FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT IN SUPPORT OF RE-ZONING APPLICATION

30 Bristol Road East, Sandalwood Square City of Mississauga Region of Peel



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File Number: 19002

Prepared For:

151516 Canada Inc.

1 No.	Draft for Client Review Revision	March 7, 2019 Date
2	Issued for Zoning By-Law Amendment	March 28, 2019



EXECUTIVE SUMMARY

This Functional Servicing and Stormwater Management Report ('FSSR') has been prepared on behalf of 151516 Canada Inc. in support of a re-zoning application for 30 Bristol Road East, Mississauga.

It is understood that the property owner has filed a consent application (City file 'B' 2/19) for the overall property that would sever a portion ('subject site' or 'Phase 1') of the north-west corner of the overall property. The newly created subject site, approximately 0.87 ha, will form the boundary of the scope of the re-zoning application. Due to the concurrent applications, this FSSR has been developed to also consider the requirements of the consent application.

This FSSR presents a site servicing strategy for the subject site that addresses the requirements of the applicable regulatory agencies and provides the basis for detailed servicing design. The servicing strategy for the proposed development is summarized as follows:

WATER SERVICING:

- The overall and subject site are serviced by a network of private servicing. The utility locate program completed, shown on the Buried Utility Map, was unable to identify the locations of the existing watermain servicing and the connection(s) to the municipal system;
- Due to the consent application, a new service connection for the subject site will be required. The subject site's buildings will remain under a single ownership. It is proposed to connect into the existing 400mm diameter watermain located in Hurontario Street. A service connection meeting Region of Peel standards, specifically Public Works standard drawing 1-8-3 will be required. The exact location of the connection will be developed during detailed design/site plan approval.
- The water demand requirement of the proposed building for maximum day demand plus fire flow is **141 L/s**. Due to the timing of the application, hydrant flow test results could not be obtained. A hydrant flow test will be required on a hydrant along Hurontario Street to confirm that the water demand can be met at 20psi.

SANITARY SERVICING:

 The overall and subject site are serviced by a network of private servicing that connects into a private sewer, within an easement, through the private property east of the overall site. This sewer connects into a municipal sewer located in Trailwood Drive.



- Due to the consent application, a new service connection for the subject site will be required. The subject site does not front a municipal roadway that contains a public sanitary sewer. Two options have been identified that could potentially service the subject site, referred to as the 'Bristol' option and the 'Hurontario' option. Further discussion and feedback from the Region of Peel on available external capacity is required in order to confirm the suitable option.
- The subject site's buildings will remain under a single ownership. As such, one connection into the extended sanitary sewer will be provided. The exact location of the connection will be developed during detailed design/site plan approval.
- Based on Region of Peel standard drawing 2-9-2, the peak flow (plus infiltration) generated will be **16.02** L/s.

STORMWATER SERVICING:

- The overall and subject site are serviced by a network of private servicing that connects into the existing 750mm diameter storm sewer in Bristol Road East.
- Due to the consent application, a new service connection into the existing 750mm diameter storm sewer will be provided. The exact location of the connection will be developed during detailed design/site plan approval.
- Quantity The subject site is located in the Cooksville Creek watershed, and will require that the 100-year post-development flow rate be controlled to the 2-year predevelopment flow rate. Quantity control will be provided on-site by approximately 271 m³ of underground storage in combination with an inlet control, and considers some uncontrolled drainage to both the adjacent roads and the remainder of the overall site. The inlet control and volume of storage will need to be re-confirmed during detailed design/site plan approval.
- Water Balance The subject site will be required to retain/reuse 5mm of stormwater. A
 water balance volume of 32.6 m³ is required and will be retained through the re-use of
 stormwater internally within the building. Details of internal reuse to be provided by the
 building design team during the site plan approval process.
- Quality The subject site will be required to provide 80% TSS removal. The
 methodology of achieving quality controls will be determined at the detailed design/site
 plan approval stage of the project.
- It is likely that all controls will be contained within the building structure, although the
 exact details of this will be determined during the site plan approval and/or building
 permit process.



GENERAL NOTES:

• The subject site's buildings will remain under a single ownership. As such, 1 set of service connections will be provided.



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Figure 1 Site Location

Figure 2 Existing Storm Drainage Figure 3 Proposed Storm Drainage

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Appendix A Topographic Survey, prepared by Speight, Van Nostrand & Gibson Ltd.

Site and Architectural Plans, prepared by Turner Fleischer Architects

Inc.

Buried Utility Map, prepared by Mark It Locates inc.

Appendix B Water Demand Calculations

Appendix C Sanitary Design Flow Calculations

Multi-Use Demand Table

Sketch of 12371-D

Appendix D Stormwater Design Calculations

LIST OF ENGINEERING DRAWINGS

Site Servicing Plan (SW-S), prepared by Counterpoint Engineering Inc. dated March 28, 2019.

Sanitary Option 1 Plan (SW-SAN1), prepared by Counterpoint Engineering Inc. dated March 28, 2019.

Site Grading Plan (SW-G), prepared by Counterpoint Engineering Inc. dated March 28, 2019.



1.0 INTRODUCTION

1.1 BACKGROUND

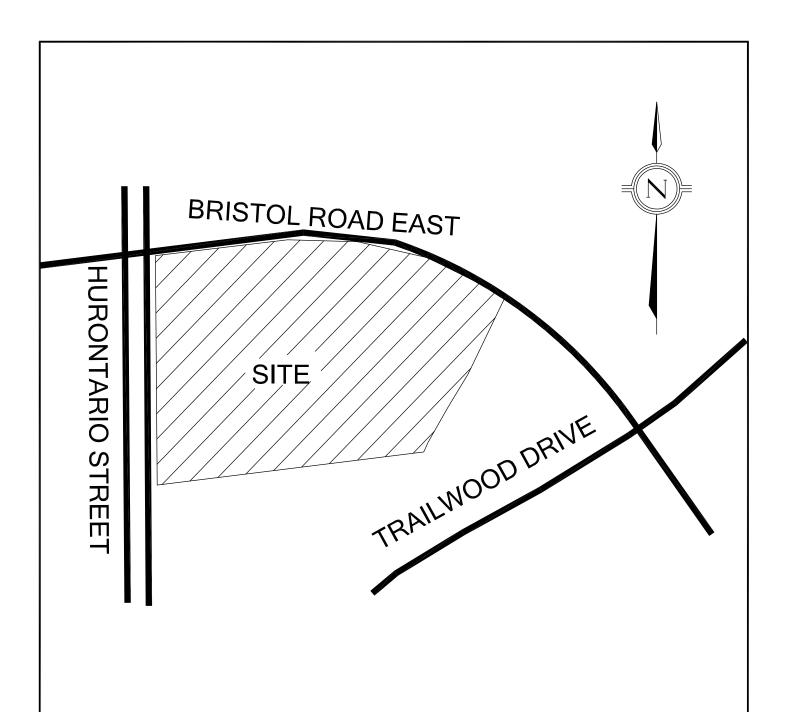
This Functional Servicing and Stormwater Management Report ('FSSR') has been prepared on behalf of 151516 Canada Inc. in support of a re-zoning application for 30 Bristol Road East, Mississauga.

It is understood that the property owner has filed a consent application for the overall property that would sever a portion ('subject site' or 'Phase 1') of the north-west corner of the overall property. The newly created subject site, approximately 0.87 ha, will form the boundary of the scope of the re-zoning application. Due to the concurrent applications, this FSSR has been developed to also consider the requirements of the consent application.

The subject site is located in the City of Mississauga and the Region of Peel. Specifically, it is located at the north-west corner of Hurontario Street and Bristol Road East. The site is bound by a variety of uses; residential lands to the north (across Bristol Road East) retail uses within the balance of the overall site to the south and east, and mixed uses to the west (across Hurontario Street). **Figure 1** illustrates the subject site within the context of its surroundings. The subject site is currently unoccupied with existing asphalt parking, etc., and the balance of the overall site is currently occupied by 2 small retail units and 1 multi-tenant retail strip plaza. To better illustrate the existing condition on the property, a topographical survey of the site has also been included in **Appendix A**.

For the details of the proposed development, refer to **Appendix A** for the Site and Architectural Plans prepared by Turner Fleischer Architects Inc.

This FSSR has been prepared in order to demonstrate that the existing municipal servicing and infrastructure can accommodate the design concept presented as part of the re-zoning application.





KEY PLAN

SITE LOCATION:
PROPOSED DEVELOPMENT
30 BRISTOL ROAD EAST, SANDALWOOD SQUARE
MISSISSAUGA, ON

DATE: MARCH 2019
PROJECT No.19002
19002
FIGURE No. 1
l



2.0 STUDY PARAMETERS

This FSSR is based on the review of the following documents and drawings:

- Architectural Plans prepared Turner Fleischer Architects Inc.
- Topographic Survey prepared by Speight van Nostrand & Gibson Ltd.
- Buried Utility Map prepared by Mark It Locates Inc.
- Plan and Profile Drawings for Hurontario Street, Bristol Road East and Trailwood Drive.
- Region of Peel Site Plan Process, prepared by the Region of Peel, dated July 2009.
- Region of Peel Functional Servicing and Storm Water Management Report, prepared by the Region of Peel.
- Region of Peel Sanitary Sewer Design Criteria, prepared by the Region of Peel, dated March 2019 (rev. 0.9).
- Region of Peel Watermain Design Criteria, prepared by the Region of Peel, dated June 2010.
- **T&W Development Requirements**, prepared by the City of Mississauga.



3.0 WATER SUPPLY

3.1 EXISTING WATER SUPPLY

The overall and subject site are serviced by a network of private servicing. The utility locate program that was completed, shown on the Buried Utility Map, was unable to identify the locations of the existing watermain servicing and the connection(s) into the municipal system.

Hurontario Street contains a 400mm diameter PVC watermain that is located within the east half of the right-of-way. Bristol Road East contains a 600mm diameter concrete watermain that is located within the south half of the right-of-way. Fire hydrants are located along Hurontario Street (1) and Bristol Road East (1) along the frontage of the subject site.

3.2 PROPOSED WATER SUPPLY

Due to the requirements of the consent application, a new fire protection and domestic connection will be required to service the subject site. It is proposed to connect into the existing 400mm diameter watermain in Hurontario Street in accordance with Region of Peel Public Works standard drawing 1-8-3. Refer to drawing **SW-S** for a visual representation of the proposed servicing. The specific location of the connection into the 400mm diameter watermain will be confirmed during detailed design/site plan approval. The FDC is shown on the architectural plans near the interior of the site. A hydrant is schematically shown within the required limits and the piping to it would fall under the mechanical plumbing scope of work.

The available municipal servicing should satisfy maximum day plus fire flow or the peak hour demand, whichever is greater. Fire demand is calculated as per the Fire Underwriter's Survey (FUS) guidelines (1999).

Using the 'persons per unit' breakdown within the Project Status Report provided to the applicant, the equivalent population of the subject site will be **1207 persons**. Refer to **Appendix B** for the supporting calculations of the following demands for the subject site:

- Peak Hour Demand = 11.74 L/s.
- Maximum Day Demand = 7.81 L/s.
- Fire Flow Demand (2.0 hours) = 150 L/s.
- Maximum Day Demand plus Fire Flow Demand = 157.81 L/s (governs)



Due to the timing of the application, a hydrant flow test could not be scheduled. A hydrant flow test will need to be completed with the rating curve compared to the demands noted above, in order to confirm that the municipal watermain infrastructure can support the proposed development.

4.0 SANITARY SERVICING

4.1 EXISTING SANITARY SERVICING

The overall site, including subject site, is serviced through a private sewer (contained in an easement) that is located on the adjacent private property to the east and south. Per Region of Peel drawing 13248-D (Sanitary Easement, Block 178, Sandalwood-7), the private sewer is a 250mm diameter PVC sewer and is located in a 3m wide private easement, assumed to be in favour of the owner of the overall site. A network of private sanitary servicing is connected into this 'easement sewer' and services both the subject site and the balance of the overall site.

The portions of Hurontario Street and Bristol Road East do not contain municipal sanitary sewers.

For the purpose of this application, it is proposed to maintain the 'easement sewer' to service the balance of the overall site (although this is outside of the scope of this application).

4.2 PROPOSED SANITARY SERVICING

Due to the consent application, an extension of a municipal sanitary sewer will be required in order to service the subject site.

Using the 'persons per unit' breakdown within the Project Status Report provided to the applicant, the equivalent population of the subject site will be **1207 persons**. In accordance with Region of Peel standard drawing 2-9-2 and a unit sewage flow of 302.8 Lpcd, the peak flows (including the peaking factor) is estimated to be 15.85 L/s.

In accordance with Region of Peel requirements, an infiltration allowance of 0.0002 m³/sec/ha is to be provided. This equates to 0.17 L/s, which results in a final peak flow of **16.02 L/s**. Refer to **Appendix C** for supporting calculations. A copy of the Region's 'Connection Multi Use Demand Table' is also included in **Appendix C**.



Two external sewer improvement options have been identified for the purpose of further discussion with the Region of Peel:

1. Bristol Road East Extension ('Bristol Option'):

A local/sub-trunk sewer is located at the intersection of Bristol Road East and Trailwood Drive. It is proposed to connect into the sub-trunk at this location and extend a 250mm diameter sewer west along Bristol Road East. A connection to the subject site can be made, with the exact location and elevation to be determined during detailed design of the sewer extension. Based on a minimum slope of 0.5% and a size of 250mm diameter, the minimum capacity provided by the sewer connection will be 42.7 l/s. Refer to **Drawing SW-SAN1** for a preliminary design concept for this option.

2. Huontario Street/Bristol Road West Extension ('Hurontario Option')

A 250mm diameter local collector sanitary sewer terminates at the east end of Bristol Road West, node 1796264 within sub-sewershed ID ME-CVCN-5. Based on the infrastructure in Hurontario Street that is shown on Region of Peel drawing 12371-D, it may be possible to extend a sewer across Hurontario Street to the subject site. It is likely that the last leg of the Bristol Street West sewer (11A to the service station service connection) will need to be lowered to a flatter grade in order to cross existing infrastructure in Hurontario Street. Refer to **Sketch of 12371-D** for a visual markup of this option.

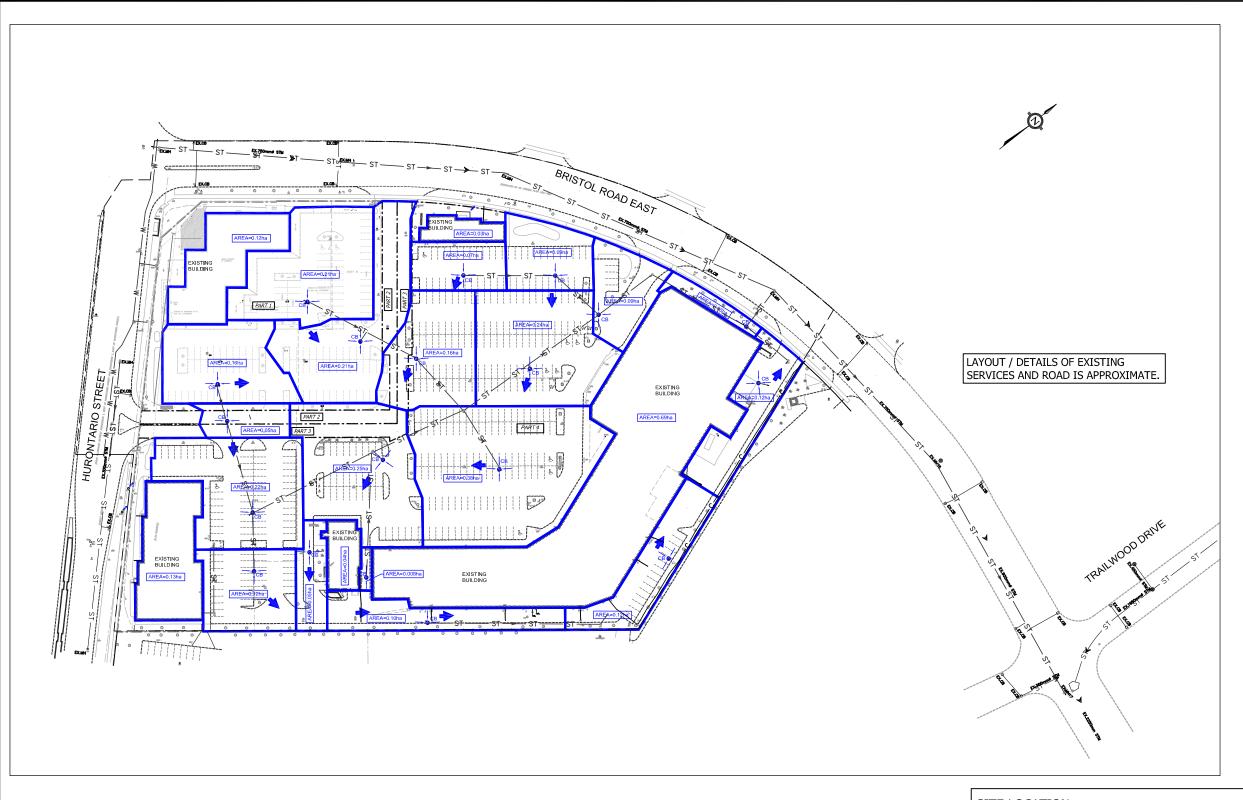
Due to the proposed Hurontario LRT works, this option has not been explored in detail, however it should be reviewed and considered as a possible option.

6.0 STORMWATER SERVICING

6.1 EXISTING CONDITIONS

The overall site, including subject site, is currently serviced by a network of private storm sewers that connects into the existing 750mm diameter storm sewer located in Bristol Road East.

Major system storm runoff discharges overland to the Bristol Road East right of way, with the outlet within the adjacent retail lands. Refer to **Appendix A** for a topographical survey of the existing site conditions, and **Figure 2** for the pre-development drainage plan. No stormwater management controls have been identified within the existing site; therefore, it is understood that the site currently discharges uncontrolled storm runoff to the adjacent retail lands.



SITE LOCATION: PROPOSED DEVELOPMENT 30 BRISTOL ROAD EAST, SANDALWOOD SQUARE MISSISSAUGA, ON

counterpoint

COUNTERPOINT ENGINEERING INC. 8395 Jane St., Suite 100, Vaughan, ON L4K 5Y2 Phone 905.326.1404 Fax 905.326.1405

EXISTING SITE DRAINAGE PLAN

DATE: MARCH 2019 SCALE: NTS PROJECT No.19002

LEGEND

--- PROPERTY LINE

—→ EXISTING STORM SEWER DRAINAGE BOUNDARY

EMERGENCY OVERLAND FLOW

FIGURE No. 2



6.2 ALLOWABLE RELEASE RATE

In accordance with the City's requirements for the Cooksville Creek watershed, the subject site will be required to control the 100-year post-development peak flows to the 2-year predevelopment flow rate. In addition to this, the maximum run-off co-efficient that can be used to calculate the pre-development flow rate (allowable) is 0.5, regardless of the current site condition. Since the subject site is predominately hard paved/surfaced, the run-off co-efficient used is 0.5.

As a result, the allowable discharge from the subject site is calculated as follows:

$$Q_A = C \times A \times i \times N (L/s)$$

Variables	Site To Bristol Road East								
A - Site Area (ha)	0.87								
Tc (min)	15								
C - Runoff Coefficient	0.50								
i - Intensity	60								
N – Constant	2.778								
Q - Release Rate (I/s)	73								

Table 2 - Allowable Release Rate

Quantity control will be provided on-site to ensure that the 100-year post development peak flows to the existing 750mm diameter Bristol Road East storm sewer will be attenuated to the allowable release rate of **73 L/s** or less. Refer to **Appendix D** for allowable release rate calculations.

6.3 PROPOSED STORMWATER SERVICING

Due to the extents of the building structure and underground parking, quantity, water balance and quality controls will likely need to be located within the parking structure. For the purpose of re-zoning, we have estimated the quantities and sizes of the controls. Refinement and re-calculation of these items will be required at the site plan approval stage of the project, as it is expected that architectural and landscaping design elements will be further refined at that time.

Under proposed conditions, the building roof-tops and areas that have underlying parking structures will be serviced by area drains that fall under the mechanical plumbing scope of



work. As such, for that area, the 'site servicing' scope of work terminates outside of the structure.

A total area of approximately 0.08 ha of the proposed development will release uncontrolled, while the balance will be captured and controlled to ensure the overall allowable release rate is maintained. An area of 0.07 ha will release uncontrolled to the adjacent municipal right-of-way and 0.01 ha will release uncontrolled to within the adjacent retail lands. The degree of uncontrolled run-off will be re-confirmed during site plan approval. Refer to drawing **SW-S** for a visual representation of proposed servicing and **Figure 3** for a proposed drainage plan.

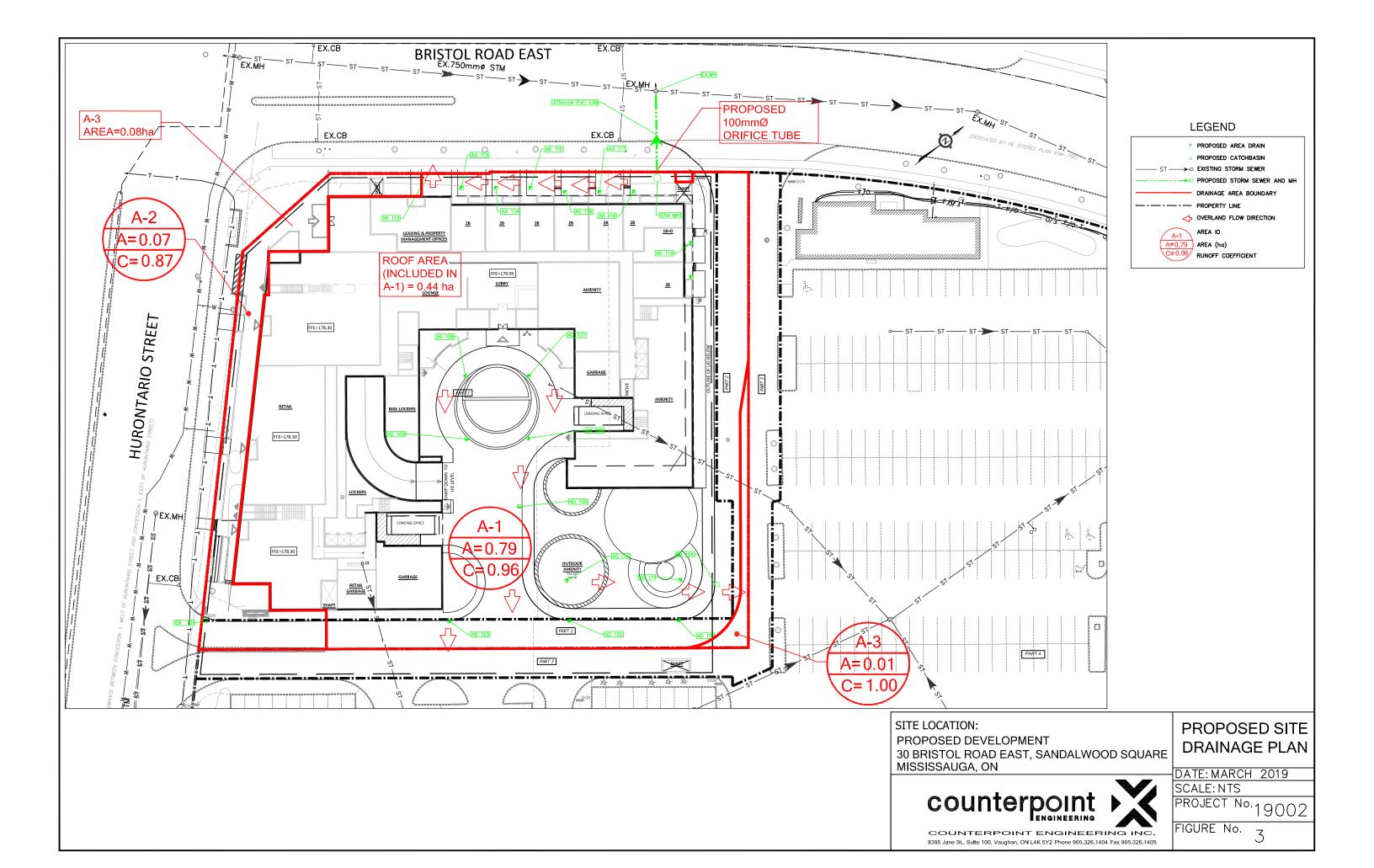
6.4 QUANTITY CONTROL

The uncontrolled area (Area A-2 and A-3), with a composite run-off co-efficient of 0.87 and 1.0 respectively, will produce a combined peak runoff of **29 L/s** during the 100-year storm event. This uncontrolled release rate will be deducted from the allowable release rate of **73 L/s**, resulting in a release rate from the captured area (Area A-1) of **44 L/s**.

Quantity control will be provided on-site by an underground storage tank within the garage level(s) of the building in combination with an inlet control device (tentative 99.4 mm orifice tube) to ensure that the release rate from Area A-1 is attenuated to 44 L/s. A storage volume of approximately **271 m³** will be required to meet the control target. Note that an additional **32.6 m³** of storage volume will be available for the water reuse cistern portion of the tank (refer to section 6.5), below the invert of the orifice control. Refer to **Table 3** and **Appendix D** for detailed calculations.

Table 3 – Peak Flow and Storage Summary - 100-Year Storm Event

				SI	NM DESIGN	CALCULAT	IONS				
				Summai	y - Storage	Provided (Calculation	าร			
Pro	ject Name:	Sandalwood	Square							Prepared by:	G.R.
Mi	unicipality:	Mississauga,	Ontario								
P	roject No.:	19002								Last Revised:	22-Mar-1
	Date:	22-Mar-19									
Rainfall Data											
Location:	Mississau	ıga, Ontario		Α	1450						
Event	100-year			В	4.9						
				С	0.78						
Area ID	Area (ha)	Runoff Coefficient	TC (min)	Provided Underground Tank Storage (m³)	Total Storage Provided Up to HGL (m³)	Storage Required (m³)	Designed Release Rate (m³/s)	Description	Orifice Size (mm)	Orifice Release Rate (m³/s)	Allowable Release Rate (m³/s)
A-1	0.79	0.96	15.00	271	271	271	0.044	Controlled	99.4	0.044	
A-2	0.07	0.87	15.00	0	0	0	0.025	Uncontrolled	-		
A-3	0.01	1.00	15.00	0	0	0	0.004	Uncontrolled	-		
Total	0.87	0.94		271.0	271.0	271	0.073				0.073





As shown in **Table 3** above, the proposed site release rate during the 100-year storm event will be less than the allowable release rate. Refer to **Appendix D** for storage volume calculations.

During system failure conditions, stormwater will spill out from a proposed interceptor catchbasin located inside the Hurontario Street entrance at an elevation of +/- 177.60m. This would allow for emergency spill to occur directly to the Hurontario right-of-way as opposed to the adjacent private property.

The design of all internal piping within the building must provide adequate capacity for full capture and conveyance of all flows generated by storms up to and including the 100-year rainfall event. All design and associated calculations for the internal storm system, including the design of the internal inlet structures, piping and mechanical appurtenances is to be completed by the Mechanical Engineer.

6.5 WATER BALANCE

In accordance with City of Mississauga requirements, 5 mm of run-off shall be retained on-site and managed by the way of infiltration, evapotranspiration or re-use. To achieve the water balance objectives, the site was categorized by surface types: impervious asphalt/paved, landscaped areas and conventional roof. The initial abstraction values for the impervious surfaces and pervious surfaces were 1 mm and 5 mm, respectively.

The site area (0.87 ha) multiplied by a 5mm, 24 hour storm is equivalent to approximately **43.7** m³ of total required retention. Without any specific retention measures, the proposed development would achieve the following levels of water balance as seen in **Table 4**.

Table 4 – Water Balance

Area Description	Fraction	of Site A	rea	Initial Abstraction (mm)	Overall Initial Abstraction Volume (m³)
Impervious Roof	50%	0.44	ha	1.0	4.4
Parking / Vehicular	43%	0.37	ha	1.0	3.7
Pervious / Green					
Roof Area	7%	0.06	ha	5.0	3.0
Total:	100%	0.874	ha		11.2



Based on **Table 4**, the site will have a shortfall of **32.6** m^3 (43.7 m^3 – 11.2 m^3). For the purpose of this submission, pervious areas were estimated and will need to be re-confirmed during site plan approval.

Due to the nature of the proposed development (i.e. predominately a building structure) methods such as bio-retention galleries, infiltration galleries, permeable pavers, etc. are not considered to be feasible. As such, it is recommended to make it a condition of site plan approval for the building design to determine a method of re-using the water balance volume requirement.

Typically, a sump will be provided as a part of the quantity control structure. The volume of the sump is to match at a minimum the water balance volume requirement and is to be located below the invert of the storm outlet, should it be discharged via gravity flow. The details and configuration of the structure will be determined at the site plan approval stage of the project.

6.6 QUALITY CONTROL

The City of Mississauga requires that 80% removal of TSS is required on an average annual loading basis from all runoff leaving the proposed development.

As a large portion of the site consists of roof, landscape, and non-vehicular impervious areas, all of which are free of oil and grit, quality control measures may not be required. However, the implementation of Oil-Grit Separators ('OGS') or other quality control measures will be investigated during the site plan approval stage of the development to determine if they are required.



7.0 CONCLUSIONS

This FSSR presents a site servicing strategy for the proposed development that addresses the requirements of the applicable design guidelines and provides the basis for detailed servicing design.

We trust this report sufficiently addresses the site servicing requirements and allows for approval of the proposed re-zoning of the subject site. Should there be any questions or comments, please feel free to contact the undersigned.

Sincerely,

Counterpoint Engineering Inc.

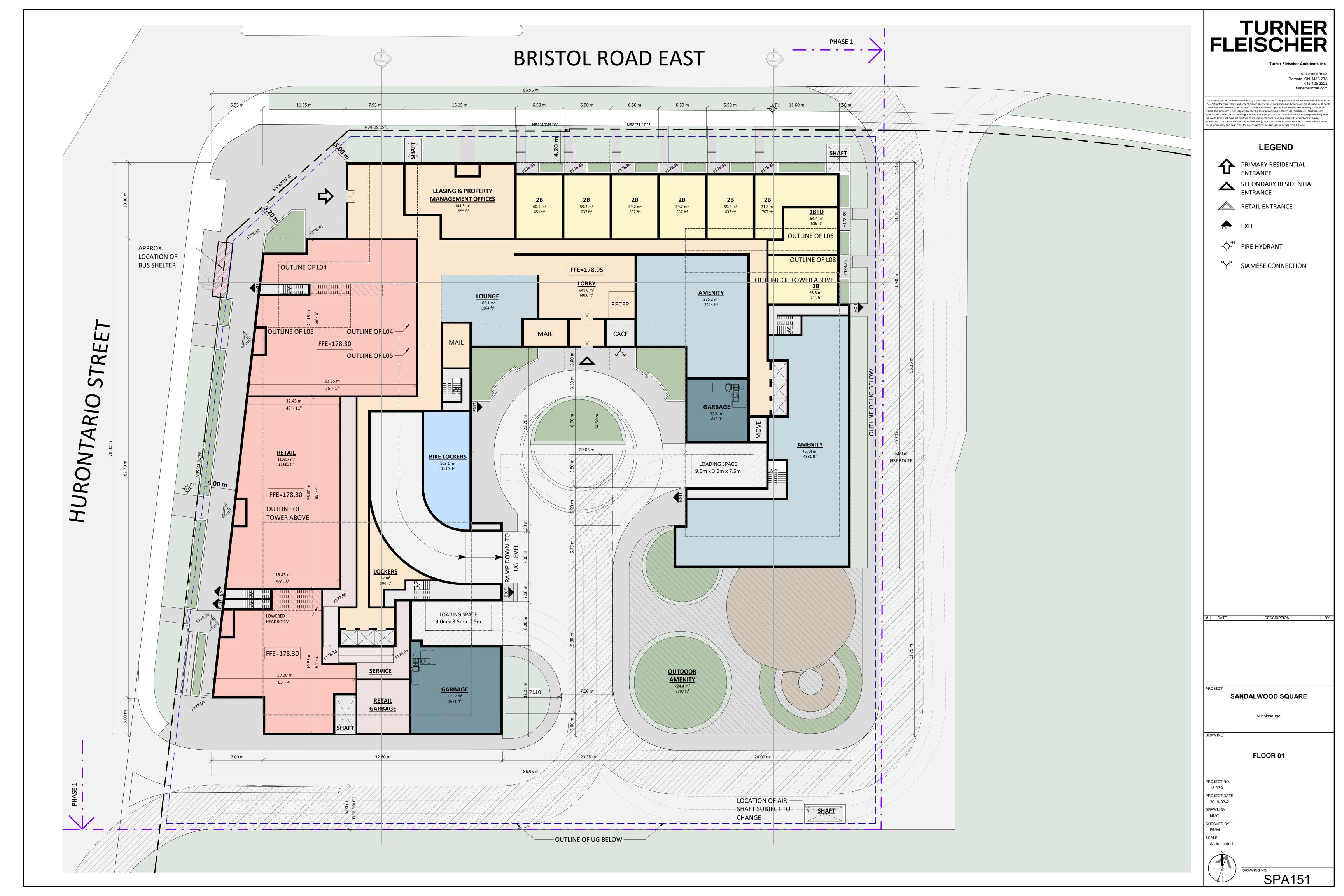


Gherard Rouby, P.Eng. 905-326-3080 grouby@counterpointeng.com

COUNTERPOINT ENGINEERING INC.



APPENDIX A



18.107FS - SANDALWOOD SQUARE

MISSISSAUGA, ONTARIO

GROSS FLOOR AREA SUMMARY

PARCEL		GFA		FSI
		m²	ft²	
16 & 25 STOREY	RESIDENTIAL	36,564.4	393,579	4.18
	INDOOR AMENITY	2,195.4	23,631	0.25
RESIDENTIAL TOWERS WITH 5 STOREY PODIUM	RETAIL	1,103.7	11,880	0.13
	TOTAL	39,863.5	429,091	4.56
PHASE 1 SITE AREA		8,743.0	94,110	

GROSS FLOOR AREA (GFA) BREAKDOWN

	4.0				GRO	SS FLOOR AR	EA BREAKDO	OWN						TOTAL GRO	SS FLOOR					
		51.000	# 05 HAUTS	55			RESIDE	NTIAL		TOTAL DESI	DEALTIAL	INDOOR	AMENITY	AREA [GF/		TOTAL FLO			OUTDOOR	AMENITY
		FLOOR	# OF UNITS	KE	TAIL	SALE	ABLE	NON-SA	LEABLE	TOTAL RESI	DENTIAL			EXCLUS	IONS)	[117] (10 2)	1020310113,			
			#	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²	m²	ft²		m²	ft²
		U/G 3						97.6	1,051	97.6	1,051			97.6	1,051		90,774			
1		U/G 2						97.6	1,051	97.6	1,051			97.6	1,051	8,433.1	90,774			
	-	U/G 1						97.6	1,051	97.6	1,051			97.6	1,051	8,433.0	90,773			
													2 100							
		1	8 44	1,103.7	11,880	491.1	5,286	833.1 384.2	8,967	1,324.2	14,254	786.7	8,468	3,214.6	34,602		43,025	-	724.4	7,797
	Poblum	3	44			3,255.3 3,299.0	35,040 35,510	391.4	4,136 4,213	3,639.5 3,690.4	39,176 39,723			3,639.5 3,690.4	39,176 39,723		40,387 40,607			
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EY P		9	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665		8,027			
STOREY		10	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665		8,027	-		
5 ST		11	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665	E 3	8,027	_		
WITH	TOWER A	12	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665		8,027			
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TOWERS		15	10			653.8	7,038	58.3	628	712.1	7,665	4.		712.1	7,665		8,027			4
ō		16	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665	The second second second	8,027			
F F		17	10			653.8	7,038	58.3	628	712.1	7,665	91		712.1	7,665	100000000000000000000000000000000000000	8,027			
ENTIAL		18	10			653.8	7,038	58.3	628	712.1	7,665	1).		712.1	7,665		8,027			
		19	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665	745.7	8,027			
/ RESI		20	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665	745.7	8,027			
RE		21	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665	745.7	8,027			
STOREY		22	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665	745.7	8,027			
25		23	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665		8,027			
16 &		24	10			653.8	7,038	58.3	628	712.1	7,665	9.		712.1	7,665		8,027	_		
		25	10			653.8	7,038	58.3	628	712.1	7,665			712.1	7,665	745.7	8,027	-		
		MPH																		
	<u></u>	6			i			74.2	799	74.2	799	769.3	8,281	843.5	9,079	881.2	9,485			
		7	11			793.9	8,546	50.1	539	844.0	9,085	709.3	0,201	844.0	9,085		9,491	-		
		8	10			736.8	7,931	44.1	475	780.9	8,406			780.9	8,406	Annual Control of the	8,811			
		9	10		5	736.8	7,931	44.1	475	780.9	8,406	(c)		780.9	8,406		8,811			
		10	10			673.8	7,253	44.2	476	718.0	7,729			718.0	7,729		8,134			
	8 8	11	10			673.8	7,253	44.2	476	718.0	7,729	9.		718.0	7,729	755.7	8,134			
	TOWER	12	10			673.8	7,253	44.2	476	718.0	7,729			718.0	7,729	755.7	8,134			
		13	10			673.8	7,253	44.2	476	718.0	7,729			718.0	7,729	755.7	8,134			
		14	10			673.8	7,253	44.2	476	718.0	7,729			718.0	7,729		8,134			
		15	10			673.8	7,253	44.2	476	718.0	7,729			718.0	7,729		8,134	L		
		16	10			673.8	7,253	44.2	476	718.0	7,729	4		718.0	7,729	755.7	8,134	L		
		MPH																		
2	200	TOTAL	470	1,103.7	11,880	32,174.6	346,327	4,389.8	47,252	36,564.4	393,579	2,195.4	23,631	39,863.5	429,091	67,101.8	722,284		2,230.2	24,006

VEHICULAR PARKING - REQUIRED

* Vehicular parkina required as per City of Mississauga Zonina By-Law NO. 0225-2007

STUDIO UNITS 1B & 1B+D UNITS 2B & 2B+D UNITS 3B & 3B+D UNITS	RATIO (MIN.)	UNITS / GFA (m²)	SPACES (MIN.)
STUDIO UNITS	1.00 / UNIT	20	20
1B & 1B+D UNITS	1.25 / UNIT	249	311
2B & 2B+D UNITS	1.40 / UNIT	175	245
3B & 3B+D UNITS	1.75 / UNIT	26	45
RESIDENTIAL SUB-TO	TAL (EXCLUDING VISITOR)		621
VISITOR	0.20 / UNIT	470	94
RETAIL	5.4 SPACES / 100 M2	1,103.7	59
	TOTAL RESIDENTIAL REQUIRE	D	774

VEHICULAR PARKING - PROPOSED

* Vehicular parking proposed in conjuction with traffic consultant report

	5 M	USE	RATIO (MIN.)	UNITS	SPACES (MIN.)
ORE	표 글	RESIDENTIAL	1.00 / UNIT	470	470
STO	N O	VISITOR	0.15 / UNIT	470	70
side	VERS REY F				
16 & RES	> 0	RETAIL	.0 SPACES / 100 M2		
_	T F		TOTAL RESIDENTIAL REQUIRED)	540

1. Provided parking calculation based on a ratio 37m² per parking space. 2. Number of units calculated based on an average unit size of 70m² per unit.

GROSS FLOOR AREA DEFINITION

Mississauga Zoning By-Law NO. 0225-2007

(GFA) - APARTMENT DWELLING 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.

UNIT MIX - PROVIDED

FLOOR				UNIT TYPE				TOTA
	STUDIO	1B	1B+D	2B	2B+D	3B	3B+D	
1			1	7				8
2	1	11	7	17	5	3		44
3		12	9	15	7	2		45
4		16	12	10	3	1		42
5		16	10	8	4	1		39
6								
7	1	8	5	5	2	1		22
8	1	5	4	6	3	1		20
9	1	6	5	5	2	1		20
10	1	6	5	5	2	1		20
11	1	6	5	5	2	1		20
12	1	6	5	5	2	1		20
13	1	6	5	5	2	1		20
14	1	6	5	5	2	1		20
15	1	6	5	5	2	1		20
16	1	6	5	5	2	1		20
17	1	3	2	2	1	1		10
18	1	3	2	2	1	1		10
19	1	3	2	2	1	1		10
20	1	3	2	2	1	1		10
21	1	3	2	2	1	1		10
22	1	3	2	2	1	1		10
23	1	3	2	2	1	1		10
24	1	3	2	2	1	1		10
25	1	3	2	2	1	1		10
SUBTOTAL	20	143	106	126	49	26		470
TOTAL UNITS	20		249	17	5		470	
UNIT MIX	4.3%		53.0%	37.2	2%	5	.5%	100.0

AMENITY AREAS - REQUIRED

* AS PER CITY OF MISSISSAUGA BY-LAW NUMBER 0225-2007 THE MINIMUM REQUIRED AMENITY IS EQUAL TO THE GREATER OF 5.6M2 PER DWELLING UNIT OR 10% OF THE NET SITE AREA. OF THIS, A MINIMUM OF 50% IS REQUIRED TO BE CONTIGUOUS

TYPE	REQUIRE	D		MINIMUM 50% C	
	RATIO	m2	ft2	m2	ft2
AMENITY AREA	@ 5.6 m2 / UNIT	2,632	28,331	1,316	14,165
(INDOOR AND OUTDOOR)	10% OF NET SITE AREA	3,906	42,044	1,953	21,022

1. Areas and unit counts may change to accommodate balconies, massing and articulation.

2. Number of units calculated based on an average unit size of 80m² per unit.

VEHICULAR PARKING - PROVIDED

₹.	FLOOR USE				TOTAL	
SIDENTI		RESIDENTIAL	VISITOR	RETAIL	TOTAL	
' RESIDENTIAL H 5 STOREY UM	U/G LEVEL 1	145	70		215	
	U/G LEVEL 2	221			221	
STC RS	U/G LEVEL 3	225			225	
& 25 TOW						
16	TOTAL PROVIDED	591	70	0	661	

TURNER FLEISCHER

67 Lesmill Road Toronto, ON, M3B 2T8

T 416 425 2222

turnerfleischer.com This drawing, as an instrument of service, is provided by and is the property of Turner Fleischer Architects Inc. The contractor must verify and accept responsibility for all dimensions and conditions on site and must notify Turner Fleischer Architects Inc. of any variations from the supplied information. This drawing is not to be scaled. The architect is not responsible for the accuracy of survey, structural, mechanical, electrical, etc., information shown on this drawing. Refer to the appropriate consultant's drawings before proceeding with the work. Construction must conform to all applicable codes and requirements of authorities having jurisdiction. The contractor working from drawings not specifically marked 'For Construction' must assume full responsibility and bear costs for any corrections or damages resulting from his work.

DATE DESCRIPTION

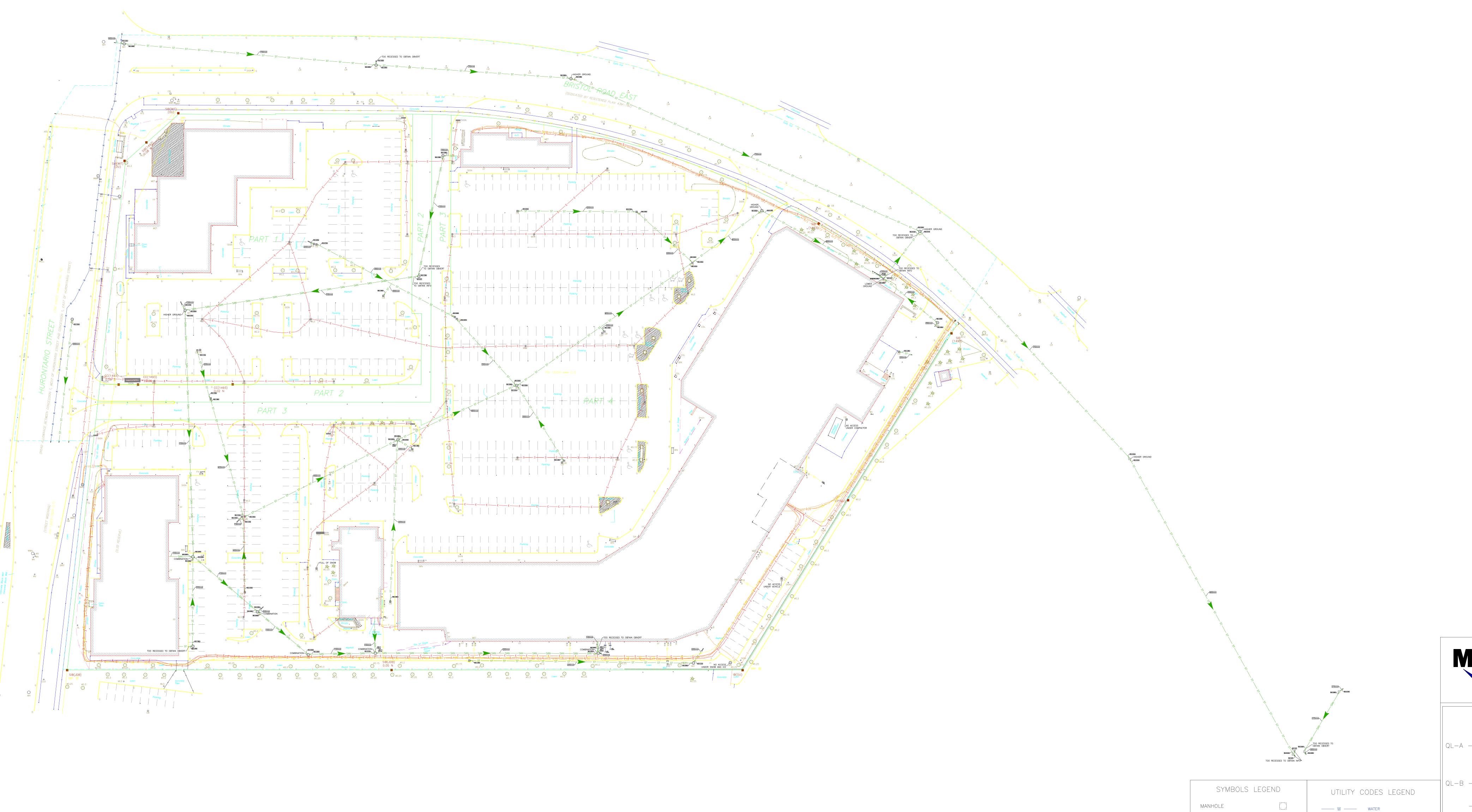
SANDALWOOD SQUARE

STATISTICS

PROJECT NO. 18.039 PROJECT DATE 2019-03-19

DRAWN BY NMC CHECKED BY RMM

SPA001





REQUIRES CS NORTH AND SOUTH PIPES ON THE FAR WEST SIDE OF M UNABLE TO SEE WEST PIPE. CAN SEE FLOW FROM WEST PIPE

Utility Mapping Quality Levels as per ASCE C-I 38-02

QL—A — Locating exact vertical and horizontal position of underground utilities using appropriate safe excavation techniques and recording these data.

QL-B - Designating the horizontal position of underground utilities by the application of appropriate surface geophysical methods.

- Limited in scope to verification of provided level D information.

- Utilities may escape detection. (See Notes)

QL-C - Survey of surface features.

QL-D - Records and plans research including record collection and review.

Notes:

CATCH BASIN

POLE

CLEAN OUT

HYDRANT

VALVE

STREET LIGHT

TRANSFORMER

VALVE CHAMBER

TRAFFIC BOX

BUS SHELTER

HEADWALL

TEST PIT

FLOW

TRAFFIC CONTROL BOX

UTILITY CONTINUES

FLUSH TO GRADE VAULT

AIR PUMP

SIGN

CONTROL BOX / PLUG

HAND WELL

PEDESTAL

——— E ——— ELECTRIC

TELEPHONE

----ALL---- ALL STREAM

----F/O---- FIBER OPTIC

----- SAN ----- SANITARY SEWER

----- ST ----- STORM SEWER

----- Wt ----- WEEPING TILE

----- IR ----- IRRIGATION

TC TRAFFIC CONTROL

---- C ---- COMMUNICATION CABLES/DUCT

 This information is provided for design purposes only.
 This information is not a substitute for sanctioned locates as provided by the utility owner. 3. Prior to any excavation, all utility owners must be contacted to obtain sanctioned locates, as stipulated by the Occupational Health & Safety Act. 4. Inferred utility depths indicated on this drawing are only estimates and should be verified by direct physical exposure. 5. Underground infrastructure shown on this drawing was obtained on a best-effort, best-practices basis, within the technical limitations of the instrumentation. 6. The spatial accuracy of the plotted information is dependent on the accuracy of the base map information as provided by others. 7. This information is provided on a best effort basis within the limitations of the technology. Consequently some utilities may escape detection (i.e. non-conductive, ináccessible, incomplete Level D information provided by the Client and/or physical expression not reasonably identifiable at the time of the survey, etc.) 8. The information herein documents the position of suspected or

known utilities existing at this site as of the drawing date.

9. Quality Level 'D' information was obtained by MARK IT

Locates Inc. during the course of this investigation.

Buried Utility Map

For: RioCan

Site: 30-70 Bristol Road East, Mississauga, ON

Project#2019-08737 Date: MAR 6, 2019 Checked: SI / RC

COUNTERPOINT ENGINEERING INC.



APPENDIX B

Counterpoint Engineering Inc.

WATER DEMAND CALCULATIONS

Sandalwood Square

Project: Project No: Location: 19002 Mississuaga

Site Area: 0.8742 ha

Table #1: Per Capita Demand

Residential	280 litres/cap/day
ICI	300 litres/employ./day

Population Rates and Domestic Sewage Rate

1 Bedroom Apartment	1.68	ppu
2+ Bedroom Apartment	2.54	ppu
Rowhouse	3.5	ppu
Commercial/Retail	50	persons per ha

Unit and Floor Area Breakdown

	Unit Count/Area	Population
Studio:	20	34
1 Bdrm. & 1 Bdrm./Den:	249	632
2 Bdrm. & 2 Bdrm./Den:	175	445
3 Bedroom:	26	91
Rowhouse	0	0
Commerical/Retail	0.11037	6

Peaking Factors

Land Use	Peak Hour	Maximum Day
Residential	3.00	2.00
ICI	3.00	1.40

Summary of Demands

Site	Building	Daily Water Demand (L/sec)	Max Day Water Demand (L/sec)	Peak Hour Water Demand (L/sec)	Fire Demand Required (L/sec)	Max Day plus Fire Demand (L/sec)
Phase 1	Proposed	3.91	7.81	11.74	150.00	157.81

Counterpoint Engineering Inc.

REQUIRED FIRE FLOW WORKSHEET - PROPOSED DEVELOPMENT

Project: Sandalwood Square

Project No: 19002 Building: Proposed

Guide for Determination of Required Flow Copyright I.S.O

 $F = 220C\sqrt{A}$

where

the required fire flow in litres per minute.
coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).

= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural compone masonry or metal walls).

= 0.6 for fire-resistive construction (fully protected frame, floors, roof).

The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building being considered.

	Class Factor	
WF	Wood Frame	1.5
OC	Ordinary Construction	1.0
NC	Non-Combustible	0.8
FC	Fire-Resistive	0.6

Area Notes for Fire Resistive Buildings (from FUS manual, 1999):

If Vertical Openings are inadequately protected (less than 1-hour fire rating): Area is the total of the two largest adjoining floors (above ground level) plus 50% of the area of each of the next 8 adjoining floors above that.

	% Reduction	
NC	Non-Combustible	25
LC	Limited Combustible	15
С	Combustible	0
FB	Free Burning	15
RB	Rapid Burning	25

If Vertical Openings are adequately protected (at least 1-hour fire rating): Area is the total of the largest floor (above ground level) plus 25% of the area of each of the next 2 immediately adjoining floors above that.

Fire Flow 1)

Type of Construction: C= 0.8 5,878.23 m^2 A= F= 13,494 L/min

Note: vertical openings are assumed to be adequately protected. Area is Podium level 1 plus 0.25 x Podium level 2 + 3.

2) Occupancy Reduction/Surcharge

Contents Factor: -15% -2,024 L/min Reduction/Surcharge of = F= 13494L/min + -2024 L/min = 11,470 L/min

3) System Type Reduction

NFPA 13 Sprinkler: YES 30% Standard Water Supply: 10% Fully Supervised: YES 10% Total 50% Reduction of 50% L/min 5,735 L/min F= 11470L/min -5,735 L/min = 5,735 L/min

4) Separation Charge

Building Face Dist(m) Charge North 5% 40 East 18 15% South 5% 35 West 65 0% Total 25% of

11469.8 L/min = 2,867 L/min (max exposure charge can be 75%)

Separation	Charge	Separation	Charge
0 to 3m	25%	20.1 to 30 m	10%
3.1 to 10m	20%	30.1 to 45m	5%
10.1 to 20m	15%		

F = 5735L/min + 2867L/min 8,602 L/min (2,000L/min<F<45,000L/min)

F =	9,000	L/min	(rc
F =	150	L/s	
F=	2,378	gpm	

ound to the nearest 1,000L/min)

COUNTERPOINT ENGINEERING INC.



APPENDIX C

Counterpoint Engineering Inc.

SANITARY FLOW CALCULATIONS

Project: Project No: Sandalwood Square

19002 Location: Mississuaga

Gross Site Area: 0.8742 ha

Population Rates and Domestic Sewage Rate

1 Bedroom Apartment	1.68	ppu
2+ Bedroom Apartment	2.54	ppu
Rowhouse	3.5	ppu
Commercial/Retail	50	persons per ha
Domestic Sewage Rate	302.8	Lcpd

Unit and Floor Area Breakdown

	Unit Count/Area	Population
Studio:	20	34
1 Bdrm. & 1 Bdrm./Den :	249	632
2 Bdrm. & 2 Bdrm./Den :	175	445
3 Bedroom:	26	91
Rowhouse	0	0
Commerical/Retail	0.11037	6

Total Equivalent Population: 1207.1

Peaking Factor

$$M_d = 1 + \frac{14}{4 + P^{0.5}}$$
 = 3.75

m³/sec Peak Flow w/o Infiltration per Std. Dwg. 2-9-2: 0.01585 15.85 L/sec

> m3/sec/ha Infiltration: 0.0002 m³/sec Infiltration Rate: 0.000175 0.17

> > m³/sec **Total Peak Flow** 0.01602 16.02 L/sec

Population	Peak Flow (m ³ /sec)	Population	Peak Flow (m ³ /sec)	Population	Peak Flow (m ³ /sec)
1000	0.0130	4750	0.0542	13000	0.1292
1050	0.0139	5000	0.0569	14000	0.1376
1100	0.0145	5250	0.0594	15000	0.1459
1150	0.0151	5500	0.0618	16000	0.1540
1200	0.0157	5750	0.0640	17000	0.1620
1300	0.0169	6000	0.0666	18000	0.1700
1400	0.0181	6250	0.0691	19000	0.1779
1500	0.0193	6500	0.0710	20000	0.1857
1600	0.0204	6750	0.0737	25000	0.2236
1700	0.0217	7000	0.0762	30000	0.2601
1800	0.0228	7250	0.0784	35000	0.2955
1900	0.0239	7500	0.0809	40000	0.3298
2000	0.0251	7750	0.0830	45000	0.3634
2200	0.0273	8000	0.0854	50000	0.3963
2400	0.0296	8250	0.0878	55000	0.4286
2600	0.0318	8500	0.0898	60000	0.4603
2800	0.0340	8750	0.0922	65000	0.4915
3000	0.0361	9000	0.0945	70000	0.5224
3250	0.0387	9250	0.0968	75000	0.5528
3500	0.0415	9500	0.0981	80000	0.5828
3750	0.0441	9750	0.1010	85000	0.6126
4000	0.0467	10000	0.1033	90000	0.6420
4250	0.0492	11000	0.1120	95000	0.6711
4500	0.0518	12000	0.1210	100000	0.7000

- capita.
 5. Lpcd = Litres per capita per day 1 Litre = 0.001 metre³

Region of Peel	Date: June 2005 Rev: 1
Working for you	Approved:
SEWAGE FLOWS	STD. DWG. 2-5-2 2-9-2

Connection Multi Use Demand Table

WATER CONNECTION

Connection point 3) Hurontario Street 400mm WM					
•					
Pressure zone of con	nection point				
Total equivalent popu	ulation to be ser	viced 1)	1207.1		
Total lands to be serv	viced				
Hydrant flow test			Not Available		
Hydrant flow test l	ocation		Not Avail	able	
		Pressure	Flow (in 1/a)	T:	
	Flow (in I/s)	Time			
Minimum water pro	essure	N/A	N/A	N/A	
Maximum water pr	essure	N/A	N/A	N/A	

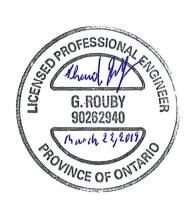
	Water demands					
No.		Demand (in I/s)				
	Demand type	Use 1 ⁵⁾	Use 2 ⁵⁾	Total		
	Average day flow			3.91		
2	Maximum day flow			7.81		
	Peak hour flow		L.	11.74		
4	Fire flow 2)			150		
	Analysis					
5	Maximum day plus fire flow			157.81		

WASTEWATER CONNECTION

		Total
Cor	nnection point ⁴⁾	TBD
Tot	al equivalent population to be serviced ¹⁾	1207.1
Tot	al lands to be serviced	
6	Wastewater sewer effluent (in I/s)	16.02

including infiltration

Please include the graphs associated with the hydrant flow test information table Please provide Professional Engineer's signature and stamp on the demand table All required calculations must be submitted with the demand table submission.



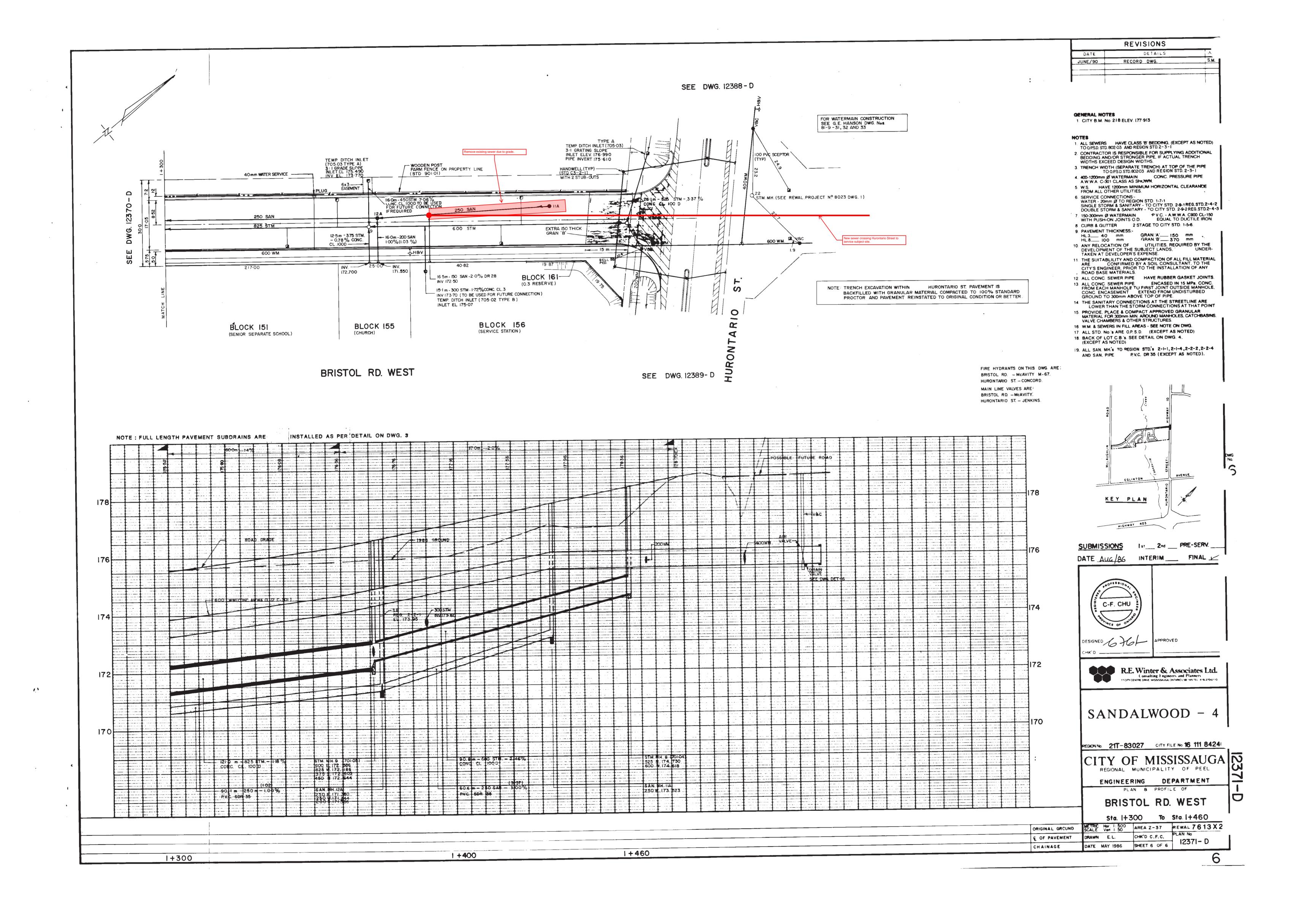
¹⁾ The calculations should be based on the development estimated population (employment and/or residential).

²⁾ Please reference the Fire Underwriters Survey Document

³⁾ Please specify the connection point ID

⁴⁾ Please specify the connection point (wastewater line or manhole ID) Also, the "total equivalent popopulation to be serviced" and the "total lands to be serviced" should reference the connection point. (The FSR should contain one copy of Site Servicing Plan)

⁵⁾ Please complete as many uses are necessary for the development. (Please specify the use)



COUNTERPOINT ENGINEERING INC.



APPENDIX D



SWM DESIGN CALCULATIONS Summary - Storage Provided Calculations

Project Name: Sandalwood Square Prepared by: G.R.

Municipality: Mississauga, Ontario

Project No.: 19002 Last Revised: 22-Mar-19

Date: 22-Mar-19

Rainfall Data

Location:	Mississauga, Ontario	Α	1450
Event	100-year	В	4.9
		С	0.78

Area ID	Area (ha)	Runoff Coefficient	TC (min)	Provided Underground Tank Storage (m³)	Total Storage Provided Up to HGL (m ³)	Storage Required (m³)	Designed Release Rate (m³/s)	Description	Orifice Size (mm)	Orifice Release Rate (m³/s)	Allowable Release Rate (m³/s)
A-1	0.79	0.96	15.00	271	271	271	0.044	Controlled	99.4	0.044	
A-2	0.07	0.87	15.00	0	0	0	0.025	Uncontrolled	-		
A-3	0.01	1.00	15.00	0	0	0	0.004	Uncontrolled	-		
Total	0.87	0.94		271.0	271.0	271	0.073				0.073



SWM DESIGN CALCULATIONS Run-Off Co-Efficient Calculation

Project Name: Sandalwood Square **Prepared by:** G.R.

Municipality: Mississauga, Ontario

Project No.: 19002 Last Revised: 22-Mar-19

Date: 22-Mar-19

Post-Development Imperviousness Area A-1

Composite RC Value	Area [ha]	RC	RC * Area
Grassed Area	0.0461	0.31	0.014
Impervious Area	0.74	1.00	0.743
	0.79	Total	0.758
	Divided by T	0.96	

Post-Dev. Imperviousness Areas A-2 Uncontrolled Hurontario

Composite RC Value	Area [ha]	RC	RC * Area
Grassed Area	0.0143	0.31	0.004
Impervious Area	0.06	1.00	0.060
	0.07	Total	0.064
	Divided by T	0.87	

Post-Dev. Imperviousness Areas A-3 Retail Lands

		•	
Composite RC Value	Area [ha]	RC	RC * Area
Grassed Area	0.00	0.31	0.000
Impervious Area	0.01	1.00	0.010
	0.01	Total	0.010

Divided by Total Area = 1.00

Total Site

Composite RC Value	Area [ha]	RC	RC * Area
Grassed Area	0.06	0.25	0.019
Impervious Area	0.81	1.00	0.803
	0.87 Total		0.822
	Divided by T	0.94	

Note: adjustment factors per City Section 2 requirements have been applied to a max RC of 1.0.



SWM DESIGN CALCULATIONS Allowable Release Rate Calculation: 2 Year Pre-development

Project Name: Sandalwood Square **Prepared by:** G.R.

Municipality: Mississauga, Ontario

Project No.: 19002 Date: 22-Mar-19 Last Revised: 22-Mar-19

Rainfall Data

Location:	Mississauga, Ontario	Α	610
Event	2-year	В	4.6
		С	0.78

Site Data

Area (ha)	0.87
Runoff Coefficient	0.50
AC	0.44
Tc (min)	15.00
Rainfall Intensity (mm/hr)	60
Rational Flow Rate (I/s)	73

The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where,

Q = the design flow (m³/s) C = the site specific runoff coefficient

a = the drainage area (ha)

i = rainfall intensity (mm/hr)



SWM DESIGN CALCULATIONS Required Storage Calculations (A-1)

Project Name: Sandalwood Square **Prepared by:** G.R.

Municipality: Mississauga, Ontario

Project No.: 19002 Last Revised: 22-Mar-19

Date: 22-Mar-19

Rainfall Data

	Mississauga,		
Location:	Ontario	Α	1450
Event	100-year	В	4.9
		С	0.78

Site Data

Area (ha)	0.79
Runoff Coefficient	0.96
AC	0.76
Tc (min)	15.00
Time Increment (min)	5
Release Rate (I/s)	44
Storage Required (m ³)	271

The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where

Q = the design flow (m^3/s)

C = the site specific runoff coefficient

A = the drainage area (ha) i = rainfall intensity (mm/hr)

Released Storm Runoff Storage Rainfall Intensity Time Runoff Volume Volume Volume (min) (mm/hr) (m^3/s) (m^3) (m^3) (m^3) 0.30 0.25 0.22 0.19 0.17 0.16 0.14 0.13 0.13 0.12 0.11 0.11 0.10 0.10 0.09 0.09 0.08 0.08 0.08 0.08

0.07

0.07

0.07



SWM DESIGN CALCULATIONS 100-Year Flow Release Rate Calculations (Area A-2 - UNC)

Project Name: Sandalwood Square Prepared by: G.R.

Municipality: Mississauga Project No.: 19002

Date: 22-Mar-19

Last Revised: 22-Mar-19

Rainfall Data

Location:	Mississauga, Ontario	Α	1450
Event	100-year	В	4.9
		С	0.78

Site Data

Area (ha)	0.07
Runoff Coefficient	0.87
AC	0.06
Tc (min)	15.00
Rainfall Intensity (mm/hr)	141
Rational Flow Rate (I/s)	25

The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where,

= the design flow (m³/s)

Q C = the site specific runoff coefficient = the drainage area (ha) = rainfall intensity (mm/hr)



SWM DESIGN CALCULATIONS 100-Year Flow Release Rate Calculations (Area A-3 - UNC)

Project Name: Sandalwood Square Prepared by: G.R.

Municipality: Mississauga Project No.: 19002

Date: 22-Mar-19

Last Revised: 22-Mar-19

Rainfall Data

Location:	Mississauga, Ontario	Α	1450
Event	100-year	В	4.9
		С	0.78

Site Data

Area (ha)	0.01
Runoff Coefficient	1.00
AC	0.01
Tc (min)	15.00
Rainfall Intensity (mm/hr)	141
Rational Flow Rate (I/s)	4

The Rational Equation:

$$Q = \frac{(C)(i)(A)}{360}$$

where,

= the design flow (m³/s) = the site specific runoff coefficient Q C

= the drainage area (ha) = rainfall intensity (mm/hr)



SWM DESIGN CALCULATIONS Orifice Calculations (In MH 2 / Upstream Side)

Project Name: Sandalwood Square Prepared by: G.R.

Municipality: Mississauga, Ontario

Project No.: 19002 Last Revised: 22-Mar-19

Date: 22-Mar-19

Area: A-1

Orifice Characteristics

Orifice Diameter (mm)	99.4	PVC DR 28
C_d	0.81	
Orifice Invert Elevation (m)	174.82	1
100-Year Ponding HGL (m)	177.40	Top of Tanl
Downstream Tailwater (m)	174.82	1
Head on Orifice (m)	2.54]
Flow from Orifice (m³/s)	0.044	
Allowable Flow (m³/s)	0.044	1

Orifice E	equation:	
	$Q = C_d x A x (2gH)^{0.5}$	$g=9.81 (m/s^2)$ gravity
		C _d = coefficient of discharge
where:	Q =flow rate (m3/s)	$C_d = 0.6$ for Sharp Orifice
	H = head on the weir (m) A = area of orifice (m2)	$C_d = 0.8$ for Tube Orifice

SWM DESIGN CALCULATIONS Summary - Water Balance Calculations

Project Name: Sandalwood Square

Municipality: Mississauga, Ontario

Project No.: 19002

Date: 22-Mar-19

Last Revised: 22-Mar-19

Prepared by: G.R.

Site Area: 0.8742 ha

Water Balance Calculation Sheet

Total Required Volume to be Retained (5mm across area)	43.7 m ³
Abstraction: Conventional Roof	
Initial Abstraction	1.0 mm
Total Area	0.44 ha
Volume for evapotranspiration	4.4 m ³
Abstraction: Asphalt Pavement and walkways	
Initial Abstraction	1.0 mm
Total Area	0.37 ha
Volume for evapotranspiration	3.7 m ³
Abstraction: Grassed and Landscaped Areas	
Initial Abstraction	5.0 mm
Total Area	0.06 ha
Volume for evapotranspiration and infiltration	3.0 m ³
Total Volume Retained (Initial Abstractions):	11.2 m ³
Percent of Required Volume Being Retained (Initial Abstractions):	25.5 %
Shortfall for Total Water Reuse Cistern Volume (to be used in first 72 hrs)	32.6 m ³