		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
	Grout			0	12

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

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 Decommission

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
12	0	4"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping _____ hrs + _____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See map

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Profile Drilling	7215

Business Address (Street Number/Name)	Municipality
149 Norfinch DR Units 4-8	North York

Province	Postal Code	Business E-mail Address
ON	M3N1W2	Jason@ProfileDrilling

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
4166506444	Slocki, Jason

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2978		2010/04/09

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No	Y Y Y Y M M D D	2010/03/22

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Audit No. z112536

Received MAY 12 2010

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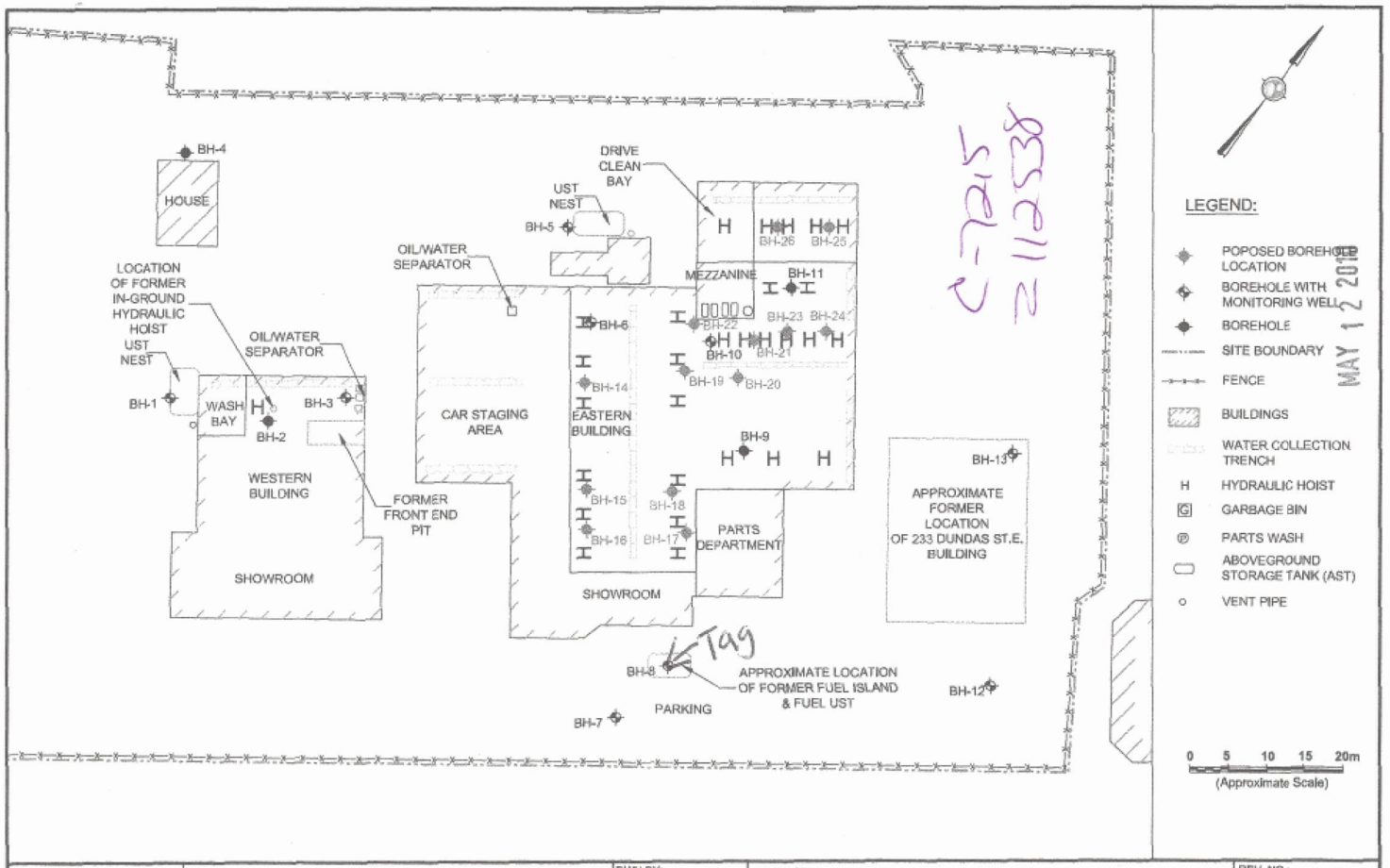


C-7215
2112538

MAY 12 2010

CLIENT: HAWLEY PONTIAC BUICK CADILLAC LTD.	DWN BY: ZF	PROJECT: PHASE II ESA	REV. NO.: A	
	CHK'D BY: MR		DATE: FEBRUARY 2010	
AMEC Earth & Environmental, 3190 Steeles Avenue East, Unit #305, Markham, Ontario L3R 1G9	SCALE: AS SHOWN	TITLE: PROPOSED BOREHOLE LOCATION PLAN 225 DUNDAS STREET EAST MISSISSAUGA, ONTARIO	PROJECT NO: TC91017	FIGURE No. FIGURE 1

R:\01 - PROJECTS\2009\TC91017-225 Dundas St.E\Figures\TC91017-Figure 2-Borehole Location Plan.dwg - Layout1 - Feb. 09, 2010 12:54pm - zhanna.furman

Ontario — Ministry of the Environment

Well Record

Regulation 903 Ontario Water Resources Act

Well Tag No. (Plate Sticker and/or Print Below): A 096787 A096787

Page 3 of 3

Measurements recorded in: [X] Metric [ ] Imperial

[redacted]

Well Location

Address of Well Location (Street Number/Name): ~~81 Talbot Road West~~ 38-40 Dundas St. West

Township:

Lot:

Concession:

County/District/Municipality:

City/Town/Village: ~~Town/Region~~ Mississauga

Province: Ontario

Postal Code:

UTM Coordinates: NAD 8 3 | Zone 17 | Easting 611696 | Northing 4826996

Municipal Plan and Sublot Number:

Other: WKQ-002528 A0 - A02

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
black	Asphalt		soft	0	.1
brown	sand		soft	.1	2.7
grey	Shale	silt	hard	2.7	4.8

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.31	Concrete	.0031
.31	3	Bentonite	.0126
3	4.8	Silica Sand	.0084

Method of Construction

[ ] Cable Tool [ ] Diamond
[ ] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[ ] Boring [ ] Digging
[ ] Air percussion
[X] Other, specify: Direct Push

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
4.03	PVC	.36	0	3.3

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.82	PVC	10	3.3	4.8

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Other, specify
	[ ] Fresh [ ] Untested [ ] Gas	
	[ ] Fresh [ ] Untested [ ] Gas	
	[ ] Fresh [ ] Untested [ ] Gas	

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	4.8	10.9

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping: ___ hrs + ___ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

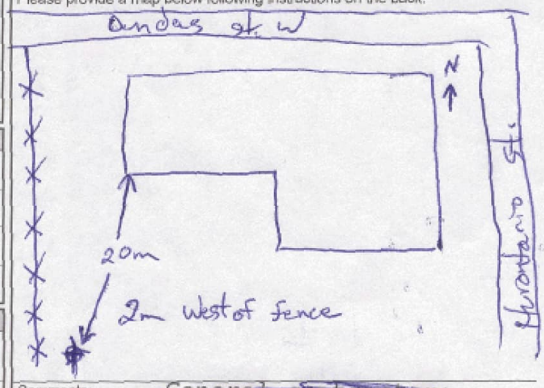
Well production (l/min / GPM)

Disinfected? [ ] Yes [ ] No

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

Map of Well Location

Please provide a map below following instructions on the back.



Comments: ~~General contractor~~: ~~The Regional Corporation~~

Well Contractor and Well Technician Information

Business Name of Well Contractor: Strata Soil Sampling Inc.

Well Contractor's Licence No.: 7241

Business Address (Street Number/Name): 147-2 West Beaver Creek Road

Municipality: Richmond Hill

Province: Ontario

Postal Code: L4B 1C6

Business E-mail Address: wrecords@stratasoil.com

Bus. Telephone No. (inc. area code): 905-764-9304

Name of Well Technician (Last Name, First Name): Robinson Travis

Well Technician's Licence No.: 3159

Signature of Technician and/or Contractor:

Date Submitted: 2010/04/30

Well owner's information package delivered: [ ] Yes [X] No

Date Package Delivered:

Date Work Completed: 2010/04/28

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Measurements recorded in: ☑ Metric ☐ Imperial

Well Tag No. (Place Sticker and/or Print Below) A103044

Well Record

Regulation 903 Ontario Water Resources Act

7559 Page 1 of 2

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
120 Dundas street east			
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
	Mississauga	Ontario	
UTM Coordinates NAD 83 — Zone 17 — Easting 610592 — Northing 4806397	**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	Depth (m/ft) To
Brown	Sand	gravel	loose	0	1.83
Brown	Clay	Silt	Dense	1.83	3.1

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	0.31	Concrete	0.0005
0.31	1.5	Bentonite	0.0225
1.5	3.1	Sand	0.0625

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
3.125	Plastic	0.375	0	1.5

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.21	Plastic	10	1.5	3.1

Status of Well

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	3.1	5.71

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See attached

MW1

A103044

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
State Soil Sampling	7241
Business Address (Street Number/Name)	**Municipality**
2-147 West Beaver Creek Dr	Richmond Hill
Province	**Postal Code**	**Business E-mail Address**
ON	L4B1C6	wrecords@StateSoil.com
Bus. Telephone No. (inc. area code)	**Name of Well Technician (Last Name, First Name)**
9057649304	Muir, Mike
Well Technician's Licence No.	**Signature of Technician and/or Contractor**	**Date Submitted**
3448	[signature]	2010 06 30

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2010 06 21

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Measurements recorded in: [X] Metric [X] Imperial

(Print Below) **A103036**

Well Record

Regulation 903 Ontario Water Resources Act

Page 2 of 2

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
120 Dundas Street East			
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
	Mississauga	Ontario	
UTM Coordinates NAD 83 — Zone	Easting	Northing	Municipal Plan and Sublot Number / Other
17	611598	4826414	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Sand	gravel	loose	0	1.83
Grey	Clay	Silt	Dense	1.83	3.35

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	0.31	Concrete	0.0005
0.31	1.83	Bentonite	0.003
1.83	3.35	Sand	0.0025

Method of Construction

- [ ] Cable Tool
- [ ] Diamond
- [ ] Rotary (Conventional)
- [ ] Jetting
- [ ] Rotary (Reverse)
- [ ] Driving
- [ ] Boring
- [ ] Digging
- [ ] Air percussion
- [x] Other, specify: Direct Push

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
3.45	Plastic	0.345	0	1.83

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
4.21	Plastic	10	1.83	3.35

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify	0	3.35	5.71
[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify			
[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify			

Results of Well Yield Testing

After test of well yield, water was:
- [ ] Clear and sand free
- [ ] Other, specify

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? [ ] Yes [ ] No

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

Map of Well Location

Please provide a map below following instructions on the back.

See attached MW2. A103036.

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling	7241

Business Address (Street Number/Name)	Municipality
2-147 West Beaver Creek Dr	Richmond Hill

Province	Postal Code	Business E-mail Address
ON	L4B1C6	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9057649304	Mott, Mike

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3148	[signature]	2010/06/31

Well owner's information package delivered	Date Package Delivered	Date Work Completed
[ ] Yes [ ] No		2010/06/21

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Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A103045

Well Record

Regulation 903 Ontario Water Resources Act

7559 Page ____ of ____

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
120 Dundas Street E			
County/District/Municipality	**City/Town/Village**	**Province**	**Postal Code**
	Mississauga	Ontario	
UTM Coordinates Zone / Easting / Northing	**Municipal Plan and Sublot Number**	**Other**	
NAD 83 17 / 614354 / 4826412			

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0'	0.5'	Cement	
0.5'	5'	Bentonite	
5'	16'	Sand	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.5"	Plastic	0.25"	0'	6'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.75"	Plastic	10	6'	16'

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From (m/ft)	Hole Diameter Depth To (m/ft)	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	0'	16'	4.5"
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify			

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MW3-1

Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor: Strata Soil Sampling
Well Contractor's Licence No.: 7124

Business Address (Street Number/Name): 2-147 West Beaver Creek Dr
Municipality: Richmond Hill

Province: ON
Postal Code: L4B 1C6
Business E-mail Address: wreed@stratasoil.com

Bus. Telephone No. (inc. area code): 905 764 9304
Name of Well Technician (Last Name, First Name): Mair, Mike

Well Technician's Licence No.: 3448
Signature of Technician and/or Contractor:
Date Submitted: 2010 06 21

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2010 06 21

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Received JUL 16 2010

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Well Tag No. (Below) A 034011

Well Record

Regulation 903 Ontario Water Resources Act

Page 1 of 1

Measurements recorded in: [X] Metric [ ] Imperial

Well Owner's Information

First Name	Last Name /	E-mail Address	
MATAS	HOMES [redacted]		[ ] Well Constructed by Well Owner

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code
109 THOMAS ST	OAKVILLE	ON	L6J 3A7 [redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
86 DUNDAS ST E	MISSISSAUGA		

County/District/Municipality	City/Town/Village	Province	Postal Code
PEEL	MISSISSAUGA	Ontario	L5A 4G8

UTM Coordinates NAD 83	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
	17	611918	4826373		

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BROWN			FILL	0	4.6
GREY	SILT			4.6	6.2
GREY			DENSE	6.2	7.6

MW2 UTM 17 611966 4826355

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	.3	CEMENT	
.3	2.8	BENTONITE CHIPS	

Method of Construction

[ ] Cable Tool [ ] Diamond
[ ] Rotary (Conventional) [ ] Jetting
[ ] Rotary (Reverse) [ ] Driving
[X] Boring [ ] Digging
[ ] Air percussion
[ ] Other, specify

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
5	PLASTIC	.3	0	3.0

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
6	PLASTIC	10	3.0	7.6

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From (m/ft)	Depth To (m/ft)	Diameter (cm/in)
3 (m/ft)	[ ] Fresh [X] Untested [ ] Gas [ ] Other, specify	0	7.6	12
(m/ft)	[ ] Fresh [ ] Untested [ ] Gas [ ] Other, specify			
(m/ft)	[ ] Fresh [ ] Untested [ ] Gas [ ] Other, specify			

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

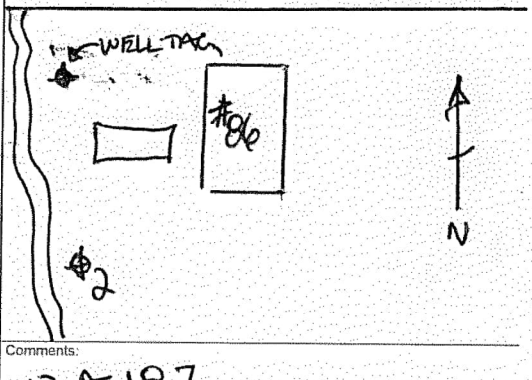
Disinfected? [ ] Yes [ ] No

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

Map of Well Location

Please provide a map below following instructions on the back.

DUNDAS ST E



Comments:

12A 187

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
ATCOST DRILLING	6032

Business Address (Street Number/Name)	Municipality
2160 HWY 6	YORK

Province	Postal Code	Business E-mail Address
ONT	L4K 1W6	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
1056691253	BARTLETT, SEAN

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
2519	[signature]	2012 10 15

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
[ ] Yes [X] No	Date Work Completed 2012 10 09	Audit No. Z121323
		Received JAN 31 2013

18/10/12

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Ontario Ministry of the Environment

Well Record for Well Cluster - Part 1 of 3

(Only for Multiple Test Holes or Dewatering Wells)

Regulation 903 Ontario Water Resources Act

All measurements recorded in: ☐ Metric ☒ Imperial

Follow instructions on the front and back of this form. Print or Type

Well Tag No. of Deep [illegible] (Print Well Tag No.) **Tag#: A139584**

Well # on Drawing of Deepest Well: TW1

Well Cluster Location Information

Address of Well Location (Street Number(s)/Name(s), RR, if available)	Lot(s)	Concession(s)	Geographic Township	County/District/Upper Tier Municipality
206 Dundas st E				

City, Town, Village or Hamlet	Province	GPS Unit Make	Model	Unit Mode of Operation
Mississauga	Ontario	Garmin	ETrex	☒ Undifferentiated ☐ Averaged ☐ Differentiated, specify:

Mandatory Attachments/Additional Information

☒ Land Owner Consent Form must be attached.

☒ Detailed Drawing of All Well Locations must be attached.

I, the person constructing the well, will promptly submit to the Director, on request, any additional information in my custody or control related to any well in the well cluster that I have constructed.

Signature of Technician/Contractor — Date (yyyy/mm/dd): 2013/05/17

Well Details

Well # on Drawing	UTM Coordinates Zone	Easting	Northing	Hole Depth (m/ft)	Hole Diameter (cm/in)	Method of Construction	Casing Material; Diameter (cm/in)	Casing (m/ft) From	Casing (m/ft) To	Screen Interval (m/ft) From	Screen Interval (m/ft) To	Annular Space Material (m/ft) From	Annular Space Material (m/ft) To	Annular Space Material: Material:	Overburden/Bedrock or Abandonment Filing Material Intervals (m/ft)	Static Water Level (m/ft)	Date of Completion (yyyy/mm/dd)
MW1	17	612139	4826648	20'	6"	Rotary	2" PVC	0'	10'	10'	20'	20' 9'	9' 2'	SAND Bentonite			2012/11/20
MW2	17	612144	4826658	19'	6"	Rotary	2" PVC	0'	9'	9'	19'	19' 8'	8' 2'	SAND Bentonite			2012/11/20

Well Contractor and Well Technician Information

Business Name of Well Contractor	Business Address (Street Number/Name, RR)	Municipality	Province
Profile Drilling Inc	6525 Northam Dr	Mississauga	ON

Postal Code	Bus. Telephone No.	Well Contractor's Licence No.	Business E-mail Address
L4V 1T2	416-650-6444	7215	mike@profiledrilling.com

Name of Well Technician (First Name, Last Name)	Well Technician's Licence No.	Signature of Well Technician	Date Submitted (yyyy/mm/dd)
Mike Slodki	3571		2013/05/17

Date First Well in Cluster Constructed or Abandoned (yyyy/mm/dd)	Date Last Well in Cluster Completed (yyyy/mm/dd)
2012/11/20	2012/11/20

Well Abandonment

Person Abandoning the Wells:

Name _____ (Print or Type) - See instruction 11 on the back of this form

Ministry Use Only

Date Received (yyyy/mm/dd)	Audit No.
MAY 26 2013	C 20417

Comments:

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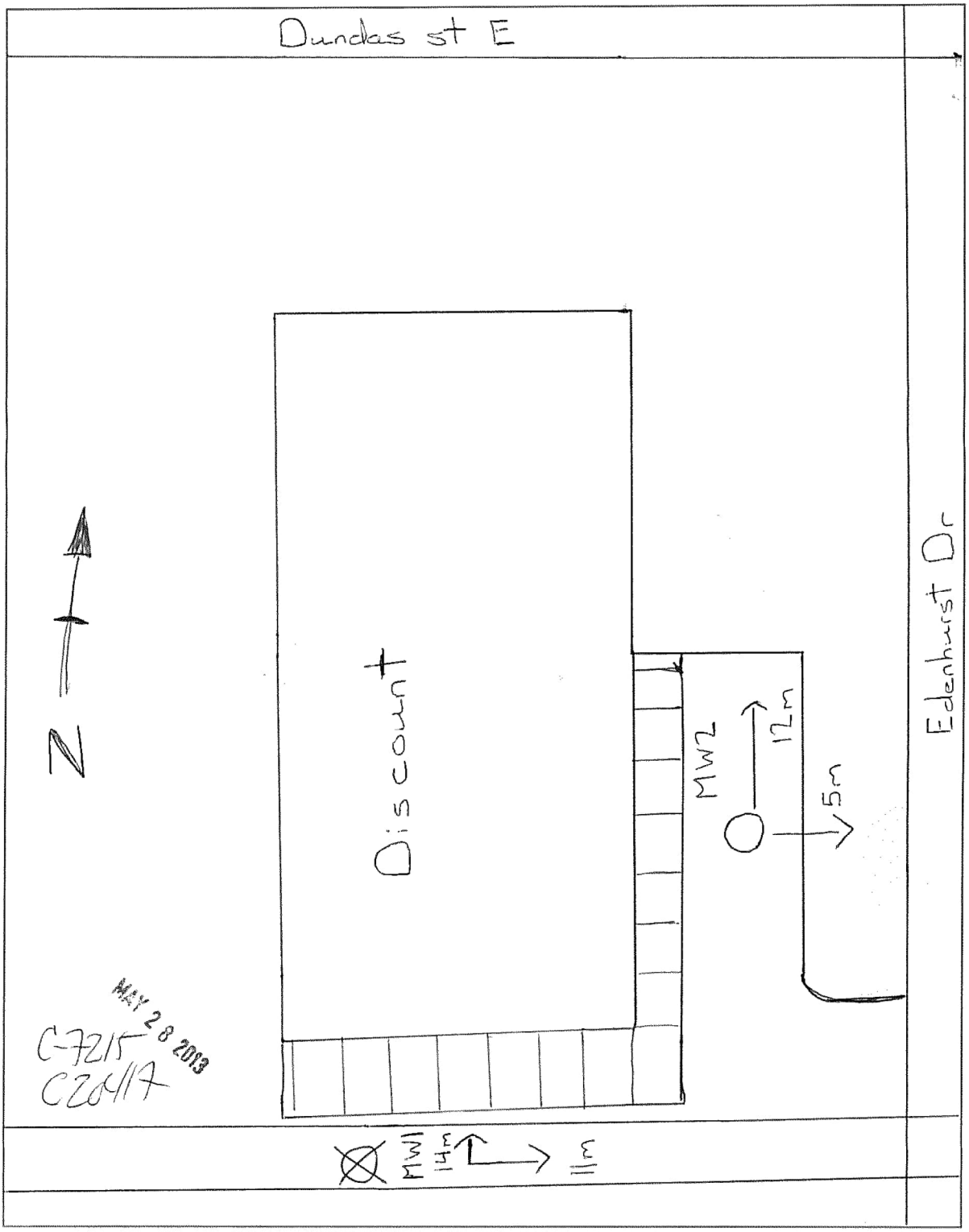
Ontario Ministry of the Environment

Well Record for Well Cluster - Part 3 of 3
Detailed Drawing of All Well Locations

Note: This **Well Record for Well Cluster Part 3 - Detailed Drawing of all Well Locations,** must be attached to Parts 1 and 2. The drawing must include all property boundaries, an arrow indicating the North direction, all named roads and sufficient measurements to locate all wells in the cluster in relation to fixed points. The drawing must show the location of each well and each well must be numbered on the drawing to match number used for that well on the **Well Record for Well Cluster Parts 1 and 2.** The well with the well tag must be clearly identified on the Drawing.
UTM coordinates should appear beside each well, if space permits. Additional comments on wells can be included on the drawing

Well Tag Number: # A139584

"Well Record for Well Cluster" Form Audit Number: # C 20417



Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below) Tag#: A156353 A156353 S-14660

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Starlight Apartments Ltd		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
401 the west Mall Suite 1100	Toronto	ON	M9C5J5	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
100 Dundas Street East			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	610917	4836437		WKQ-006380 A0 - A02

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Fill			0	3'
Brown	Silty	Sand		3'	10'
Grey	Silty	Clay		10'	18'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	0.5'	Flushmount/concrete	
0.5'	7'	Bensea	
7'	18'	Sand	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	0.25"	0	8'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25"	PVC	10	8'	18'

Status of Well

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	18'	6"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MW-1

Comments: General contractor: Pinchin Environmental

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
147-2 West Beaver Creek Road	Richmond Hill

Province	Postal Code	Business E-mail Address
Ontario	L4B 1C6	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Gadhati, Mark

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3708		2013/10/16

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☐ No		Audit No. Z179768
	Date Work Completed 2013/06/11 (MD)	Received 2013

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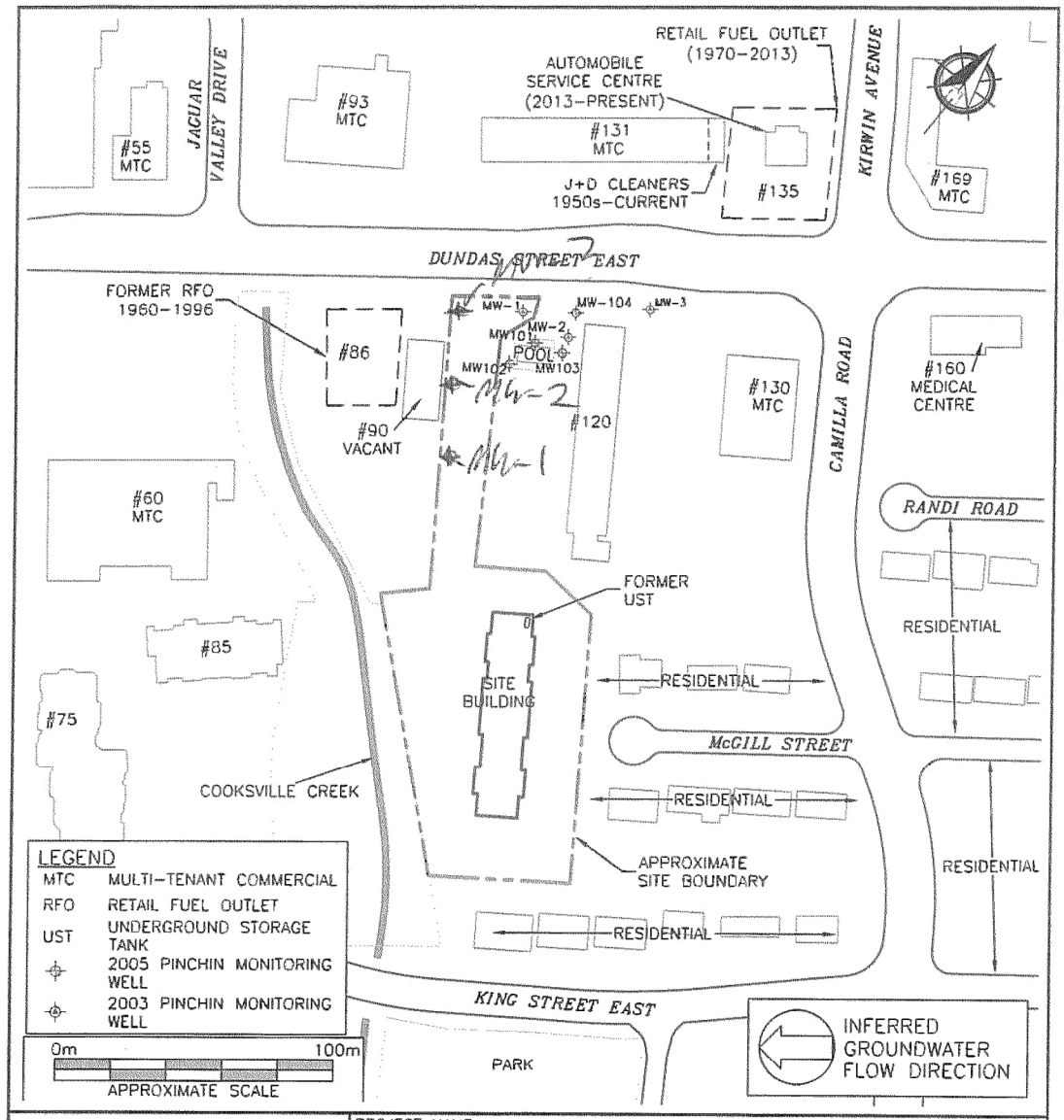

PINCHIN ENVIRONMENTAL

PROJECT NAME	[redacted]		
CLIENT NAME	[redacted]		
PROJECT LOCATION	100 DUNDAS STREET EAST, MISSISSAUGA, ONTARIO		
FIGURE NAME	SITE AND SURROUNDING LANDUSE PLAN		FIGURE NO.
APPROXIMATE SCALE	PROJECT NO.	DATE	2
AS SHOWN	87839	SEPT. 2013	

C-7241 2179768

NOV 12 2013

7210806

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. (Place Sticker and/or Print Below) Tag#: A156350 A156350

5-14660

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

[redacted]

STARLIGHT APARTMENTS LTD.

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
100 Dundas Street East			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	61 19 2[illegible]	48 36 423		WKQ-006380 A0 - A02

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Black	Asphalt			0	4"
Brown	Silty	sand		4"	8'
Grey	Silty	Clay		8'	16'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	0.5'	Flushmount/concrete.	
0.5'	5'	Hole Plug	
5'	16'	Sand	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	0.25"	0	6'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25"	PVC	10	6'	16'

Status of Well

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

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ 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) From	Depth (m/ft) To	Diameter (cm/in)
0	16	6"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See map

Mw-3

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
147-2 West Beaver Creek Road	Richmond Hill

Province	Postal Code	Business E-mail Address
Ontario	L4B 1C6	wrecords@stratasoil.co

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	[illegible] Mark

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3708	[signature]	2013/11/01

Comments: General contractor: Pinchin Environmental

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☐ No	Date Work Completed 2013/09/01	Audit No. Z179767
		NOV 2013 Received

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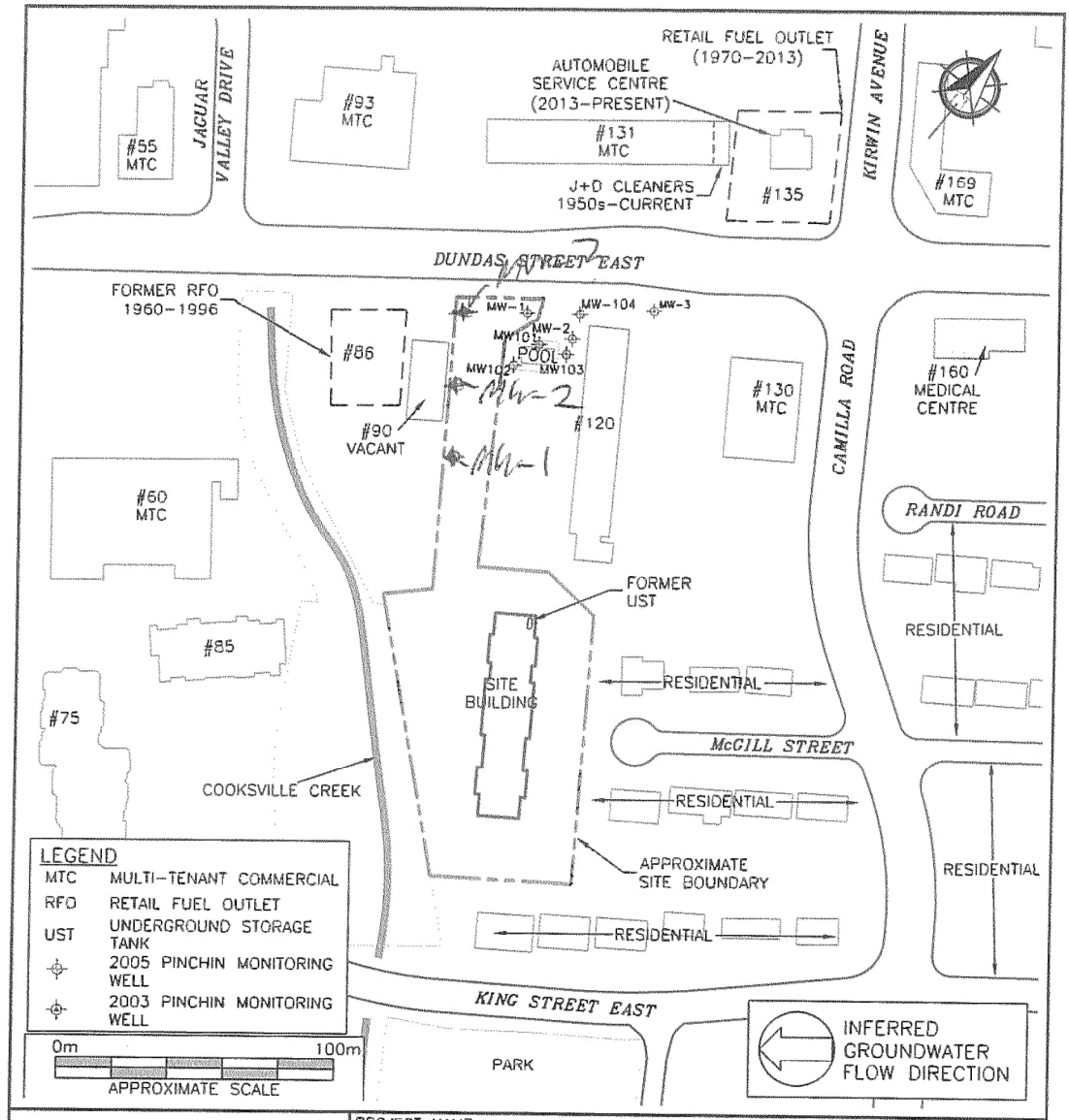

PINCHIN ENVIRONMENTAL

PROJECT NAME	[redacted]		
CLIENT NAME	[redacted]		
PROJECT LOCATION	100 DUNDAS STREET EAST, MISSISSAUGA, ONTARIO		
FIGURE NAME	SITE AND SURROUNDING LANDUSE PLAN		FIGURE NO.
APPROXIMATE SCALE	PROJECT NO.	DATE	2
AS SHOWN	87839	SEPT. 2013	

NOV [illegible] 13

C-7211 217967

7210807

Ontario — Ministry of the Environment

Well Tag No. (Place Sticker and/or Print Below) 5-14660

Tag#: A156352 A156352

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

STARLIGHT APARTMENTS LTD.

[redacted]

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
100 Dundas Street East			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	619473	4826410		WKQ-006380 A0 - A02

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Fill			0	3'
Brown	Silty	Sand		3'	8'
Gray	Silty	Clay		8'	15.5'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	0.5'	Flush mount/Concrete	
0.5'	4.5'	Hole plug	
4.5'	15.5'	Sand	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	0.25"	0	5.5'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25"	PVC	10	5.5'	15.5'

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	15.5'	6"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MW-2.

Comments: General contractor: Pinchin Environmental

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
147-2 West Beaver Creek Road	Richmond Hill

Province	Postal Code	Business E-mail Address
Ontario	L4B 1G6	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	[redacted]

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3708	[redacted]	2013/11/01

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☒ No		2013/10/16

Ministry Use Only

Audit No. Z179766

Received NOV 2013

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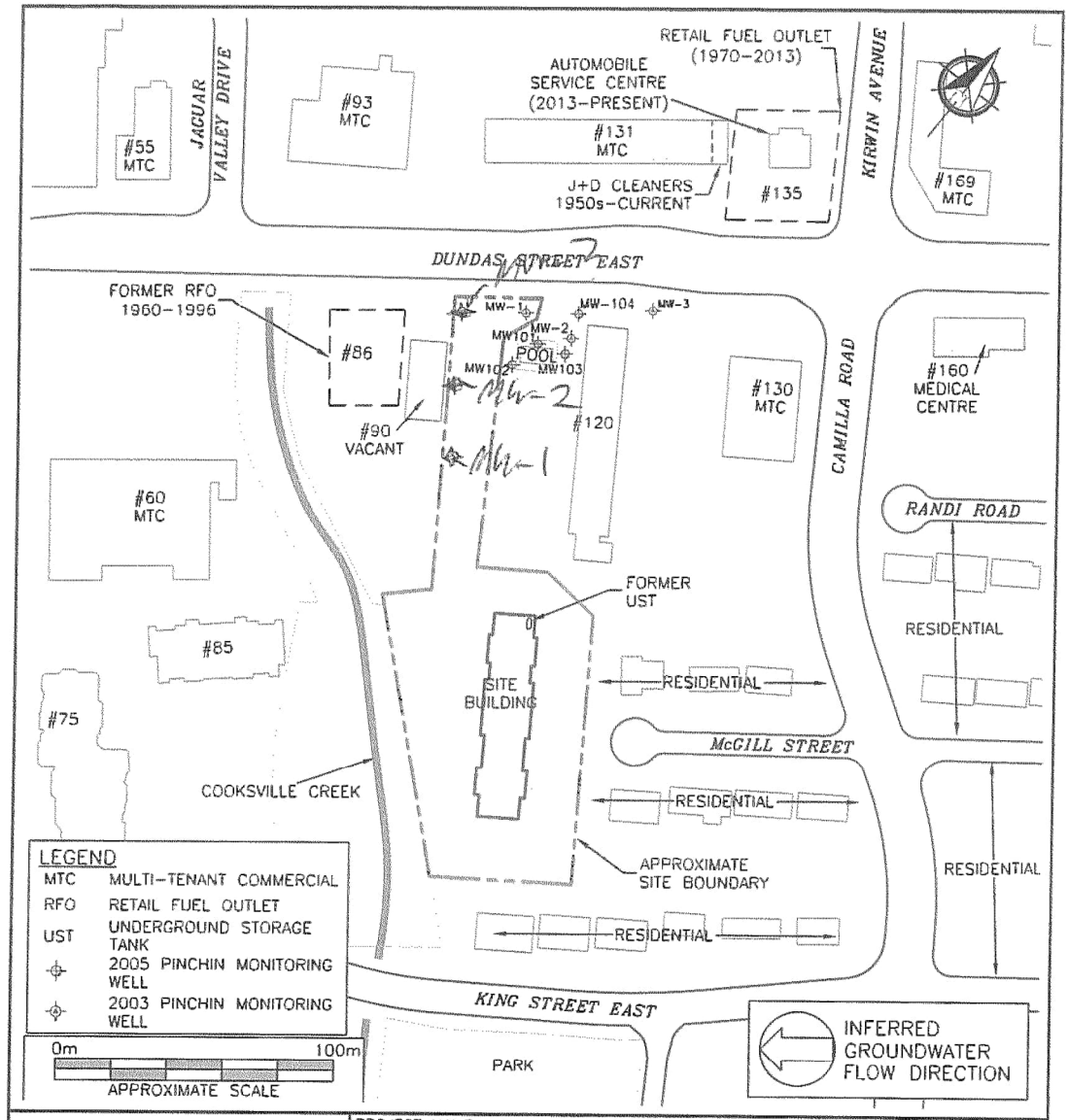

PINCHIN ENVIRONMENTAL

PROJECT NAME	[redacted]		
CLIENT NAME	[redacted]		
PROJECT LOCATION	100 DUNDAS STREET EAST, MISSISSAUGA, ONTARIO		
FIGURE NAME	SITE AND SURROUNDING LANDUSE PLAN		FIGURE NO.
APPROXIMATE SCALE	PROJECT NO.	DATE	2
AS SHOWN	87839	SEPT. 2013	

C-7241 2179766

NOV [illegible] 13

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

We Tag#: A197898 (Below)

A197895

S-18471

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	CIBC Corporate Real Estate		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
55 Yonge St, 4th floor	Toronto	On	M5E1J4	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
5 Dundas Street East			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	610697	4826279		WKQ-008852 A0 - A03

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BLK	Asphalt			0	3"
BRN	Sand	Silt		3"	5'
BRN/GRY	Silt	Clay/Sand		5'	14½
GRY	Shale	Weathered		14½	17'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
17'	6'	Sand	
6'	0	Holeplug	
		Flowmound	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	.25	0	7'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25	PVC	.10	7'	17'

Status of Well

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

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

MW1

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	17'	6"

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
Ontario	L3R 8V2	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Keegan Mc

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1570		2016/04/26

Comments: General contractor: Pinchin Environmental

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2016/04/26

Ministry Use Only

Audit No. Z231550

Received MAY 27 2016

0506E (2014/11)

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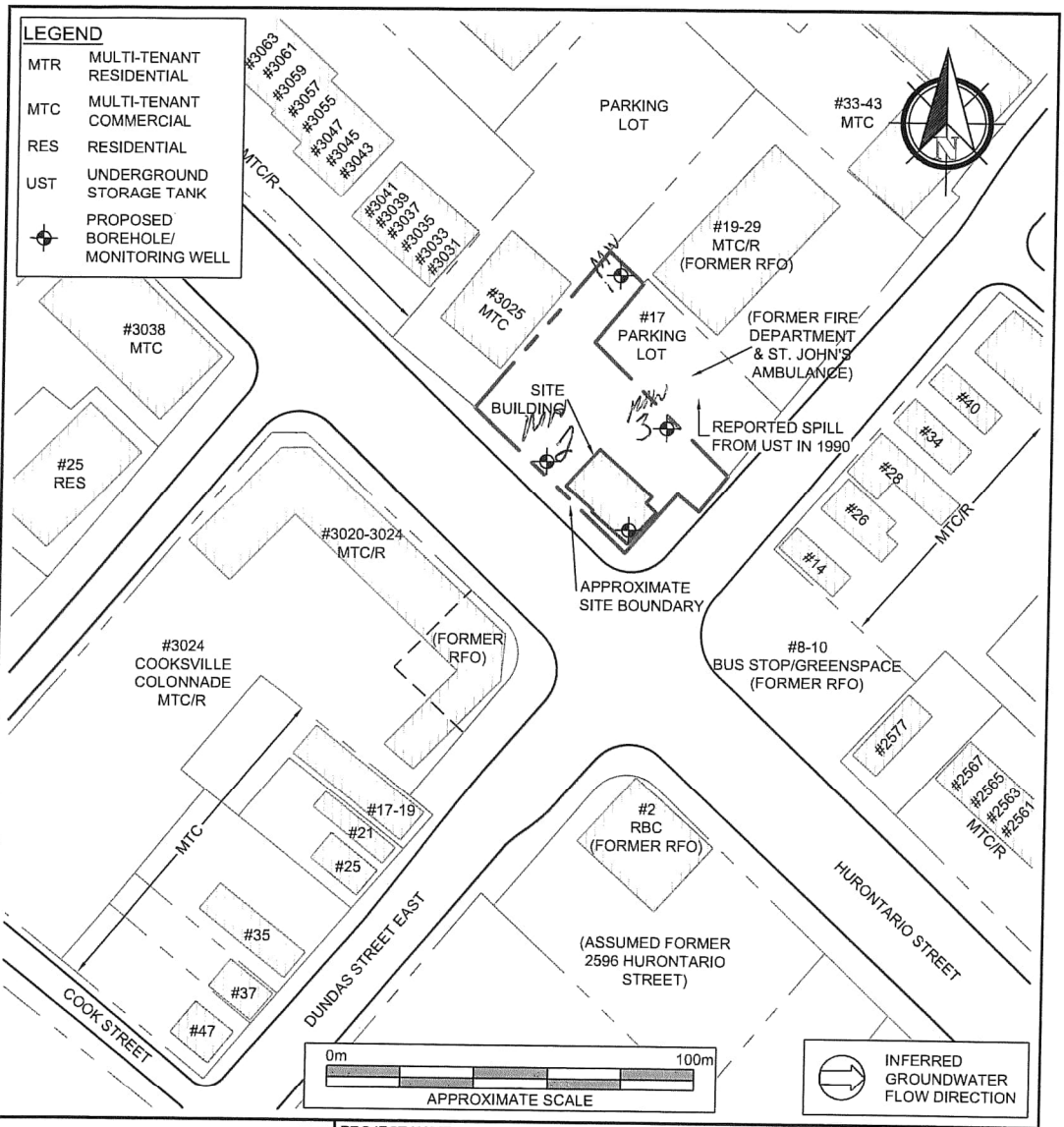
S-18471



PINCHIN

PROJECT NAME: PHASE II ENVIRONMENTAL SITE ASSESSMENT		
CLIENT NAME: CIBC CORPORATE REAL ESTATE		
PROJECT LOCATION: 5 DUNDAS STREET EAST, MISSISSAUGA, ONTARIO		
FIGURE NAME: PROPOSE BOREHOLE/ MONITORING WELL LOCATION PLAN		FIGURE NO.: 2
APPROXIMATE SCALE: AS SHOWN	PROJECT NO.: 111021.002	DATE: MAR. 2016

MAY 27 2016

C-7241 2231550

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag#: A197938 (A197938)

S-1847 | **Well Record**

Regulation 903 Ontario Water Resources Act

Page _____ of _____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	CIBC Corporate Real Estate		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
55 Yonge St 4th floor	Toronto	On	M5E1J4	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
5 Dundas Street East			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	611689	4826238		WKQ-008852 A0 - A03

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BLK	Asphalt			0	3'
BRN	Sand	Silt		3"	5'
BRN/GRY	Silt	Sand/Clay		5'	12½
GRY	Shale Shale	w	weathered	12½	17'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
17'	6"	Sand	
6'	0	Hydrovac Flushmount	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	.25	0	7'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25	PVC	10	7'	17

Status of Well

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

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	17'	6"

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping _____ hrs + _____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

MW 2

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
Ontario	L3R 8V2	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Leccese, Mike

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
1358		2016/04/11

Comments: General contractor: Pinchin Environmental

Well owner's information package delivered	Date Package Delivered	Ministry Use Only
☐ Yes ☐ No		Audit No. Z231549
	Date Work Completed 2016/04/11	MAY 27 2016 Received

0506E (2014/11)

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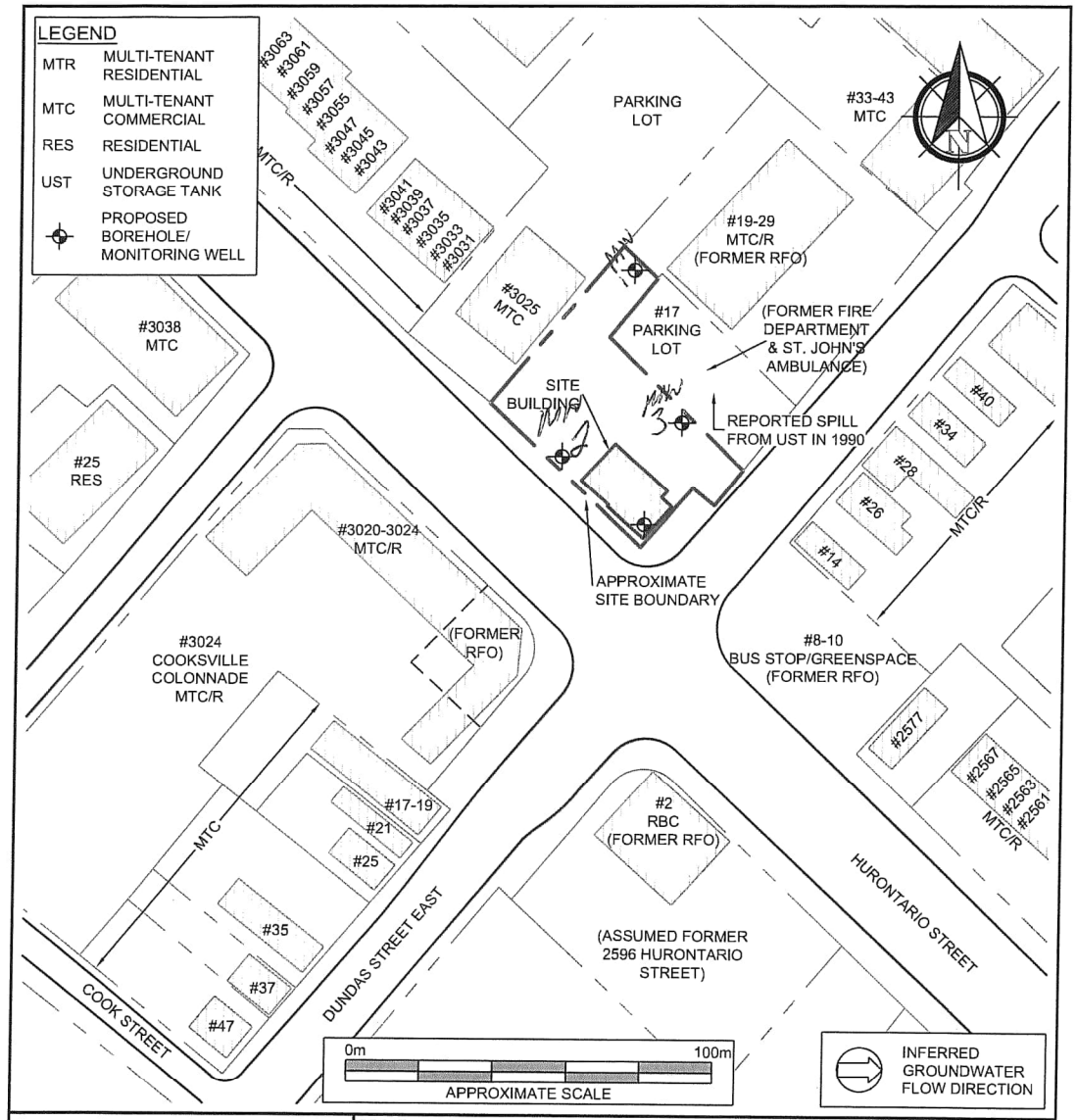

PINCHIN

PROJECT NAME: PHASE II ENVIRONMENTAL SITE ASSESSMENT			
CLIENT NAME: CIBC CORPORATE REAL ESTATE			
PROJECT LOCATION: 5 DUNDAS STREET EAST, MISSISSAUGA, ONTARIO			
FIGURE NAME: PROPOSE BOREHOLE/ MONITORING WELL LOCATION PLAN			FIGURE NO. 2
APPROXIMATE SCALE: AS SHOWN	PROJECT NO.: 111021.002	DATE: MAR. 2016	

MAY 27 2016

C-7211 7231549

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag#: A197940 (Owner) — A197940

S-18471

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	CIBC Corporate Real Estate		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
55 Yonge St 42nd floor	Toronto	ON	M5E1J4	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
5 Dundas Street East			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	610714	4822242		WKQ-008852 A0 - A03

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BLK	Asphalt			0	3"
BRN	Sand	Silt		3"	5'
BRN/GRY	Silt	Clay		5'	14'
GRY	Shale		Weathered	14'	17'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
17'	6'	Sand	
6'	0	Hydrated Bentonite	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	.25	0	7'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25	PVC	.10	7'	17'

Status of Well

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

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

N

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	17'	6"

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
Ontario	L3R 8V2	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Leccese, Nick

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
7316		2016/04/11

Comments: General contractor: Pinchin Environmental

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2016/04/11

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Audit No. Z231548

MAY 27 2016

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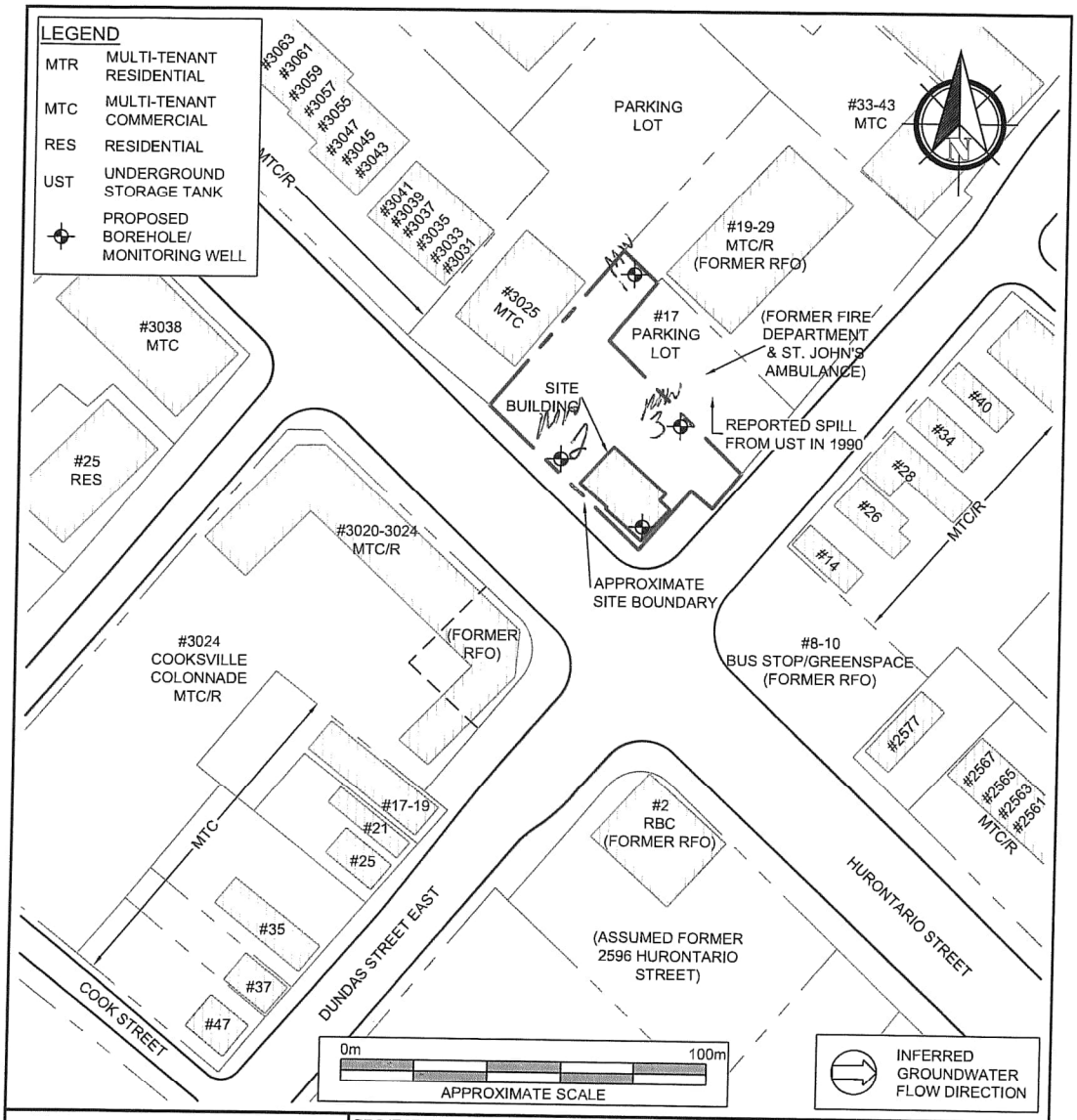

PINCHIN

PROJECT NAME: PHASE II ENVIRONMENTAL SITE ASSESSMENT			
CLIENT NAME: CIBC CORPORATE REAL ESTATE			
PROJECT LOCATION: 5 DUNDAS STREET EAST, MISSISSAUGA, ONTARIO			
FIGURE NAME: PROPOSE BOREHOLE/ MONITORING WELL LOCATION PLAN			FIGURE NO. 2
APPROXIMATE SCALE: AS SHOWN	PROJECT NO.: 111021.002	DATE: MAR. 2016	

C-241 7231548

Ontario — Ministry of the Environment and Climate Change

Well Tag No. *(Place Sticker and/or Print Below)* A197985

S-18471

Well Record

Regulation 903 Ontario Water Resources Act

Page ____ of ____

Measurements recorded in: ☐ Metric ☒ Imperial

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	CIBC Corporate Real Estate		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
55 Yonge St, 4th floor	Toronto	ON	M5E1J4	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
5 Dundas Street East			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	17	611711	4826220		WKQ-008919 A0 - A00

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Grey	Concrete			0	0.5'
Brown	Fill			0.5'	2'
Grey	Clay			2'	4.5'

Annular Space

Depth Set at (m/ft) From	Depth Set at (m/ft) To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
0	0.5'	concrete/flushmount	
0.5'	1.5'	Bensead	
1.5'	4.5'	Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☒ Other, *specify* Direct Push

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.25"	PVC	0.125"	0	2'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.5"	PVC	10	2'	4.5'

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*

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Hole Diameter Depth To	Hole Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	0	4.5'	2.25"
Water found at Depth (m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
Water found at Depth (m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

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

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

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Map

MW1

Comments: General contractor: Pinchin Environmental

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
Ontario	L3R 8V2	wrecords@stratasoil.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
905-764-9304	Walker, Jonathan

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3833		Y Y Y Y M M D D

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☒ No	Y Y Y Y M M D D	2016 04 21

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Audit No. Z231466

Received MAY 27 2016

MAY 27 2016

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7296548

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. (Place Sticker and/or Print Below) A199312 A199312

Tag#: A199312

Well Record

Regulation 903 Ontario Water Resources Act

S-20827 Page ____ of ____

ROYAL BANK OF CANADA

Address of Well Location (Street Number/Name)	Township	Lot	Concession
2 Dundas Street West			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Mississauga	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	611750	4826092		WKQ-010354 A0 - A02

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
B/K	Asphalt			0	3"
Brown	silt	clay		3"	10'
Grey	Shale			10'	13'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	6"	Concrete	
6"	2'	Bentonite	
2'	13'	Sand	

Method of Construction

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

Well Use

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

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
2"	PVC	.225	0	3'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
2.25	PVC	10	3'	13'

Status of Well

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

Results of Well Yield Testing

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

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

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

Map of Well Location

Please provide a map below following instructions on the back.

See Map

B"

Water Details

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

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	13'	6"

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Soil Sampling Inc.	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
Ontario	L3R 8V2	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
905-764-9304	Vanderbaan, Andrew

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3164	Andrew Vanderbaan	2017 09 29

Comments: General contractor: Pinchin Environmental

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: ____

Date Work Completed: 2017 09 12

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APPENDIX D

Water Balance Summary Tables

Table C: Water Balance Summary Table

Characteristic	Site			
	Pre-Development	Post-Development	Change (Pre to Post)	
Inputs (Volume)				
Precipitation (m^3/yr)	4,974	4,974	0	0%
Run-On (m^3/yr)	0	0	0	NA
Other Inputs (m^3/yr)	0	0	0	NA
Total Inputs (m^3/yr)	4,974	4,974	0	0%
Outputs (Volume)				
Precipitation Surplus (m^3/yr)	1,845	2,993	1,147	62%
Net Surplus (m3/yr)	1,845	2,993	1,147	62%
Evapotranspiration (m^3/yr)	3,129	1,981	-1,147	-37%
Infiltration (m^3/yr)	862	412	-450	-52%
Rooftop Infiltration (m^3/yr)	0	0	0	NA
Total Infiltration (m^3/yr)	**862**	**412**	**-450**	**-52%**
Run-Off Pervious Areas (m^3/yr)	983	441	-542	-55%
Run-Off Impervious Areas (m^3/yr)	0	2,139	2,139	NA
Total Run-Off (m^3/yr)	983	2,581	1,598	163%
Total Outputs (m^3/yr)	**4,974**	**4,974**	**0**	**0%**

Table A: Pre-Development

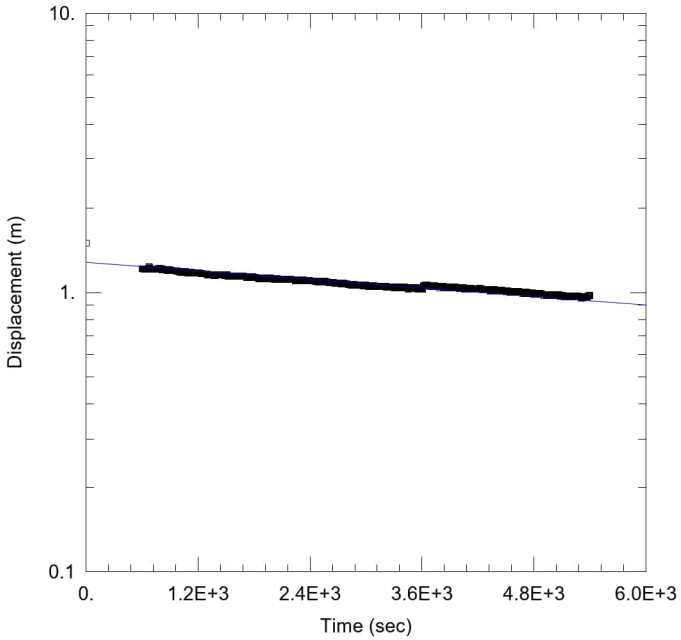
Catchment Designation	Forest	Landscaped Grass	Total
Area (m^2)	4,300	2,085	6,385
Pervious Area (m^2)	4,300	2,085	6,385
Impervious Area (m^2)	0	0	0
Infiltration Factors			
Topography Infiltration Factor	0.2	0.2	
Soil Infiltration Factor	0.1	0.1	
Land Cover Infiltration Factor	0.2	0.1	
Infiltration Factor	0.5	0.4	
Run-Off Coefficient	0.5	0.6	
Run-Off From Impervious Surfaces	0.8	0.8	
Inputs (Per Unit Area)			
Precipitation (mm/yr)	779	779	779
Rainfall (mm/yr)	632	632	632
Run-On (mm/yr)	0	0	0
Other Inputs (mm/yr)	0	0	0
Total Inputs (mm/yr)	**779**	**779**	779
Outputs (Per Unit Area)			
Precipitation Surplus (mm/yr)	289	289	289
Net Surplus (mm/yr)	289	289	289
Evapotranspiration (mm/yr)	490	490	490
Infiltration (mm/yr)	145	116	135
Surplus Infiltration (mm/yr)	0	0	0
Total Infiltration (mm/yr)	145	116	135
Run-Off Pervious Areas (mm/yr)	145	173	154
Run-Off Impervious Areas (mm/yr)	0	0	0
Total Run-Off (mm/yr)	145	173	154
Total Outputs (mm/yr)	**779**	**779**	**779**
Difference (Inputs - Outputs)	**0**	**0**	**0**
Inputs (Volumes)			
Precipitation (m^3/yr)	3,350	1,624	4,974
Run-On (m^3/yr)	0	0	0
Other Inputs (m^3/yr)	0	0	0
Total Inputs (m^3/yr)	**3,350**	**1,624**	**4,974**
Outputs (Volumes)			
Precipitation Surplus (m^3/yr)	1,243	603	1,845
Net Surplus (m^3/yr)	1,243	603	1,845
Evapotranspiration (m^3/yr)	2,107	1,022	3,129
Infiltration (m^3/yr)	621	241	862
Surplus Infiltration (m^3/yr)	0	0	0
Total Infiltration (m^3/yr)	**621**	**241**	**862**
Run-Off Pervious Areas (m^3/yr)	621	362	983
Run-Off Impervious Areas (m^3/yr)	0	0	0
Total Run-Off (m^3/yr)	621	362	983
Total Outputs (m^3/yr)	3,350	1,624	4,974
Difference (Inputs - Outputs)	**0**	**0**	**0**

Table B: Post-Development (no mit)

Catchment Designation	Parkland Dedication	Landscaped Grass	Structure	Total
Area (m^2)	2,450	502	3,433	6,385
Pervious Area (m^2)	2,450	502	0	2,952
Impervious Area (m^2)	0	0	3,433	3,433
Infiltration Factors				
Topography Infiltration Factor	0.2	0.2	0	
Soil Infiltration Factor	0.1	0.1	0	
Land Cover Infiltration Factor	0.2	0.1	0	
Infiltration Factor	0.5	0.4	0	
Run-Off Coefficient	0.5	0.6	1	
Run-Off From Impervious Surfaces	0.8	0.8	0.8	
Inputs (Per Unit Area)				
Precipitation (mm/yr)	779	779	779	779
Rainfall (mm/yr)	632	632	632	632
Run-On (mm/yr)	0	0	0	0
Other Inputs (mm/yr)	0	0	0	0
Total Inputs (mm/yr)	**779**	**779**	**779**	779
Outputs (Per Unit Area)				
Precipitation Surplus (mm/yr)	289	289	623	469
Net Surplus (mm/yr)	289	289	623	469
Evapotranspiration (mm/yr)	490	490	156	310
Infiltration (mm/yr)	145	116	0	65
Surplus Infiltration (mm/yr)	0	0	0	0
Total Infiltration (mm/yr)	145	116	0	65
Run-Off Pervious Areas (mm/yr)	145	173	0	69
Run-Off Impervious Areas (mm/yr)	0	0	623	335
Total Run-Off (mm/yr)	145	173	623	404
Total Outputs (mm/yr)	**779**	**779**	**779**	**779**
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**
Inputs (Volumes)				
Precipitation (m^3/yr)	1,909	391	2,674	4,974
Run-On (m^3/yr)	0	0	0	0
Other Inputs (m^3/yr)	0	0	0	0
Total Inputs (m^3/yr)	**1,909**	**391**	**2,674**	**4,974**
Outputs (Volumes)				
Precipitation Surplus (m^3/yr)	708	145	2,139	2,993
Net Surplus (m^3/yr)	708	145	2,139	2,993
Evapotranspiration (m^3/yr)	1,201	246	535	1,981
Infiltration (m^3/yr)	354	58	0	412
Surplus Infiltration (m^3/yr)	0	0	0	0
Total Infiltration (m^3/yr)	**354**	**58**	**0**	**412**
Run-Off Pervious Areas (m^3/yr)	354	87	0	441
Run-Off Impervious Areas (m^3/yr)	0	0	2,139	2,139
Total Run-Off (m^3/yr)	354	87	2,139	2,581
Total Outputs (m^3/yr)	1,909	391	2,674	4,974
Difference (Inputs - Outputs)	**0**	**0**	**0**	**0**

APPENDIX E

Hydraulic Conductivity Testing



WELL TEST ANALYSIS

Data Set: X:\...\BH2 Logger.aqt
Date: 06/02/22 Time: 17:50:09

PROJECT INFORMATION

Company: Azimuth Environmental
Client: Azure Group
Project: 22-056
Location: Mississauga
Test Date: May 11th 2022

AQUIFER DATA

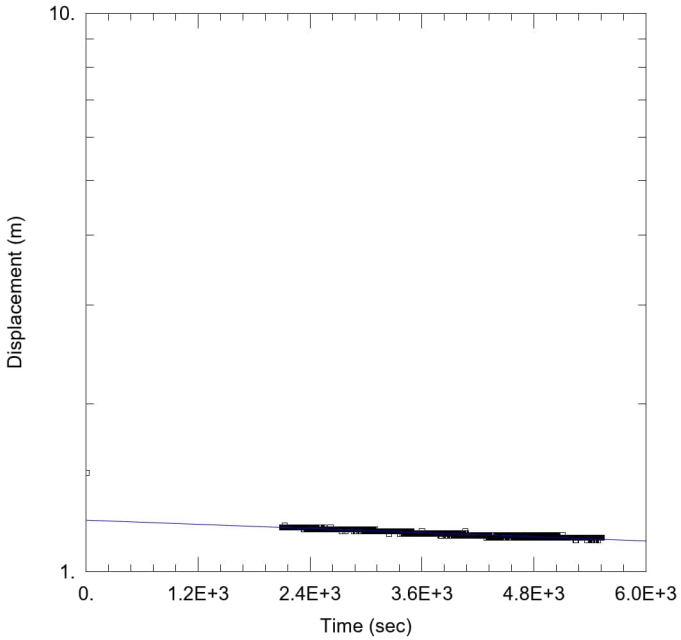
Saturated Thickness: 3.34 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH2)

Initial Displacement: 1.5 m
Total Well Penetration Depth: 3.34 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.9 m
Screen Length: 3.05 m
Wellbore Radius: 0.1524 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 2.278E-8 m/sec
y0 = 1.28 m



WELL TEST ANALYSIS

Data Set: X:\...\BH106 Logger.aqt
Date: 06/02/22 Time: 17:49:51

PROJECT INFORMATION

Company: Azimuth Environmental

AQUIFER DATA

Saturated Thickness: 3.58 m
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH106)

Initial Displacement: 1.5 m
Total Well Penetration Depth: 3.58 m
Casing Radius: 0.0254 m
Static Water Column Height: 3.84 m
Screen Length: 3.05 m
Wellbore Radius: 0.1524 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 5.564E-9 m/sec
y0 = 1.236 m

APPENDIX F

Water Quality Data

Results of Surface Water Chemical Analyses

Parameter	Symbol	Units	Provincial Water Quality Objectives (1994) Objective	BH-3 Sampled on: 2022-05-11 Sampled by: Azimuth Analyzed Caduceon
Saturation pH		N/A	-	6.73
pH		N/A	6.5-8.5	7.51
Langlier Index		N/A	-	0.777
Alkalinity (as CaCO3)		mg/L	262	244
Bicarbonate (as CaCO3)	HCO_3^-	mg/L	-	244
Carbonate (as CaCO3)	CO_3^{-2}	mg/L	-	< 5
Hydroxide		mg/L	-	< 5
Electrical Conductivity		uS/cm	-	3380
Fluoride	F	mg/L	-	< 1
Chloride	Cl^-	mg/L	-	777
Nitrate as N	NO_3-N	mg/L	-	5.47
Nitrite as N	NO_2-N	mg/L	-	< 0.5
Bromide	Br^-	mg/L	-	< 4
Sulphate	SO_4^{-2}	mg/L	-	83
Calcium	Ca	mg/L	-	247
Magnesium	Mg	mg/L	-	26.7
Sodium	Na	mg/L	-	393
Potassium	K	mg/L	-	4.9
Ammonia as N	NH_3-N	mg/L	-	0.02
Phosphate as P	PO_4^{-3}	mg/L	-	0.005
Total Phosphorus	P	mg/L	0.03	**2.89**
Reactive Silica	Si	mg/L	-	9.33
Total Organic Carbon	TOC	mg/L	-	1.1
Colour		Colour Units	-	< 2
Turbidity		NTU	-	181
Aluminum	Al	mg/L	0.075	0.29
Antimony	Sb	mg/L	0.02	0.0002
Arsenic	As	mg/L	0.005	< 0.0003
Barium	Ba	mg/L	-	0.265
Boron	B	mg/L	0.2	0.04
Cadmium	Cd	mg/L	0.0002	< 0.000029
Chromium	Cr	mg/L	0.0089	0.001
Copper	Cu	mg/L	0.005	0.0009
Iron	Fe	mg/L	0.3	0.259
Lead	Pb	mg/L	0.001	0.00024
Manganese	Mn	mg/L	-	0.032
Mercury	Hg	mg/L	0.0002	< 0.00002
Molybdenum	Mo	mg/L	0.04	0.0003
Nickel	Ni	mg/L	0.025	< 0.01
Selenium	Se	mg/L	0.1	0.004
Silver	Ag	mg/L	0.0001	0.0003
Strontium	Sr	mg/L	-	0.623
Thallium	Tl	mg/L	0.0003	< 0.00005
Tin	Sn	mg/L	-	< 0.05
Titanium	Ti	mg/L	-	0.008
Uranium	U	mg/L	0.005	0.0006
Vanadium	V	mg/L	0.006	0.0005
Zinc	Zn	mg/L	0.03	< 0.005
Total Dissolved Solids	TDS	mg/L	-	1678
Total Hardness (as CaCO3)		mg/L	-	727
% Difference/Ion Balance		%	-	4.69
Biochemical Oxygen Demand	BOD	mg/L	-	< 3
Total Kjeldahl Nitrogen	TKN	mg/L	-	5.9
Chemical Oxygen Demand	COD	mg/L	-	31
Phenols		mg/L	0.001	< 0.001
Total Suspended Solids	TSS	mg/L	-	
Conductivity (field)		µS/cm	-	
Temperature (field)		°C	-	
pH (field)			-	
Redox		mV	-	
Dissolved Oxygen		mg/L	-	

Bold and highlighted indicates PWQO exceedance
INS - Insufficient sample quantity to analyze for parameter

APPENDIX G

Dewatering Calculations

Pumping Rates Calculations

Project: Kirwin Ave Construction Phase
Project Number: 22-056

Legend:
- Fill in
- Leave alone
- calculated number

K m/sec 2.28E-07
K m/d calc 1.97E-02

Open Cut Calculations (Rectangular Excavation) ℓ / ω >1.5

$$Q = \frac{\pi K(H^2 - h^2)}{ln(\frac{R_o}{R_s})} + 2(\frac{LK(H^2 - h^2)}{2L})$$

Based on Equation 6.12 in systems where l/w> 1.5 (Powers, P.E., 1992) Where:

Q (m^3/Day)

K - Hydraulic Conductivity (m/Day)

H – Distance from Static water level to bottom of Aquifer (m)

h – lowest water level needed from static (m)

R_o- Radius of conical depression (m) (Taken from Equation 6.14 (Powers, P.E., 1992))

$$Ro = 3(H - h)\sqrt{k}$$

Where

K- Hydraulic Conductivity (m/Sec)

R_s – Equivalent Radius (m)

$$R_s = \frac{l + w}{\pi}$$

l- Length of excavation/trench

w- width of trench

in systems where l/w> 1.5

Parameter	Units		Q_R	
K	**m/d**	0.01968192	21.06	m^3/d
H	**m**	7.10	2.44E-04	m^3/Sec
h	**m**	3.65		
R	**m**	46.3		
	ω	47		
	ℓ	83		
Rs	**m**	41	Q_T 21.06 m^3/d	21,065
ln(Ro/Rs)		0.113		
Limit	400 m^3/d		Q_T 63.19 m^3/d **Expected Pumping Rate with contingency**	63,194
EASR	50 m^3/d			

EASR Reqired

300.0% Contingency for the variability in hydraulic conductivity that could be experienced and to provide flexibility to address additional drainage needed as a result of precipitation events.

50.00% Porosity Table from Freeze and Cherry 1979

Storage Volume					
	Thickness (m)	m^3	L	30 day (m^3)	60 Day (m^3)
Clayey Silt	3.6	7119	7.12E+06	79	40
		0	0	0	0
Total	3.6	7119	7119325	79	40

Table 2.4 Range of Values of Porosity

	n(%)
Unconsolidated deposits	
Gravel	25–40
Sand	25–50
Silt	35–50
Clay	40–70
Rocks	
Fractured basalt	5–50
Karst limestone	5–50
Sandstone	5–30
Limestone, dolomite	0–20
Shale	0–10
Fractured crystalline rock	0–10
Dense crystalline rock	0–5

Precipitation Event into excavation					
Storm Event	(mm)	Depth (m)	Area m2	(m3)	(L)
2-yr 24-hr.	56.2	0.0562	3901	219	219236
5-yr 24-hr.	74.2	0.0742	3901	289	289454
25-yr 24-hr.	101.2	0.1012	3901	395	394781
100-yr 24-hr.	123.6	0.1236	3901	482	482164
Climate Normals (/Yr)	709	0.709	3901	2766	2765809
Climate Normals (/Day Average 6 months)				17	16762

Pumping Rates				
Time	m^3/day	m^3/hour	L/Min	
Storage (30 day pre excavation)	142.3	6	99	EASR Reqired
Storage (60 day pre excavation)	102.7	4	71	EASR Reqired
Construction	63.19	2.6	44	EASR Reqired

ω – excavation width
ℓ – excavation length

	W	L	L/W
Development footprint requiring dewatering	47	83	1.765957

Note: Width and length of the excavation is assuming PL to PL

K Max used 2.28E-07 m/sec

		mRD
Ground Surface from:	Finished Floor (Drawing)	113.65

		mASL	Water Column	
High Water Table		109.10		BH/MW1
Bottom of excavation (mbgs)	8.7	105.45		Set to 2 mb finished P2 Slab
Bottom of lowest screen		104.90		Based on the lowest elevation of known screens
Dewatering Target (Construction)		105.45	3.65	
Dewatering Target (Operations)				
Aquifer depth		102.00	7.10	Based on assumed bedrock elevation in the area

Pumping Rates Calculations

Project: Kirwin Ave Development Post Construction
Project Number: 22-056

Legend:
- Fill in
- Leave alone
- calculated number

K m/sec 2.28E-07
K m/d calc 1.97E-02

Open Cut Calculations (Rectangular Excavation)

ℓ / ω >1.5

$$Q = \frac{\pi K(H^2 - h^2)}{ln(\frac{R_o}{R_s})} + 2(\frac{LK(H^2 - h^2)}{2L})$$

Based on Equation 6.12 in systems where l/w> 1.5 (Powers, P.E., 1992) Where:

Q (m^3/Day)

K - Hydraulic Conductivity (m/Day)

H – Distance from Static water level to bottom of Aquifer (m)

h – lowest water level needed from static (m)

R_o- Radius of conical depression (m) (Taken from Equation 6.14 (Powers, P.E., 1992))

$$Ro = 3(H - h)\sqrt{k}$$

Where

K- Hydraulic Conductivity (m/Sec)

R_s – Equivalent Radius (m)

$$R_s = \frac{l + w}{\pi}$$

l- Length of excavation/trench

w- width of trench

in systems where l/w> 1.5

Parameter	Units		Q_R	
K	**m/d**	0.01968192	18.01	m^3/d
H	**m**	7.10	2.08E-04	m^3/Sec
h	**m**	1.65		
R	**m**	49.2		
	ω	47		
	ℓ	83		
			Q_T	
Rs	**m**	41	18.01 m^3/d	18,006
ln(Ro/Rs)		0.173		
			Q_T	
Limit	400 m^3/d		54.02 m^3/d	54,019
EASR	50 m^3/d			

Expected Pumping Rate with contingency

EASR Reqired

300.0% Contingency for the variability in hydraulic conductivity that could be experienced and to provide flexibility to address additional drainage needed as a result of precipitation events.

ω – excavation width
ℓ – excavation length

	W	L	L/W
Development footprint requiring dewatering	47	83	1.765957

Note: Width and length of the excavation is assuming PL to PL

K Max used 2.28E-07 m/sec

		mASL
Ground Surface from:	Finished Floor (Drawing)	113.65

		mASL	Water Column	
High Water Table		109.10		BH/MW1
Bottom of excavation (mbgs)	6.7	107.45		Set to 2 mb finished P2 Slab
Bottom of lowest screen		104.90		Based on the lowest elevation of known screens
Dewatering Target (Construction)		107.45	1.65	
Dewatering Target (Operations)		107.45	1.65	
Aquifer depth		102.00	7.10	Based on assumed bedrock elevation in the area