FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

1108 & 1094 EGLINTON AVENUE EAST

CITY OF MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

ALI MOTORS

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4

MARCH 2021

CFCA FILE NO. 1277-4440

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	April 2017	Issued for First Submission
Rev.1	December 2018	Issued for Second Submission (additional property added)
Rev.2	March 2021	Issued for Third Submission

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Ali Motors to prepare a Functional Servicing & Preliminary Stormwater Management Report in support of the Zoning By-Law (ZBA) for a proposed commercial development at 1094 and 1108 Eglinton Avenue East in the City of Mississauga, Region of Peel. The Zoning By-Law in effect (0225-2007) classifies the existing zoning for 1108 and 1094 Eglinton Avenue East as Development (D) and Commercial (C3-64), respectively.

The purpose of this report is to demonstrate that the proposed site can be developed in accordance with the City of Mississauga and Region of Peel guidelines from a functional servicing & preliminary stormwater management perspective.

The following reports and design standards were referenced during the preparation of this report:

- Region of Peel Public Works Design, Specifications & Procedures Manual, July 2009
- City of Mississauga Transportation and Works Department Development Requirements Manual, 2016
- Ministry of Environment (MOE) Stormwater Management Planning and Design Manual, 2003
- Greater Golden Horseshoe Area Conservation Authorities Erosion & Sediment Control Guidelines for Urban Construction, 2006

2.0 Site Description

The subject property, comprising of the adjacent properties 1108 and 1094 Eglinton Avenue East, covers a combined area of approximately 0.51 ha. The property is located in a commercial/industrial neighbourhood with some mixed residential units in the area. The properties currently consist of a detached dwelling, compacted gravel parking area, and landscaped area.

The property is bounded by:

- Eglinton Avenue East to the north
- A treed lot and commercial development to the south
- A detached dwelling to the east
- Little Etobicoke Creek to the west

The proposed Site Plan (Brian Luey Architect Inc., March 5, 2021) consists of:

- Two proposed 1-storey commercial buildings with an approximate gross floor area of 526 m^2 and 325 m^2 respectively
- An entrance driveway off Eglinton Avenue East
- Parking areas and landscaped areas
- 3.5 m ROW widening from Eglinton Avenue East

3.0 Water Servicing

The Region of Peel is responsible for the operation and maintenance of the public water and treatment system in the City of Mississauga, and any local servicing will have to connect to this public system.

3.1 Existing Water Servicing

A review of the Region of Peel as-constructed drawing 28461-D dated March 2002 indicates that:

- There is an existing 300 mm watermain (local watermain) along Eglinton Avenue East. The watermain runs on the north side of Eglinton Avenue, approximately 35 m away from the property line.
- The subject properties are currently serviced by an existing water service connection connecting to the 300 mm watermain.
- There is also an existing 600 mm watermain (local transmission feedermain) along Eglinton Avenue. This watermain runs approximately 9 m away from the property line.

3.2 Design Water Demand

To estimate the proposed water demand, Region of Peel design criteria was considered and used to determine the maximum flows generated by the proposed development. A summary of the results is presented below in Table 1, and detailed domestic water demand calculations are provided in Appendix A.

Table 1: Estimated Domestic Water Demand

Design Criteria	**Average Day** (L/s)	**Max Day** (L/s)	**Peak Hour** (L/s)	**Standard**
Region of Peel	0.21	0.29	0.63	Region of Peel Standards – Public Works Sanitary Sewer Design Criteria (Revised July 2009)

For this application, there is one individual domestic service sized to convey a peak hour demand rate of 0.63 L/s, as determined by Region of Peel Standards.

3.3 Proposed Water Servicing

The development is proposed to be serviced by a 50 mm diameter water service. The proposed 50 mm diameter water service will connect to the existing 300 mm diameter watermain using a tapping sleeve and valve. A valve & box per City standards is proposed at the property line.

The proposed Water Servicing Plan is shown on the Site Servicing Plan (Drawing C01).

4.0 Sanitary Servicing

The Region of Peel is responsible for the operation and maintenance of the public sewage collection and treatment system in the City of Mississauga, and any local sewage services will have to connect to this public system.

4.1 Existing Sanitary Servicing

A review of the Region of Peel as-constructed drawing 28461-D dated March 2002 indicates that there is an existing 450 mm sanitary sewer along Eglinton Avenue East approximately 38 m away from the property line. The sanitary sewer flows westward from the property at a 1.72% slope. The existing residential house on the site is not shown to be connected to this sanitary line.

4.2 Design Sanitary Flow

To estimate the proposed sanitary design flows, Region of Peel design criteria has been considered and used to determine the design flows generated by the development. A summary of the results is presented below in Table 2, and detailed sanitary demand calculations are provided in Appendix B.

Table 2: Estimated Sanitary Design Flows

Design Criteria	**Average Day** (L/s)	**Peak Flow** (L/s)	**Peak Flow + Infiltration Flow** (L/s)	**Standard**
Region of Peel	0.21	0.90	1.00	Region of Peel Public Works Design Criteria Manual – Sanitary Sewer July 2009

Based on the Region of Peel Standard Drawing 2-9-2, the minimum flow rate for a population of less than 1000 people shall be 13 L/s. As such, sanitary services will be sized to meet the requirement of 13 L/s.

4.3 Proposed Sanitary Servicing

A proposed sanitary service will be constructed as shown on the Site Servicing Plan (Drawing C01) in accordance with City of Mississauga and Region of Peel criteria. The proposed sanitary service, a 150 mm diameter sanitary sewer installed at 1% slope, will discharge to the 450 mm diameter sanitary sewer flowing westward along Eglinton Avenue. The proposed sewer service will have a capacity of 15 L/s which is sufficient to service the development.

The Site Servicing Plan (Drawing C01) illustrates the location of the sanitary sewer and all connections. The internal sanitary system of the building will be designed per the mechanical engineer's details and specifications.

5.0 Drainage Conditions

The drainage conditions for the site in both pre-development and post-development conditions have been outlined separately below.

5.1 Existing Drainage

The subject properties currently consist of a detached dwelling, compacted gravel parking area, and landscaped area.

A review of topographic survey indicates that under existing conditions, the site drains uncontrolled via sheet flow towards Little Etobicoke Creek. The majority of the site runoff flows and discharges south-west towards Little Etobicoke Creek, as shown in the Pre-Development Drainage Plan (Figure 1).

Upon review of Section 2 – Design Requirements of the City of Mississauga Transportation and Works Department Development Requirements Manual (2016) and discussions with City of Mississauga engineering staff, it was concluded that a pre-development runoff coefficient of 0.50 be used for the site area envisioned for development. Refer to Section 6.0 for a discussion on stormwater management and the application of the pre-development runoff coefficient.

5.2 Proposed Drainage

Upon development of the subject property, drainage will be collected and conveyed via an internal storm sewer system. Major flow will discharge towards Little Etobicoke Creek through an existing headwall; the major overland flow route of the site is proposed to remain consistent with existing conditions with drainage flowing southwest toward Little Etobicoke Creek.

The Post-Development Drainage Plan (Figure 2) illustrates the proposed drainage of the site. Table 3 below provides a runoff coefficient comparison for the developable area of the site under pre- and post-development conditions. Detailed stormwater management calculations are provided in Appendix C.

Table 3: Pre-Development and Post-Development RC Comparison

Conditions	Catchment	**Area** (ha)	RC
Pre-Development	**101**	**0.38**	**0.50**
Post-Development	201	0.25	0.84
	202	0.05	0.90
	UC01	0.03	0.28
	UC02	0.05	0.25
	UC03	0.002	0.25
	Total Post-Dev	**0.38**	**0.73**

The stormwater runoff from catchment 201 will be controlled by a 75 mm orifice tube and the storage will be provided through underground storage chamber. The roof runoff from Building B (catchment 202) will be restricted with roof flow control devices and discharge towards Little Etobicoke Creek.

6.0 Stormwater Management

Stormwater management design criteria were established with the City of Mississauga, Region of Peel, Toronto Region Conservation Authority (TRCA), and Ministry of Environment. The following criteria are applicable for the subject property:

- **Stormwater Quantity Control Design Criteria:** City of Mississauga criteria dictate that a control for all design storms (2, 5, 10, 25, 50, and 100-year) to 2-year pre-development control, using a pre-development runoff coefficient of 0.50. Per TRCA's 'Stormwater Management Criteria' (August 2012), post-development release rates are required to meet the mandated Etobicoke Creek stormwater unit flow control release rates. The more stringent of the two shall govern.

- **Stormwater Quality Control Design Criteria:** Enhanced Level of runoff water quality protection equivalent to 80% total suspended solids removal as specified in 'Stormwater Management Criteria' (August 2012).

- **Water Balance:** The TRCA requires the on-site retention of the first 5 mm of every rainfall event.

- **Erosion:** Best efforts to reduce erosion and sediment during construction, additionally, first 5 mm of every rainfall event is to be retained on site.

6.1 Stormwater Quantity Control

The Modified Rational Method was used to determine the pre-development and post-development runoff peak flows for the proposed development, based on the City of Mississauga intensity-duration-frequency (IDF) rainfall data and an initial time of concentration of 15 minutes. These peak flows were used to determine the volume of storage required on-site in accordance with City of Mississauga stormwater management criteria.

The TRCA Stormwater Management Criteria report (August 2012) was used to obtain unit release rates for discharge to Little Etobicoke Creek. The release rates are calculated based on the developable area of the site (0.38 ha) and compared to the City of Mississauga peak flow for 2-year pre-development, as shown in Table 4.

Table 4: Post-Development Target Flow Rates

Storm	TRCA Unit Flow (L/s/ha)	TRCA Target[1] (L/s)	City of Mississauga 2-year Target[2] (L/s)
2-year	31.1	12.0	22.1
5-year	45.2	17.4	
10-year	56.0	21.5	
25-year	69.3	26.6	
50-year	82.1	31.6	
100-year	93.0	35.8	

Note: 1. TRCA target flow rates = Developable Site Area (0.38ha) x Unit Flow Rates (L/s/ha)
2. City of Mississauga Target = 2-year Pre-development Peak Flow – 100-year Uncontrolled Peak Flow

As shown in Table 4, the target flow rate that are calculated based on the City of Mississauga stormwater guidelines, provide higher release rates under post-development conditions than the TRCA flow targets. Hence, City of Mississauga peak flow is used to determine the required on-site detention storage.

Table 5: Post-Development Controlled Peak Flow Rates

Storm	City of Mississauga 2-year Target (L/s)	Controlled $Q_{ORIFICE-201}$ (L/s)	Controlled $Q_{ROOF-202}$ (L/s)	Controlled Q_{TOTAL} (L/s)
2-year	**22.1**	16.1	2.2	**18.3**
5-year				
10-year				
25-year				
50-year				
100-year				

To meet the City of Mississauga stormwater quantity control, orifice control device is proposed for Catchment 201 and rooftop flow control devices are proposed for Catchment 202. The total controlled flow for the entire development will be 18.3 L/s, lower than the target flow rate of 22.1 L/s as shown in Table 5.

Stormwater runoff generated from Catchment 201 will be controlled by a 75 mm diameter orifice tube and a storage volume of approximately 114 m^3 is required to meet the City of Mississauga criteria of controlling the 100-year post-development peak flow down to the 2-year pre-development peak flow. The underground storm chamber (Triton S29 or equivalent) will provide 133 m^3, which will meet the required storage volume for catchment 201.

Rooftop runoff generated from Building B (Catchment 202) will be controlled by rooftop control devices at a unit rate of 42 L/s/ha and a storage volume of 26 m^3 is required. Building B will provide a ponding depth of 10 cm with available storage volume of 53 m^3. See table below and Appendix C for details.

Table 6: Required Storage and Provided Storage

Catchment 201		Catchment 202 – Building B Roof	
Required Volume (m^3)	**Provided Underground Storage Volume**(m^3)	**Required Volume** (m^3)	**Provide Roof Ponding Volume**(m^3)
114	133	26	53

As shown in Table 6, sufficient storage volumes are provided for catchment 201 and 202, which satisfy the required storage volumes.

6.2 Stormwater Quality Control

Stormwater quality controls for the site must incorporate measures to provide an Enhanced Level of Protection (Level 1) according to the MOE (March 2003) guidelines. Enhanced water quality protection involves the removal of at least 80% of the total suspended solids (TSS) from 90% of the annual runoff volume.

A treatment train approach was used to achieve the quality control criteria. The treatment train includes CB shields at each catchbasin structures and an oil-grit-separator (model EFO). The oil-grit-separator (OGS) will be located upstream of the underground storage chamber provides pre-treatment prior to infiltration and details will be provided in detail design stage. TSS removal performance of the proposed SWM treatment train based on the individual removal rates obtained from the MECP SWM Planning and Design Manual (2003) is summarized in Table 7.

Table 7: Water Quality Summary

Treatment Train	TSS Removal Rate	Total Removal Rate %
CB Shields	50%	80
OGS (model EFO)	60%	

As shown in Table 7, the treatment train approach provides the TSS removal rate of 80%, achieving the required TSS removal rate.

6.3 Water Balance

The water balance criteria for the site based on City of Mississauga design criteria is to retain the first 5 mm of runoff on site by infiltration, evapotranspiration, and/or reuse. The water balance volume requirements for the site are listed in Table 8. Detailed calculations are presented in Appendix C.

Table 8: Site Water Balance Summary

Developable Site Area (m^2)	Water Balance Criteria	Volume Required (m^3)
3,845	Retain first 5 mm	19.2

Open Bottom Underground Storage Chamber

One option to retain stormwater runoff on site for water balance purposes is to provide the required storage volume within a small underground storage chamber system complete with an open bottom. This system would be designed to infiltrate storage rainwater into the underlying native soils. With the footprint of 190.20 m^2 and 300 mm stone depth underneath the chamber, 22.8 m^3 will be provided for infiltration, which meets the water balance requirement.

On-Site Reuse

One alternative to infiltration to retain the first 5 mm of rainfall is to store the runoff volume within an on-site cistern or reservoir to reuse for irrigation purposes.

Further review and design of the chosen option for meeting the water balance criteria will be completed during detailed design.

7.0 Erosion and Sediment Controls During Construction

Erosion and sediment controls will be installed prior to the commencement of any construction activities and will be maintained until the site is stabilized or as directed by the Site Engineer and/or the City of Mississauga. Controls are to be inspected after each significant rainfall event and maintained in proper working condition. A Removals & Erosion and Sediment Control Plan will be prepared at the detailed design stage.

The following sediment and erosion control options will be incorporated at detailed design:

Heavy Duty Silt Fencing

Heavy duty silt fence will be installed on the perimeter of the site to intercept sheet flow. Additional silt fence may be added based on field decisions by the Site Engineer and Owner, prior to, during and following construction.

Rock Mud Mat

A rock mud mat will be installed at the entrance to the construction zone in order to prevent mud tracking from the site onto the surrounding lands and perimeter roadway network. All construction traffic will be restricted to this access only.

Double Wrapped Catchbasins

The existing storm sewer catchbasins located in the vicinity of the site on Eglinton Avenue East shall be double wrapped in filter cloth during construction.

8.0 Conclusions and Recommendations

Based on the information contained within this Functional Servicing and Preliminary Stormwater Management Report, we offer the following conclusions:

1. The proposed development can be serviced through connections to the existing water and sanitary infrastructure located within Eglinton Avenue East ROW.

2. The water demand for the proposed development will be met using a new 50 mm diameter water service connection, which will connect to the existing 300 mm municipal watermain along Eglinton Avenue.

3. The sanitary flow for the proposed development will be met using a new 150 mm diameter PVC sanitary sewer connection, which will connect to the existing 450 mm sanitary sewer along Eglinton Avenue.

4. Drainage will be collected and conveyed via an internal storm sewer system that will connect into an existing storm outfall to Little Etobicoke Creek. The internal storm sewer will be sized in accordance with City of Mississauga design requirements.

5. Stormwater management quantity control for the proposed development will control the 100-year post-development peak flow rate to the 2-year pre-development peak flow in accordance with the City of Mississauga's requirements for stormwater quantity control. Stormwater quantity control will be provided through approximately 133 m^3 of underground storage in a Triton system or equivalent.

6. Stormwater quality control for the proposed development will be achieved by treatment train approach, including catchbasin shields and oil-grit-separator. Detailed sizing for the oil-grit-separator will be provided during detailed design.

7. Per the City of Mississauga's design criteria for water balance, the first 5 mm of runoff on site must be retained by infiltration, evapotranspiration, and/or reuse. As such, a storage volume of 19.2 m^3 will be provided through an open-bottom underground storage chamber or approved equivalent.

8. Erosion and sediment controls, such as silt fences and rock mud mat, are proposed to be installed prior to the commencement of any construction activities. A Removals & Erosion and Sediment Control Plan will be prepared at the detailed design stage.

As such, we recommend approval of the Zoning By-Law for the development of the subject lands from the perspective of site servicing and stormwater management requirements.

Respectfully submitted,

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APPENDIX A

Water Demand Calculations

Project: 1108 & 1094 Eglinton Avenue
Project No.: 1277-4440
Date: 2021-03-21
Created By: KR
Checked By: HL/TE

WATER DEMAND CALCULATIONS
1108 & 1094 EGLINTON AVENUE EAST
CITY OF MISSISSAUGA, REGION OF PEEL

Region of Peel

References

Site Area =	0.51	ha	Site Area taken from Site Plan prepared by Brian Luey Architect Inc. (March 2021)
Occupancy =	Commercial		
Population Density =	50	persons/ha	Population density for commercial buildings per Section 2.1 of Region of Peel - Public Works Sanitary Sewer Design Criteria (July 2009)
Population =	60	persons	Assume population to be 60 persons as per the Site Plan area and the number of parking spaces (47)

Commercial Water Demand

Average Daily Demand =	300	L/employee/d	Average Daily Demand and Peak Factors per Section 2.3 of Region of Peel - Public Works Watermain Design Criteria (Revised June 2010)
Max Day Factor =	1.4	-	
Peak Hour Factor =	3.0	-	
Average Day =	**0.21**	**L/s**	Average Day = (Average Daily Demand * Population) / 86400 seconds
Max Day =	**0.29**	**L/s**	Max Day = Average Day Demand *Max Day
Peak Hour =	**0.63**	**L/s**	Peak Hour = Average Day Demand * Peak Hour

Design Criteria	**Average Daily Water Demand** (L/s)	**Max Day Demand** (L/s)	**Peak Hourly Demand** (L/s)
Region of Peel	0.21	0.29	0.63

APPENDIX B

Sanitary Design Flow Calculations

Project: 1108 & 1094 Eglinton Avenue
Project No.: 1277-4440
Date: 2021-03-21
Created By: KR
Checked By: HL/TE

SANITARY FLOW CALCULATIONS
1108 & 1094 EGLINTON AVENUE EAST
CITY OF MISSISSAUGA, REGION OF PEEL

Region of Peel

References

Site Area = 0.51 ha
Occupancy = Commercial

Site Area taken from Site Plan prepared by Brian Luey Architect Inc. (March 2021)

Population Density = 50 persons/ha

Population density for commercial buildings per Section 2.1 of Region of Peel - Public Works Sanitary Sewer Design Criteria (Revised July 2009)

Population = 60 persons

Assume population to be 60 persons per the Site Plan area and the number of parking spaces (47)

Commercial Sanitary Design Flow

Harmon Peak Factor (M) = $1 + \frac{14}{4 + P^{0.5}}$
where: P is population in thousands

Peaking Factor per Section 2.2 of Region of Peel - Public Works Sanitary Sewer Design Criteria (Revised July 2009)

M = 4.30

Average Daily Demand = 302.8 L/cap/d
= 0.21 L/s

Average Daily Demand per Section 2.4 and Standard Drawing 2-9-2 of Region of Peel - Public Works Sanitary Sewer Criteria (Revised June 2009)

Infiltration Flow = 0.20 L/s/ha

Infiltration Flow per Section 2.3 of Region of Peel - Public Works Sanitary Sewer Criteria (Revised June 2009)

Peak Flow = **0.90** **L/s**
Total Infiltration Flow = **0.1** **L/s**

Peak Flow = Harmon Factor * Average Daily Demand
Total Infiltration Flow = Site Area * Infiltration Flow

Total Design Flow = **1.00** **L/s**

Total Design Flow = Peak Flow + Total Infiltration Flow

APPENDIX C

Stormwater Management Calculations

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-04

Created By: HL
Checked By: TE
Updated: 2021-03-19

Modified Rational Calculations - Input Parameters

Storm Data: City of Mississauga

Time of Concentration: T_c = **15** **min** (per City of Mississauga standards)

Return Period	A	B	C	I (mm/hr)
2 yr	610	4.6	0.78	59.89
5 yr	820	4.6	0.78	80.51
10 yr	1010	4.6	0.78	99.17
25 yr	1160	4.6	0.78	113.89
50 yr	1300	4.7	0.78	127.13
100 yr	1450	4.9	0.78	140.69

Pre - Development Conditions (101)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Total Site	**0.38**	**3845**	**-**	**0.50**

Post - Development Conditions (201)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.02	211	**0.25**	**0.02**
Impervious	0.23	2273	**0.90**	**0.82**
Total Site	**0.25**	**2484**	**-**	**0.84**

Post - Development Conditions (202)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.00	0	**0.25**	**0.00**
Impervious	0.05	526	**0.90**	**0.90**
Total Site	**0.05**	**526**	**-**	**0.90**

Post - Development Conditions (UC01)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.03	290	**0.25**	**0.24**
Impervious	0.002	15	**0.90**	**0.04**
Total Site	**0.03**	**305**	**-**	**0.28**

Post - Development Conditions (UC02)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.05	515	**0.25**	**0.25**
Impervious	0.00	0.00	**0.90**	**0.00**
Total Site	**0.05**	**515**	**-**	**0.25**
Post - Development Conditions (UC03)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.00	15	**0.25**	**0.25**
Impervious	0.00	0.00	**0.90**	**0.00**
Total Site	**0.00**	**15**	**-**	**0.25**

Equations:

Peak Flow

$$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$$

Intensity

Modified Rational Calculations - Peak Flow Summary

Return Period	Pre-development Peak Flow (L/s)		Post-development Peak Flow (L/s)			
	C_{pre}	Q_{pre}	C_{post}	Q_{UC01}	Q_{UC02}	Q_{target}
2 yr	0.50	32.2	0.25	1.3	2.2	**28.8**
5 yr	0.50	43.3	0.25	1.7	2.9	**38.7**
10 yr	0.50	53.4	0.25	2.1	3.6	**47.7**
25 yr	0.50	61.3	0.28	2.7	4.5	**54.1**
50 yr	0.50	68.4	0.03	0.3	0.5	**67.6**
100 yr	0.50	75.7	0.31	3.8	6.3	**65.6**

Return Period	TRCA Unit Flow (L/s/ha)	TRCA Unit Flow Target (L/s)	Mississauga 2-year Target (L/s)	Post-development Peak Flow (L/s)		
				$Q_{201\text{-controlled}}$	$Q_{202\text{-controlled}}$	$Q_{controlled\ 201+202}$
2 yr	31.1	12.0	**22.1**	16.1	2.2	18.3
5 yr	45.2	17.4				
10 yr	56.0	21.5				
25 yr	69.3	26.6				
50 yr	82.1	31.6				
100 yr	93.0	35.8				

Return Period	Stormwater Storage (m^3)			
	201 Storage Required	UG Tank Provided	202 Storage Required	Rooftop Provided
2 yr	19	133	6	53
5 yr	33		10	
10 yr	47		14	
25 yr	68		19	
50 yr	92		23	
100 yr	114		26	

CROZIER & ASSOCIATES
Consulting Engineers

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-04

Created By: HL
Checked By: TE
Updated: 2021-03-19

Modified Rational Calculations - 100-year Peak Flow Summary

MUNICIPALITY: City of Mississauga

2-year Peak Flow Target
TRCA Peak Flow 22.1 L/s

100-yr Post-Development Peak Flow

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
1.06	140.69	0.25	0.10	102.59
	Q_{post} =	16.1	L/s	

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
1.00	140.69	0.05	0.02	20.34
	Roof Control Rate:	42	L/s/ha	
		2.2	L/s	

Catchment 201 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	176.31	600	0.129	65.6
20	118.12	1200	0.087	87.2
30	90.77	1800	0.067	98.3
40	74.58	2400	0.055	105.0
50	63.75	3000	0.047	109.1
60	55.95	3600	0.041	111.8
70	50.03	4200	0.037	113.4
80	45.38	4800	0.033	114.2
90	41.60	5400	0.031	114.4
100	38.47	6000	0.028	114.1
110	35.84	6600	0.026	113.5
120	33.58	7200	0.025	112.5
130	31.62	7800	0.023	111.3
140	29.90	8400	0.022	109.8
150	28.39	9000	0.021	108.1
160	27.04	9600	0.020	106.3
170	25.82	10200	0.019	104.3
180	24.73	10800	0.018	102.1
190	23.73	11400	0.017	99.9
200	22.82	12000	0.017	97.5
210	21.99	12600	0.016	95.1
220	21.22	13200	0.016	92.5
230	20.52	13800	0.015	89.8
240	19.86	14400	0.015	87.1
250	19.25	15000	0.014	84.3
260	18.68	15600	0.014	81.5
270	18.15	16200	0.013	78.6
280	17.65	16800	0.013	75.6
290	17.18	17400	0.013	72.5
300	16.74	18000	0.012	69.5
310	16.32	18600	0.012	66.3
320	15.93	19200	0.012	63.2
330	15.56	19800	0.011	60.0
340	15.20	20400	0.011	56.7
350	14.87	21000	0.011	53.4
360	14.55	21600	0.011	50.1
Required Storage Volume:				**114.4**

Catchment 202 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	176.31	600	0.026	13.8
20	118.12	1200	0.017	18.3
30	90.77	1800	0.013	20.8
40	74.58	2400	0.011	22.5
50	63.75	3000	0.009	23.6
60	55.95	3600	0.008	24.4
70	50.03	4200	0.007	25.0
80	45.38	4800	0.007	25.5
90	41.60	5400	0.006	25.8
100	38.47	6000	0.006	26.1
110	35.84	6600	0.005	26.2
120	33.58	7200	0.005	26.4
130	31.62	7800	0.005	26.4
140	29.90	8400	0.004	26.4
150	28.39	9000	0.004	26.4
160	27.04	9600	0.004	26.3
170	25.82	10200	0.004	26.2
180	24.73	10800	0.004	26.1
190	23.73	11400	0.003	26.0
200	22.82	12000	0.003	25.8
210	21.99	12600	0.003	25.6
220	21.22	13200	0.003	25.4
230	20.52	13800	0.003	25.2
240	19.86	14400	0.003	24.9
250	19.25	15000	0.003	24.7
260	18.68	15600	0.003	24.4
270	18.15	16200	0.003	24.1
280	17.65	16800	0.003	23.8
290	17.18	17400	0.003	23.5
300	16.74	18000	0.002	23.2
310	16.32	18600	0.002	22.9
320	15.93	19200	0.002	22.6
330	15.56	19800	0.002	22.2
340	15.20	20400	0.002	21.9
350	14.87	21000	0.002	21.5
360	14.55	21600	0.002	21.2
Required Storage Volume:				**26.4**

Uncontrolled Flow
$Q_{uncont} = Q_{uncont\ 201} + Q_{uncont\ external}$

Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$

Storage
$S_d = Q_{post} \bullet T_d - Q_{target} (T_d + T_c) / 2$

CROZIER & ASSOCIATES Consulting Engineers

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-04

Created By: HL
Checked By: TE
Updated: 2021-03-19

Modified Rational Calculations - Peak Flow Summary

MUNICIPALITY: City of Mississauga

2-year Peak Flow Target
TRCA Peak Flow 22.1 L/s

50-yr Post-Development Peak Flow

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
1.01	127.13	0.25	0.09	89.00
	Q_{post} =	16.1	L/s	

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
1.00	127.13	0.05	0.02	18.38
	Roof Control Rate:	42	L/s/ha	
		2.2	L/s	

Catchment 201 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	159.75	600	0.113	55.5
20	106.57	1200	0.075	73.3
30	81.75	1800	0.058	82.1
40	67.10	2400	0.047	87.0
50	57.32	3000	0.040	89.9
60	50.28	3600	0.035	91.5
70	44.95	4200	0.032	92.1
80	40.76	4800	0.029	92.1
90	37.36	5400	0.026	91.6
100	34.54	6000	0.024	90.7
110	32.17	6600	0.023	89.5
120	30.14	7200	0.021	87.9
130	28.38	7800	0.020	86.2
140	26.84	8400	0.019	84.3
150	25.48	9000	0.018	82.1
160	24.26	9600	0.017	79.9
170	23.17	10200	0.016	77.5
180	22.19	10800	0.016	75.0
190	21.29	11400	0.015	72.3
200	20.48	12000	0.014	69.6
210	19.73	12600	0.014	66.8
220	19.04	13200	0.013	63.9
230	18.41	13800	0.013	61.0
240	17.82	14400	0.013	58.0
250	17.27	15000	0.012	54.9
260	16.76	15600	0.012	51.8
270	16.28	16200	0.011	48.6
280	15.83	16800	0.011	45.3
290	15.41	17400	0.011	42.1
300	15.01	18000	0.011	38.7
310	14.64	18600	0.010	35.4
320	14.29	19200	0.010	32.0
330	13.95	19800	0.010	28.5
340	13.64	20400	0.010	25.1
350	13.34	21000	0.009	21.5
360	13.05	21600	0.009	18.0
Required Storage Volume:				**92.1**

Catchment 202 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	159.75	600	0.023	12.3
20	106.57	1200	0.016	16.3
30	81.75	1800	0.012	18.5
40	67.10	2400	0.010	19.8
50	57.32	3000	0.008	20.8
60	50.28	3600	0.007	21.4
70	44.95	4200	0.007	21.9
80	40.76	4800	0.006	22.3
90	37.36	5400	0.005	22.5
100	34.54	6000	0.005	22.6
110	32.17	6600	0.005	22.7
120	30.14	7200	0.004	22.8
130	28.38	7800	0.004	22.7
140	26.84	8400	0.004	22.7
150	25.48	9000	0.004	22.6
160	24.26	9600	0.004	22.4
170	23.17	10200	0.003	22.3
180	22.19	10800	0.003	22.1
190	21.29	11400	0.003	21.9
200	20.48	12000	0.003	21.7
210	19.73	12600	0.003	21.5
220	19.04	13200	0.003	21.2
230	18.41	13800	0.003	20.9
240	17.82	14400	0.003	20.6
250	17.27	15000	0.003	20.4
260	16.76	15600	0.002	20.0
270	16.28	16200	0.002	19.7
280	15.83	16800	0.002	19.4
290	15.41	17400	0.002	19.1
300	15.01	18000	0.002	18.7
310	14.64	18600	0.002	18.4
320	14.29	19200	0.002	18.0
330	13.95	19800	0.002	17.6
340	13.64	20400	0.002	17.2
350	13.34	21000	0.002	16.9
360	13.05	21600	0.002	16.5
Required Storage Volume:				**22.8**

Uncontrolled Flow
$Q_{uncont} = Q_{uncont\ 201} + Q_{uncont\ external}$

Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$

Storage
$S_d = Q_{post} \bullet T_d - Q_{target} (T_d + T_c) / 2$

CROZIER & ASSOCIATES Consulting Engineers

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-04

Created By: HL
Checked By: TE
Updated: 2021-03-19

Modified Rational Calculations - Peak Flow Summary

MUNICIPALITY: City of Mississauga

2-year Peak Flow Target
TRCA Peak Flow 22.1 L/s

25-yr Post-Development Peak Flow

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.93	113.89	0.25	0.07	73.09
	Q_{post} =	16.1	L/s	

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.99	113.89	0.05	0.02	16.30
	Roof Control Rate:	42	L/s/ha	
		2.2	L/s	

Catchment 201 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	143.31	600	0.093	43.5
20	95.40	1200	0.062	57.1
30	73.11	1800	0.047	63.4
40	59.98	2400	0.039	66.5
50	51.22	3000	0.033	68.0
60	44.92	3600	0.029	68.4
70	40.15	4200	0.026	68.0
80	36.40	4800	0.024	67.1
90	33.36	5400	0.022	65.8
100	30.85	6000	0.020	64.2
110	28.73	6600	0.019	62.3
120	26.91	7200	0.017	60.2
130	25.34	7800	0.016	57.9
140	23.96	8400	0.015	55.4
150	22.74	9000	0.015	52.8
160	21.66	9600	0.014	50.0
170	20.69	10200	0.013	47.2
180	19.81	10800	0.013	44.3
190	19.01	11400	0.012	41.2
200	18.28	12000	0.012	38.1
210	17.61	12600	0.011	35.0
220	17.00	13200	0.011	31.7
230	16.43	13800	0.011	28.4
240	15.90	14400	0.010	25.1
250	15.41	15000	0.010	21.7
260	14.96	15600	0.010	18.3
270	14.53	16200	0.009	14.8
280	14.13	16800	0.009	11.2
290	13.75	17400	0.009	7.7
300	13.40	18000	0.009	4.1
310	13.07	18600	0.008	0.5
320	12.75	19200	0.008	-3.2
330	12.45	19800	0.008	-6.9
340	12.17	20400	0.008	-10.6
350	11.90	21000	0.008	-14.4
360	11.65	21600	0.008	-18.1
Required Storage Volume:				**68.4**

Catchment 202 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	143.31	600	0.021	10.8
20	95.40	1200	0.014	14.2
30	73.11	1800	0.011	16.0
40	59.98	2400	0.009	17.1
50	51.22	3000	0.007	17.9
60	44.92	3600	0.006	18.4
70	40.15	4200	0.006	18.7
80	36.40	4800	0.005	19.0
90	33.36	5400	0.005	19.1
100	30.85	6000	0.004	19.1
110	28.73	6600	0.004	19.1
120	26.91	7200	0.004	19.1
130	25.34	7800	0.004	19.0
140	23.96	8400	0.003	18.9
150	22.74	9000	0.003	18.7
160	21.66	9600	0.003	18.5
170	20.69	10200	0.003	18.3
180	19.81	10800	0.003	18.1
190	19.01	11400	0.003	17.8
200	18.28	12000	0.003	17.5
210	17.61	12600	0.003	17.2
220	17.00	13200	0.002	16.9
230	16.43	13800	0.002	16.6
240	15.90	14400	0.002	16.3
250	15.41	15000	0.002	16.0
260	14.96	15600	0.002	15.6
270	14.53	16200	0.002	15.3
280	14.13	16800	0.002	14.9
290	13.75	17400	0.002	14.5
300	13.40	18000	0.002	14.1
310	13.07	18600	0.002	13.7
320	12.75	19200	0.002	13.3
330	12.45	19800	0.002	12.9
340	12.17	20400	0.002	12.5
350	11.90	21000	0.002	12.1
360	11.65	21600	0.002	11.7
Required Storage Volume:				**19.1**

Uncontrolled Flow
$Q_{uncont} = Q_{uncont\ 201} + Q_{uncont\ external}$

Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$

Storage
$S_d = Q_{post} \bullet T_d - Q_{target} (T_d + T_c) / 2$

CROZIER & ASSOCIATES
Consulting Engineers

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-04

Created By: HL
Checked By: TE
Updated: 2021-03-19

Modified Rational Calculations - Peak Flow Summary

MUNICIPALITY: City of Mississauga

2-year Peak Flow Target
TRCA Peak Flow 22.1 L/s

10-yr Post-Development Peak Flow

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.84	99.17	0.25	0.06	57.85

Q_{post} = 16.1 L/s

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.90	99.17	0.05	0.01	12.90

Roof Control Rate: 42 L/s/ha
2.2 L/s

Catchment 201 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	124.77	600	0.073	31.9
20	83.06	1200	0.049	41.7
30	63.66	1800	0.037	45.6
40	52.22	2400	0.031	47.1
50	44.60	3000	0.026	47.3
60	39.11	3600	0.023	46.6
70	34.96	4200	0.021	45.3
80	31.69	4800	0.019	43.6
90	29.05	5400	0.017	41.6
100	26.86	6000	0.016	39.3
110	25.01	6600	0.015	36.7
120	23.43	7200	0.014	34.1
130	22.06	7800	0.013	31.2
140	20.86	8400	0.012	28.3
150	19.80	9000	0.012	25.2
160	18.86	9600	0.011	22.0
170	18.01	10200	0.011	18.8
180	17.24	10800	0.010	15.4
190	16.55	11400	0.010	12.0
200	15.92	12000	0.009	8.6
210	15.33	12600	0.009	5.1
220	14.80	13200	0.009	1.5
230	14.30	13800	0.008	-2.1
240	13.85	14400	0.008	-5.8
250	13.42	15000	0.008	-9.5
260	13.02	15600	0.008	-13.2
270	12.65	16200	0.007	-16.9
280	12.30	16800	0.007	-20.7
290	11.98	17400	0.007	-24.6
300	11.67	18000	0.007	-28.4
310	11.38	18600	0.007	-32.3
320	11.10	19200	0.007	-36.2
330	10.84	19800	0.006	-40.1
340	10.60	20400	0.006	-44.1
350	10.36	21000	0.006	-48.0
360	10.14	21600	0.006	-52.0
Required Storage Volume:				**47.3**

Catchment 202 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	124.77	600	0.016	8.2
20	83.06	1200	0.011	10.8
30	63.66	1800	0.008	12.1
40	52.22	2400	0.007	12.8
50	44.60	3000	0.006	13.3
60	39.11	3600	0.005	13.5
70	34.96	4200	0.005	13.7
80	31.69	4800	0.004	13.7
90	29.05	5400	0.004	13.7
100	26.86	6000	0.004	13.6
110	25.01	6600	0.003	13.4
120	23.43	7200	0.003	13.3
130	22.06	7800	0.003	13.1
140	20.86	8400	0.003	12.8
150	19.80	9000	0.003	12.5
160	18.86	9600	0.002	12.3
170	18.01	10200	0.002	12.0
180	17.24	10800	0.002	11.6
190	16.55	11400	0.002	11.3
200	15.92	12000	0.002	10.9
210	15.33	12600	0.002	10.6
220	14.80	13200	0.002	10.2
230	14.30	13800	0.002	9.8
240	13.85	14400	0.002	9.4
250	13.42	15000	0.002	9.0
260	13.02	15600	0.002	8.6
270	12.65	16200	0.002	8.2
280	12.30	16800	0.002	7.8
290	11.98	17400	0.002	7.3
300	11.67	18000	0.002	6.9
310	11.38	18600	0.001	6.4
320	11.10	19200	0.001	6.0
330	10.84	19800	0.001	5.5
340	10.60	20400	0.001	5.1
350	10.36	21000	0.001	4.6
360	10.14	21600	0.001	4.1
Required Storage Volume:				**13.7**

Uncontrolled Flow
$Q_{uncont} = Q_{uncont\ 201} + Q_{uncont\ external}$

Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$

Storage
$S_d = Q_{post} \bullet T_d - Q_{target} (T_d + T_c) / 2$

CROZIER & ASSOCIATES
Consulting Engineers

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-04

Created By: HL
Checked By: TE
Updated: 2021-03-19

Modified Rational Calculations - Peak Flow Summary

MUNICIPALITY: City of Mississauga

2-year Peak Flow Target
TRCA Peak Flow 22.1 L/s

5-yr Post-Development Peak Flow

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.84	80.51	0.25	0.05	46.97

Q_{post} = 16.1 L/s

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.90	80.51	0.05	0.01	10.47

Roof Control Rate: 42 L/s/ha
2.2 L/s

Catchment 201 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	101.30	600	0.060	23.7
20	67.43	1200	0.040	30.7
30	51.68	1800	0.030	33.0
40	42.40	2400	0.025	33.3
50	36.21	3000	0.021	32.5
60	31.76	3600	0.019	31.0
70	28.38	4200	0.017	29.1
80	25.73	4800	0.015	26.8
90	23.58	5400	0.014	24.2
100	21.81	6000	0.013	21.4
110	20.31	6600	0.012	18.5
120	19.02	7200	0.011	15.4
130	17.91	7800	0.011	12.2
140	16.94	8400	0.010	8.9
150	16.08	9000	0.009	5.5
160	15.31	9600	0.009	2.0
170	14.62	10200	0.009	-1.5
180	14.00	10800	0.008	-5.1
190	13.44	11400	0.008	-8.8
200	12.92	12000	0.008	-12.5
210	12.45	12600	0.007	-16.3
220	12.01	13200	0.007	-20.1
230	11.61	13800	0.007	-23.9
240	11.24	14400	0.007	-27.8
250	10.90	15000	0.006	-31.7
260	10.57	15600	0.006	-35.6
270	10.27	16200	0.006	-39.6
280	9.99	16800	0.006	-43.6
290	9.72	17400	0.006	-47.6
300	9.47	18000	0.006	-51.6
310	9.24	18600	0.005	-55.7
320	9.01	19200	0.005	-59.8
330	8.80	19800	0.005	-63.9
340	8.60	20400	0.005	-68.0
350	8.41	21000	0.005	-72.1
360	8.23	21600	0.005	-76.2
Required Storage Volume:				**33.3**

Catchment 202 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	101.30	600	0.013	6.3
20	67.43	1200	0.009	8.3
30	51.68	1800	0.007	9.2
40	42.40	2400	0.006	9.7
50	36.21	3000	0.005	10.0
60	31.76	3600	0.004	10.1
70	28.38	4200	0.004	10.1
80	25.73	4800	0.003	10.0
90	23.58	5400	0.003	9.8
100	21.81	6000	0.003	9.6
110	20.31	6600	0.003	9.4
120	19.02	7200	0.002	9.1
130	17.91	7800	0.002	8.8
140	16.94	8400	0.002	8.5
150	16.08	9000	0.002	8.2
160	15.31	9600	0.002	7.8
170	14.62	10200	0.002	7.4
180	14.00	10800	0.002	7.0
190	13.44	11400	0.002	6.6
200	12.92	12000	0.002	6.2
210	12.45	12600	0.002	5.8
220	12.01	13200	0.002	5.4
230	11.61	13800	0.002	4.9
240	11.24	14400	0.001	4.5
250	10.90	15000	0.001	4.1
260	10.57	15600	0.001	3.6
270	10.27	16200	0.001	3.1
280	9.99	16800	0.001	2.7
290	9.72	17400	0.001	2.2
300	9.47	18000	0.001	1.7
310	9.24	18600	0.001	1.2
320	9.01	19200	0.001	0.7
330	8.80	19800	0.001	0.2
340	8.60	20400	0.001	-0.3
350	8.41	21000	0.001	-0.8
360	8.23	21600	0.001	-1.3
Required Storage Volume:				**10.1**

Uncontrolled Flow
$Q_{uncont} = Q_{uncont\ 201} + Q_{uncont\ external}$

Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$

Storage
$S_d = Q_{post} \bullet T_d - Q_{target} (T_d + T_c) / 2$

CROZIER & ASSOCIATES
Consulting Engineers

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-04

Created By: HL
Checked By: TE
Updated: 2021-03-19

Modified Rational Calculations - Peak Flow Summary

MUNICIPALITY: City of Mississauga

2-year Peak Flow Target
TRCA Peak Flow 22.1 L/s

2-yr Post-Development Peak Flow

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.84	59.89	0.25	0.03	34.94
	Q_{post} =	16.1	L/s	

C	i (mm/hr)	A (ha)	Q (m3/s)	Qpost(L/s)
0.90	59.89	0.05	0.01	7.79
	Roof Control Rate:	42	L/s/ha	
		2.2	L/s	

Catchment 201 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	75.36	600	0.044	14.5
20	50.16	1200	0.029	18.5
30	38.45	1800	0.023	19.0
40	31.54	2400	0.019	18.0
50	26.94	3000	0.016	16.1
60	23.62	3600	0.014	13.8
70	21.12	4200	0.012	11.1
80	19.14	4800	0.011	8.2
90	17.54	5400	0.010	5.1
100	16.22	6000	0.010	1.8
110	15.11	6600	0.009	-1.7
120	14.15	7200	0.008	-5.2
130	13.33	7800	0.008	-8.8
140	12.60	8400	0.007	-12.5
150	11.96	9000	0.007	-16.3
160	11.39	9600	0.007	-20.1
170	10.88	10200	0.006	-24.0
180	10.42	10800	0.006	-27.9
190	10.00	11400	0.006	-31.9
200	9.61	12000	0.006	-35.9
210	9.26	12600	0.005	-39.9
220	8.94	13200	0.005	-43.9
230	8.64	13800	0.005	-48.0
240	8.36	14400	0.005	-52.2
250	8.11	15000	0.005	-56.3
260	7.87	15600	0.005	-60.5
270	7.64	16200	0.004	-64.6
280	7.43	16800	0.004	-68.8
290	7.23	17400	0.004	-73.1
300	7.05	18000	0.004	-77.3
310	6.87	18600	0.004	-81.5
320	6.71	19200	0.004	-85.8
330	6.55	19800	0.004	-90.1
340	6.40	20400	0.004	-94.4
350	6.26	21000	0.004	-98.7
360	6.13	21600	0.004	-103.0
Required Storage Volume:				**19.0**

Catchment 202 - Storage Volume Determination

T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	75.36	600	0.010	4.3
20	50.16	1200	0.007	5.6
30	38.45	1800	0.005	6.1
40	31.54	2400	0.004	6.3
50	26.94	3000	0.004	6.3
60	23.62	3600	0.003	6.2
70	21.12	4200	0.003	6.1
80	19.14	4800	0.003	5.8
90	17.54	5400	0.002	5.5
100	16.22	6000	0.002	5.2
110	15.11	6600	0.002	4.9
120	14.15	7200	0.002	4.5
130	13.33	7800	0.002	4.1
140	12.60	8400	0.002	3.7
150	11.96	9000	0.002	3.3
160	11.39	9600	0.001	2.9
170	10.88	10200	0.001	2.4
180	10.42	10800	0.001	2.0
190	10.00	11400	0.001	1.5
200	9.61	12000	0.001	1.0
210	9.26	12600	0.001	0.5
220	8.94	13200	0.001	0.1
230	8.64	13800	0.001	-0.4
240	8.36	14400	0.001	-0.9
250	8.11	15000	0.001	-1.4
260	7.87	15600	0.001	-1.9
270	7.64	16200	0.001	-2.5
280	7.43	16800	0.001	-3.0
290	7.23	17400	0.001	-3.5
300	7.05	18000	0.001	-4.0
310	6.87	18600	0.001	-4.5
320	6.71	19200	0.001	-5.1
330	6.55	19800	0.001	-5.6
340	6.40	20400	0.001	-6.1
350	6.26	21000	0.001	-6.7
360	6.13	21600	0.001	-7.2
Required Storage Volume:				**6.3**

Uncontrolled Flow
$Q_{uncont} = Q_{uncont\ 201} + Q_{uncont\ external}$

Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$

Storage
$S_d = Q_{post} \bullet T_d - Q_{target} (T_d + T_c) / 2$

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created By: HL
Checked By: TE
Date: 2020-03-19
Updated: 2021-03-19

300mm Dia. Orifice Tube Design Summary

Orifice Type =	Orifice Tube	
Invert Elevation =	138.96	m
Diameter of Orifice =	75	mm
Area of Orifice (A) =	0.004	sq.m
Orifice Coefficient (Cd) =	0.82	

Calculation of Head

Centroid Elevation =	139.00	m
Water Elevation =	140.00	m
Upstream Head*, (h) =	1.00	m

Qa = **(Cd)(A)(2gh)^0.5**

Actual Controlled Discharge, Qa = **0.02** **cms**

16 L/s

*Head is based upon orifice area @ orifice face not Vena Contracta

Project: 1108 & 1094 Eglinton Ave
Project No.: 1346-4573 (R.01)
Created: 20221-03-19

Created By: HL
Checked By: TE
Updated: 2021-03-19

Water Balance Calculation

Description	Initital Abstraction (mm)	Area (ha)	Volume (m^3)
Developable Site Area	5.0	0.38	19.2
Site Total	**-**	0.38	19.2
Required Water Balance Volume			**19.2**

Provided Underground Storage Chamber Footprint	190.2
Provided Stone Depth under the Chamber	0.3
Provide Water Balance Volume	**22.8**

Project: 1108 & 1094 Eglinton
Project No.: 1277-4440
Prepared By: HL
Reviewed By: TE
Created Date: 2021.03.19
Revised Date: 2021.03.19

WATER QUALITY - TREATMENT TRAIN

WATER QUALITY CALCULATIONS (TREATMENT TRAIN)			
Catchment ID	LID	TSS removal	Total
201	OGS (EFO system)	60	80.0
	CB Shields	50	

Treatment Train Approach:

$$R = A + B - [(A \times B) / 100] \qquad \text{(Equation 4-1)}$$

Where:

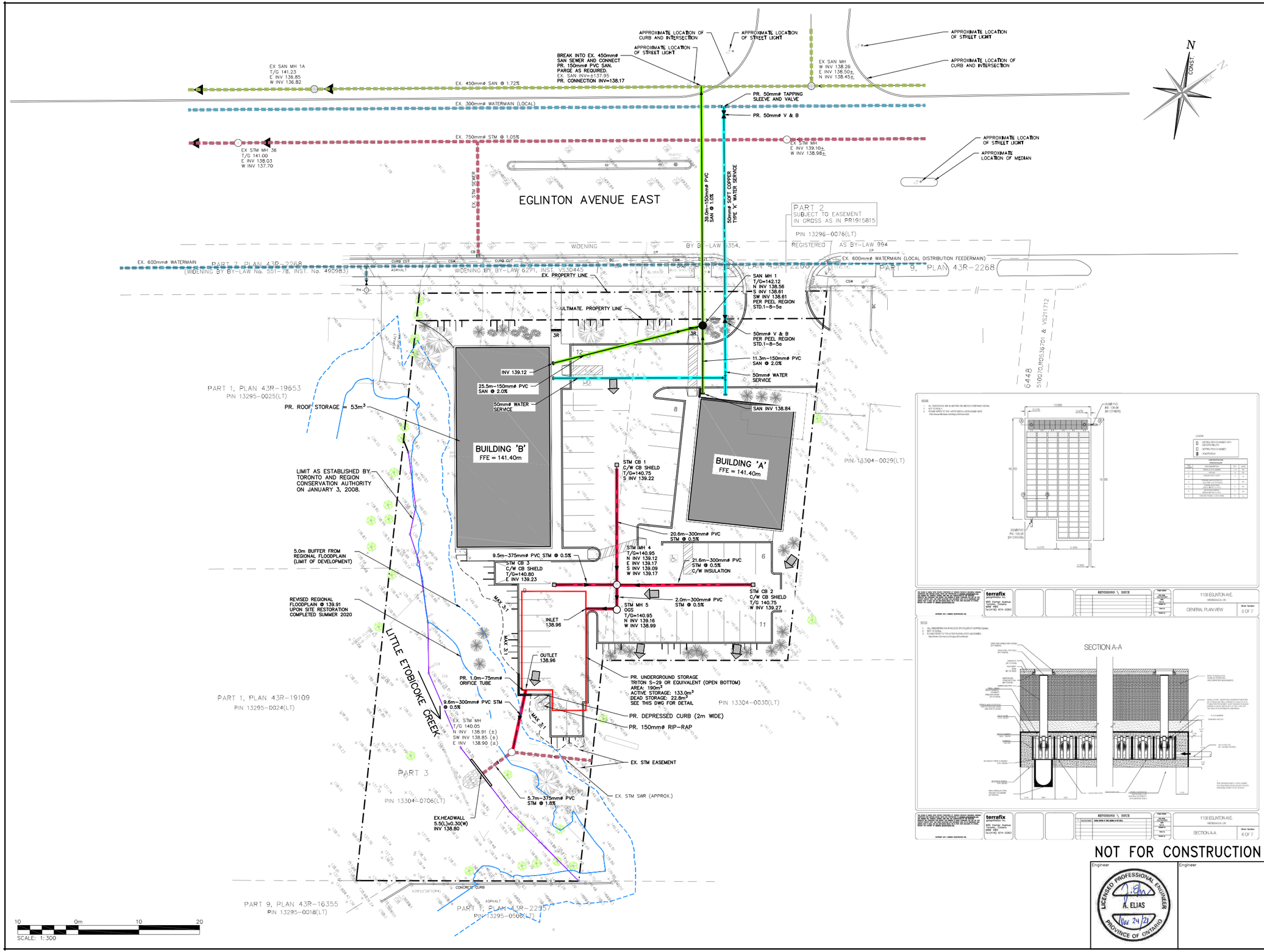
R = Total TSS Removal Rate
A = TSS Removal Rate of the First or Upstream BMP
B = TSS Removal Rate of the Second or Downstream BMP

*As per 'New Jersey Stormwater Best Management Practices Manual' Equation 4-1 (February 2004)

TSS Removal:
OGS (EFO system) (Rate 1) = 60.0 %
CB Shields (Rate 2) = 50 %

Removal at end of treatment train:
R_3 = Rate 1 + Rate 2 - [(Rate 1 x Rate 2)/100]
R_{total} = 80.0 %

DRAWINGS



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ELEVATION = 142.565m

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VERTICAL DATUM: CANADIAN GEODETIC DATUM, 1928
(NOT 1978 SOUTHERN ONTARIO READJUSTMENT)

SURVEY NOTES:

SURVEY COMPLETED BY DAVID B. SEARLES SURVEY. (2015/OCT/30)
REFERENCE No.: 139-O-15

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UTM ZONE 17, NAD83 (GSRS) (2010.0)

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996781

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY BRIAN LUEY ARCHITECT INC. DATED MAR 5. 2021

AS CONSTRUCTED INFORMATION:

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Project

1108 EGLINTON AVENUE EAST CITY OF MISSISSAUGA

Drawing

SITE SERVICING PLAN

NOT FOR CONSTRUCTION

Engineer

A. ELIAS
Nov 24/21
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

Engineer

CROZIER & ASSOCIATES Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	A.K.	Design	H.L.	Project No.	1277-4440
Check	S.C.	Check	T.E.	Scale	1:300
				Dwg.	C 01

SCALE: 1:300

EGLINTON AVENUE EAST

APPROXIMATE LOCATION OF STREET LIGHT

APPROXIMATE LOCATION OF MEDIAN

N

CONST.

TRUE N

PART 2
SUBJECT TO EASEMENT
IN GROSS AS IN PR1915815
PIN 13296-0076(LT)
REGISTERED AS BY-LAW 994

WIDENING BY BY-LAW 5354

PART 7, PLAN 43R-2268
(WIDENING BY BY-LAW No. 551-78, INST. No. 490983)

WIDENING BY BY-LAW 6271, INST. VS30445

PART 8, PLAN 43R-2268

PART 9, PLAN 43R-2268

EX. PROPERTY LINE

ULTIMATE. PROPERTY LINE

PART 1, PLAN 43R-19653
PIN 13295-0025(LT)

PR. ROOF STORAGE = 53m³

BUILDING 'B'
FFE = 141.40m

BUILDING 'A'
FFE = 141.40m

PR. DEPRESSED CURB

PR. RETAINING WALL
LENGTH: 1.8m
HEIGHT: 0.25m

RAISED FOUNDATION WALL

STM CB 1
T/G 140.75

STM CB 3
T/G 140.80

STM MH 4
T/G 140.97

STM MH 5 OGS
T/G 140.97

STM CB 2
T/G 140.75

PR. DEPRESSED CURB (1m WIDE)

PR. DEPRESSED CURB (2m WIDE)

PR. 150mmø RIP-RAP

EX. STM EASEMENT

PART 1, PLAN 43R-36448
SUBJECT TO RIGHT-OF-WAY AS IN RO519070; RO536701 & VS211712

PIN 13304-0029(LT)

PIN 13304-0030(LT)

LIMIT AS ESTABLISHED BY TORONTO AND REGION CONSERVATION AUTHORITY ON JANUARY 3, 2008.

5.0m BUFFER FROM REGIONAL FLOODPLAIN (LIMIT OF DEVELOPMENT)

REVISED REGIONAL FLOODPLAIN @ 139.91 UPON SITE RESTORATION COMPLETED SUMMER 2020

LITTLE ETOBICOKE CREEK

PR. RETAINING HEADWALL
LENGTH: 5.39m
HEIGHT: 0.98m

EX.HEADWALL
5.5(L)x0.30(W)
INV 138.80

PART 1, PLAN 43R-19109
PIN 13295-0024(LT)

PART 3
PIN 13304-0706(LT)

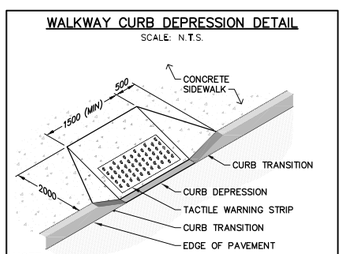
CONCRETE CURB

ASPHALT

N39°22'20"E(R4)

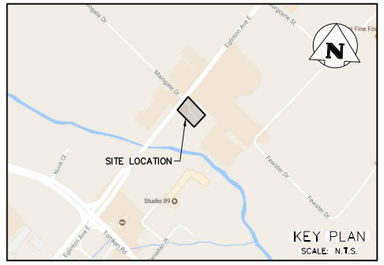
WALKWAY CURB DEPRESSION DETAIL

SCALE: N.T.S.



NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

5 0m 5 10 15 20
SCALE: 1:250



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING FENCE
- 215.00 EXISTING GRADE
- 215.00 PROPOSED GRADE
- 215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- 2.0% PROPOSED GRASSED SWALE
- PROPOSED RETAINING WALL
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION
- LIMIT AS ESTABLISHED BY TORONTO AND REGION CONSERVATION AUTHORITY ON JANUARY 3, 2008.
- REVISED REGIONAL FLOODPLAIN @ 139.91 UPON SITE RESTORATION COMPLETED SUMMER 2020
- 5.0m BUFFER FROM REGIONAL FLOODPLAIN

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Project

1108 EGLINTON AVENUE EAST
CITY OF MISSISSAUGA

Drawing

SITE GRADING PLAN

NOT FOR CONSTRUCTION

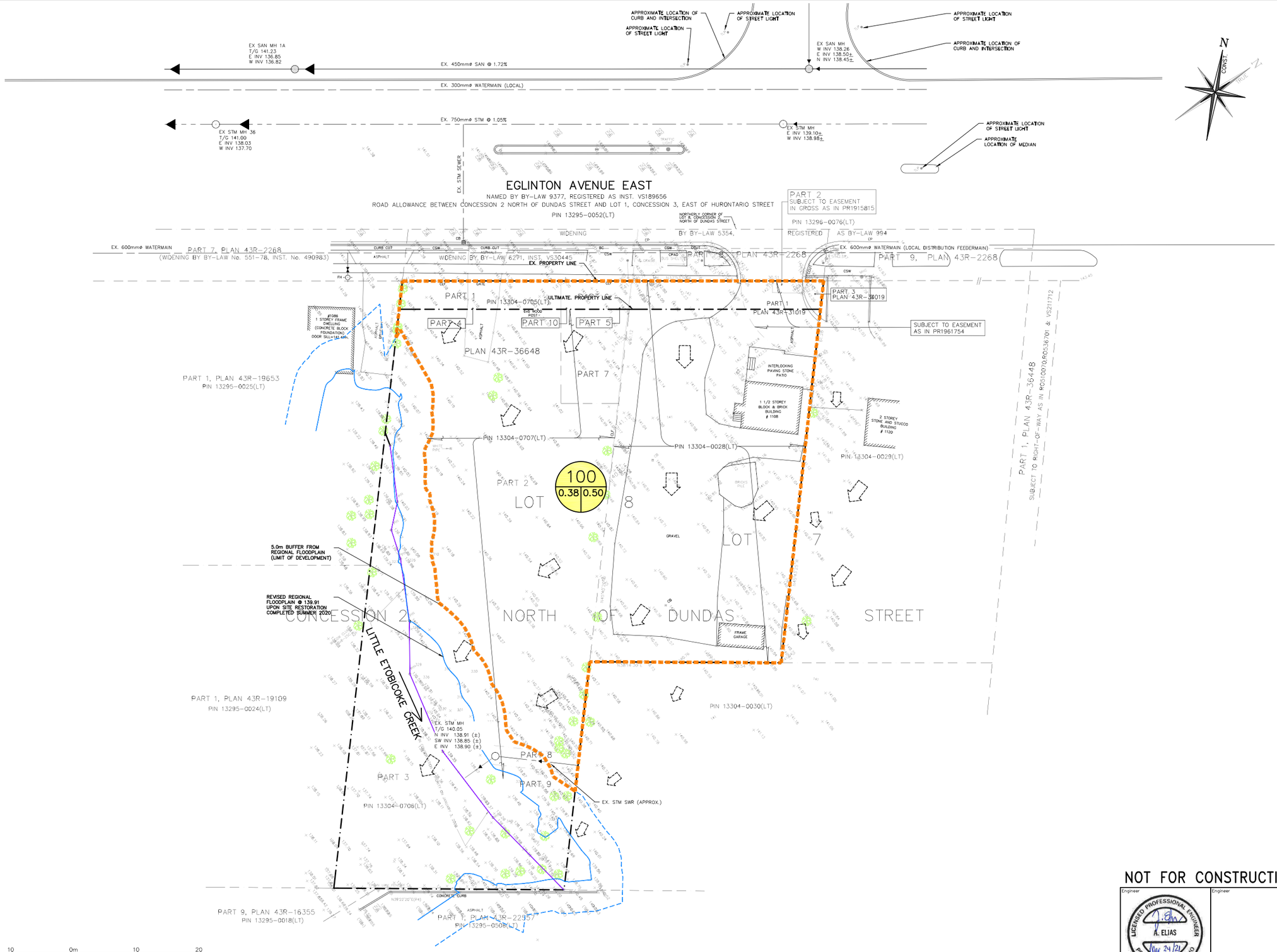
Engineer

LICENSED PROFESSIONAL ENGINEER
A. ELIAS
Mar 24/21
PROVINCE OF ONTARIO

Engineer

CROZIER & ASSOCIATES Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	S.T.T.	Design	M.C.B.	Project No.	1277-4440
Check	S.C.S.	Check	K.J.F.	Scale	1: 250
				Dwg.	C 02



10 0m 10 20
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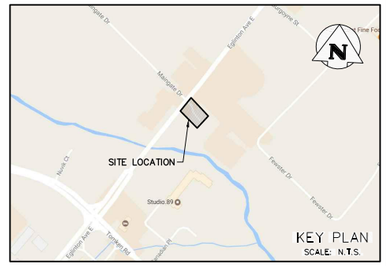

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- PRE-DEVELOPMENT STORM DRAINAGE CATCHMENT AREA
- ID / A|RC — CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT
- LIMIT AS ESTABLISHED BY TORONTO AND REGION CONSERVATION AUTHORITY ON JANUARY 3, 2008.
- REVISED REGIONAL FLOODPLAIN @ 139.91 UPON SITE RESTORATION COMPLETED SUMMER 2020
- 5.0m BUFFER FROM REGIONAL FLOODPLAIN

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Project
1108 EGLINTON AVENUE EAST CITY OF MISSISSAUGA

Drawing
PRE-DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

SPA# 0000-000

Engineer
LICENSED PROFESSIONAL ENGINEER — A. ELIAS — Mar 24/21 — PROVINCE OF ONTARIO

Engineer

CROZIER & ASSOCIATES Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	M.I.M.	Design	M.C.B.	Project No.	1277-4440
Check	S.C.S.	Check	K.J.F.	Scale 1:300	Dwg. FIG 1

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- PR. STORM DRAINAGE CATCHMENT AREA
- ID / A | RC — CATCHMENT I.D.; AREA (ha) | RUNOFF COEFFICIENT
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Project

1108 EGLINTON AVENUE EAST CITY OF MISSISSAUGA

Drawing

POST-DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

SPA# 0000-000

Engineer

LICENSED PROFESSIONAL ENGINEER
A. ELIAS
Nov 24/21
PROVINCE OF ONTARIO

Engineer

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Drawn	M.I.M.	Design	M.C.B.	Project No.	1277-4440
Check	S.C.S.	Check	K.J.F.	Scale	1:300
				Dwg.	FIG 2