FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

7170 GOREWAY DRIVE
FILE NO. OZ/OPA 18 13 & 21T-M 18 3

CITY OF MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

2150745 ONTARIO INC.

PREPARED BY:

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

OCTOBER 2019

CFCA FILE NO. 1346-4573

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	December 15, 2017	Issued for Zoning By-Law Amendment
Rev. 1	August 30, 2019	Issued for 2nd Submission (OPA/ZBA)
Rev.2	September 30, 2019	Issued for 3rd Submission (OPA/ZBA) – Revised FFE
Rev.3	October 30, 2019	Issued for 3rd Submission (OPA/ZBA) – Revised Figures

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by 2150745 Ontario Inc. to prepare a Functional Servicing & Preliminary Stormwater Management Report to support the Official Plan Amendment and Zoning By-Law Amendment to permit the development of 7170 Goreway Drive in the City of Mississauga, Region of Peel.

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

- City of Mississauga Transportation and Works Development Requirements Manual, September 2016
- Region of Peel Public Works Design, Specifications & Procedures Manual – Sanitary Sewer Design Criteria, July 2009 [MODIFIED March 2017 Rev 0.9 (CS)]
- Region of Peel Public Works Design, Specifications & Procedures Manual – Watermain Design Criteria, June 2010

Crozier has previously submitted a servicing and stormwater management design for the subject property. This report has been updated to address agency comments from the City of Mississauga, received in August and September 2018.

This report demonstrates how the proposed development's functional servicing and stormwater management will integrate with the area's existing water, sanitary and stormwater infrastructure.

2.0 Site Description

The subject property is approximately 0.41 ha and is located in a mixed residential and commercial area in the City of Mississauga. The subject property is currently vacant but previously contained one house.

The property is bounded by:

- Etude Drive to the north
- Goreway Drive to the east
- Residential properties to the south and west

The project will consist of a 15-unit residential townhouse development with a private road and access from Etude Drive.

3.0 Water Servicing

The Region of Peel is responsible for the operation and maintenance of the public water supply and treatment in the City of Mississauga. Local water supply system will connect to the Region's municipal water network.

3.1 Existing Water Servicing

A review of Region of Peel as-constructed drawing no. 40529-D dated September 22, 2008 indicates that:

- There is an existing 300 mm diameter watermain within the far side (north side) of Etude Drive, north of the subject property

- There is an existing fire hydrant in the north boulevard of Etude Drive near the subject property

3.2 Design Water Demand

The Region of Peel's Sanitary Design Criteria (March 2017) was used to determine an equivalent population estimate for the proposed residential development. The results are provided in **Table 1** and detailed calculations are provided in **Appendix A.**

Table 1: Equivalent Population Estimate

Standard	Unit Type	Site Area (ha)	Persons/unit	Total Persons
Region of Peel Public Works Design, Specifications & Procedures Manual – Sanitary Sewer Design Criteria, July 2009 [MODIFIED March 2017 Rev 0.9 (CS)]	Persons/ha	0.41	175	71

The Region of Peel's Watermain Design Criteria (June 2010) was used to determine the maximum domestic water demand generated by the proposed development based on the equivalent population estimate for the site. **Table 2** summarizes the estimated design water demand. **Appendix A** contains detailed calculations.

Table 2: Estimated Design Water Demand

Standard	Average Daily Demand (L/s)			Maximum Daily Demand (L/s)	Peak Hourly Demand (L/s)
	Existing	Proposed	Increase		
Region of Peel Public Works Design, Specifications & Procedures Manual – Watermain Design Criteria, June 2010	0	0.23	0.23	0.46	0.69

Note: The subject property appears to have previously contained one residence. The subject property no longer contains any buildings and currently sits vacant.

For this application, the domestic water service will be designed to convey a design water demand of 0.69 L/s.

3.3 Fire Flow Demand

The Fire Underwriters Survey (FUS) method was used to estimate the fire flow demand for the proposed development. This calculation is used to estimate the size of incoming fire lines but does not provide a recommendation for fire protection for the townhouses.

The townhouses are assumed to have ordinary construction and therefore a construction coefficient of 1.0 was applied to the fire flow calculations (Water Supply for Public Fire Protection by Fire Underwriters Survey, 1999).

The preliminary fire demand flow is 216.7 L/s (3,432 US GPM) for a duration of 2.75 hours. Detailed calculations are provided in **Appendix A.** Note that the Fire Underwriter's Survey value is a conservative estimate for comparison purposes only. The Mechanical Engineer for this development will complete the required analysis for fire protection, and the Architect will design fire separation methods per the determined fire flow rate in order to meet municipally available flows and pressures.

3.4 Proposed Water Servicing

The development is proposed to be serviced by a 150 mm diameter PVC watemain looped from the existing 300 mm diameter watermain in Etude Drive to the existing 150mm diameter watermain in Goreway Drive. An isolation valve and valve box will be installed between these two connections. Individual townhouse units will be serviced with copper service laterals. A water meter will be installed within the building envelope per the mechanical design and specifications. The proposed water servicing plan is shown on **Figure 1.**

4.0 Sanitary Servicing

The Region of Peel is responsible for the operation and maintenance of the public sewage conveyance and treatment in the City of Mississauga. Local sewage systems will connect to the Region's municipal sanitary network.

4.1 Existing Sanitary Servicing

A review of Region of Peel as-constructed drawing no. 40529-D dated September 22, 2008 indicates that:

- There are no existing sanitary mains within Etude Drive directly in front of the subject property

A review of Region of Peel as-constructed drawing no. 20065-D dated April, 1993 indicates that:

- There is an existing 250 mm diameter sanitary sewer that flows south with an approximate 0.5% slope within the west boulevard of Goreway Drive

4.2 Design Sanitary Flow

The sanitary design flow for the subject property was calculated using the Region of Peel's Sanitary Sewer Design Criteria (March 2017) and the equivalent population estimate described in **Section 3.2**. Estimated design sanitary calculations are provided in **Table 3**, and detailed calculations are provided in **Appendix A**.

Table 3: Estimated Sanitary Design Flows

Standard	**Average Flow** (L/s)	**Peaking Factor**	**Infiltration Flow** (L/s)	**Peak Flow** (L/s)
Region of Peel Public Works Design, Specifications & Procedures Manual – Sanitary Sewer Design Criteria, July 2009 [MODIFIED March 2017 Rev 0.9 (CS)]	0.25	4.28	0.08	1.15

The proposed sanitary service was sized to convey a peak sanitary flow of 1.15 L/s for the development, as determined by the Region of Peel Sanitary Sewer Design Criteria.

4.3 Proposed Sanitary Servicing

It is proposed to service the subject property by connecting to the existing 250 mm diameter sanitary sewer on Goreway Drive with a proposed 150 mm diameter sanitary sewer. Individual sanitary services will branch off the proposed sanitary sewer, to service each unit.

The Preliminary Site Servicing Plan (**Figure 1**) illustrates the location of the sanitary sewer and all connections. The internal sanitary system of any buildings will be designed per the mechanical engineer's details and specifications.

5.0 Drainage Conditions

5.1 Existing Drainage

The subject property is currently a grassed field and contains no existing buildings. A pre-development runoff coefficient of 0.25 was selected based on the existing topography. **Figure 1** illustrates the existing storm sewer and manhole locations.

According to the topographic survey (J.H. Gelbloom Surveying Limited, updated November 27, 2018) the site maintains relatively flat grading throughout, and existing stormwater drainage splits between two outlets:

- Catchment 101 (0.27 ha) demonstrates drainage from the west of the site being conveyed overland through the south property line
- Catchment 102 (0.14 ha) demonstrates drainage from the east of the site discharging to the Goreway Drive municipal right-of-way

External drainage from the west is conveyed overland towards the site where it ponds and ultimately spills south towards the watercourse. In proposed conditions a berm and drainage swale are proposed to maintain this existing condition. Refer to **Section 5.3** for more details.

Figure 3 shows the delineation of the drainage areas that make up Catchments 101 and 102.

5.2 Proposed Internal Drainage

The proposed development consists of a fifteen (15) unit row-style townhouse development and private road with access through Etude Drive.

The subject property has been divided into three post-development stormwater catchment areas as shown on **Figure 4.** The grading of the site results in:

- Catchment 201 (0.29 ha) discharging controlled to Goreway Drive through the internal storm system
- Catchment 202 (0.10 ha) discharging uncontrolled via overland flow to Goreway Drive
- Catchment 203 (0.02 ha) discharging uncontrolled via a conveyance swale to Goreway Drive

To follow the pre-development drainage pattern, an earthen berm will be constructed along the southwest corner of the subject site, to raise the grades and redirect the overland flow toward the Goreway Drive Right-of-Way. This earth berm will have a setback from the south and west property lines, to allow external runoff to be conveyed across the site to the Goreway Drive Right-of-Way.

Upon development, 24% of the subject site (Sub-catchment 202) will match pre-development drainage conditions and convey stormwater overland toward the catch basins within the Etude Drive and the Goreway Drive roadways.

The stormwater management strategy for the remaining 71% of the site (Sub-catchment 201) will consist of a minor and major stormwater conveyance system comprised of an internal storm sewer system, on-site infiltration and overland flow respectively.

The other 5% (sub-catchment 203) will be conveyed with the external overland flow as indicated below in **Section 5.3.**

The Preliminary Site Servicing and Site Grading Plans (**Figures 1** and **2**) illustrate the proposed site drainage, the location and design of the storm sewers, and all proposed connections. Please refer to **Figure 3** and **4** which highlights the pre- and post-development pervious and impervious areas in the Drainage Plans.

5.3 Proposed External Drainage

Under pre-development conditions, approximately 0.11 ha of external drainage enters 7170 Goreway Drive, along the south and west property limits. Due to the existing grades on the subject property, a natural outlet for the stormwater does not exist until ponding of the stormwater to an elevation of 166.32 meters above sea level (MASL) occurs, at which point it appears that the stormwater will flow overland to the northeast corner of 7170 Goreway Drive and the middle of the 7156 Goreway Drive site. Due to the low elevations at the southwest corner of the subject property (between approximately 166.30 MASL – 166.40 MASL) where external runoff enters 7170 Goreway Drive, there are no simple or practical engineering solutions available to convey the external flows. It's not able to connect into the internal minor and major storm systems since the grades of the external drainage area are lower than the internal overland flow path to Goreway Dr. ROW.

We explored the installation of catch basins and 100-year pipes to convey the external drainage directly to the municipal storm sewers within Goreway Drive. Based on our conversations with the City of Mississauga, there does not appear to be additional capacity available within the Goreway Drive stormwater pipes to convey the external flows. This presents a risk of a backwater effect causing flooding at the inlet catch basins should capacity not be available.

As previously noted by the City of Mississauga, it is not possible for us to raise the site via berms and/or retaining walls as this would block the external flows and may impact neighbouring property owners. As such the only practical engineering solution consists of a flat (approximately 0.3%) swale nearby the south property line to convey this external runoff. Although not ideal, the subject property is constrained by the lowest possible overland outlet elevation of 166.18 MASL at the southeast corner of 7170 Goreway Drive. As such, it is not possible to design an overland flow path steeper than 0.3%. At the time of SPA submission, we will provide detailed design for the swale. Essentially, an underdrain will be proposed to assist in ensuring water is conveyed during minor storm events. During the major storm events, the 0.3% slope will provide enough fall to ensure that water is safely conveyed to the Goreway Drive ROW.

6.0 Stormwater Management

Stormwater management design criteria were established through a review of the City of Mississauga's Transportation and Works Department's Development Requirements Manual. The stormwater management criteria include:

Quantity Control

Provide post to pre control for all design storms (2, 5, 10, 25, 50, and 100-year) per the Mimico Creek requirements in the City of Mississauga Transportation and Works Manual.

Quality Control

"Enhanced" level protection (80% TSS removal) per the MOECC SWM Design Manual (2003).

Water Balance

The initial 5 mm of runoff shall be retained on-site and managed through infiltration, evapotranspiration, or re-use.

6.1 Stormwater Quantity Control

Stormwater is proposed to be collected through multiple catch basins within the internal road on the subject property. It will then be conveyed through an underground pipe network, surcharging into an underground storage chamber, restricted by a 75 mm diameter orifice tube. Stormwater is then conveyed into the existing municipal storm sewer.

Using the City of Mississauga intensity-duration-frequency (IDF) data, the Modified Rational Method was used to determine the pre-development and post-development peak flow rates for site stormwater runoff. As described in **Section 5.2**, catchments 202 and 203 will be uncontrolled areas, with stormwater flowing overland to Etude Drive and Goreway Drive. No quantity controls will be provided for these catchments.

Stormwater from catchment 201 will outlet controlled into the municipal storm system. A 75 mm diameter orifice pipe to restrict flow, and on-site storage will be used to provide best efforts quantity control. Under existing conditions only catchment 102 (0.14 ha) drains to Goreway Drive and the remainder of the site ponds in the south-west corner and ultimately spills south. In proposed conditions, the drainage is improved by reducing the ponding on-site through capturing majority of the site's drainage and conveying it to the internal storm sewer network.

The uncontrolled flows from Catchments 202 and 203 exceed the pre-development flows from catchment 102 and therefore best efforts have been applied to simultaneously improve the drainage situation and limit the additional drainage entering the municipal system from catchment 201. **Table 4** illustrated the existing and proposed peak flows.

Table 4: Pre- and Post-Development Peak Flows

Storm Event (year)	Qpre: Catchment 102 (L/s)	Qpre: Whole Site (Catchment 101 + 102) (L/s)	Post-development Peak Flows (L/s)			
			Q_{post} (Uncontrolled 202)	Q_{post} (Uncontrolled 203)	Q_{post} (Controlled 201)[1]	Q_{total}
2	**6**	42	9	1	25	**35**
5	**8**	57	12	1		**38**
10	**10**	70	15	1		**41**
25	**12**	88	19	2		**46**
50	**15**	108	23	2		**50**
100	**17**	124	27	2		**54**

1. Worst case scenario based on smallest practical orifice (75 mm diameter)

As shown in **Table 4,** the post-development flows exceed the pre-development flows at this specific point of entry. When viewed holistically, the total peak flows entering the Goreway Drive right-of-way and ultimately the watercourse, from the subject site, are significantly less than the current peak flows ultimately entering the municipal stormwater system.

Using the smallest practical size of orifice tube (75 mm diameter) we have restricted peak flows from catchment 201 which directly enter the municipal storm sewer system to approximately 25 L/s during an 100-year storm event. A storm sewer design sheet prepared for the municipal storm sewer network from the Subject Site to the downstream watercourse, indicates that in the most critical case (i.e. 100-year storm event), the additional peak stormwater flows increase the existing municipal storm sewer capacity from 6% up to 10%. Refer to **Appendix B** for details.

Peak flows from catchments 202 and 203 will be conveyed overland through the Goreway Drive right-of-way. Ultimately, in existing conditions the entire site conveyed drainage overland to the watercourse either through the south properties or the Goreway Drive right-of-way.

Approximately 81 m^3 of storage is required to achieve a peak flow rate of 25 L/s from catchment 201. The proposed underground storage chamber is oversized to promote the retention of stormwater in an effort to reduce the overland conveyance of stormwater from the catchment to the Goreway right-of-way. The proposed underground stormwater chamber has capacity for 294 m^3 of stormwater storage therefore providing capacity to retain major system stormwater flows.

Refer to **Appendix B** for complete stormwater calculations. The Preliminary Servicing Plan (**Figure 1**) illustrates the locations of the underground stormwater chamber and the orifice tube.

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 MOECC (March, 2003) guidelines. Enhanced water quality protection involves the removal of at least 80% of total suspended solids (TSS) from 90% of the annual runoff volume.

Catchments 202 and 203 discharge uncontrolled to the municipal right-of-way. Each catchment is comprised mostly of grass and rooftop which are both considered clean sources of water. Therefore, catchments 202 and 203 will naturally achieve the quality control target.

Water quality control for catchment 201 will be provided using an oil-grit-separator. The oil-grit-separator, located downstream of the underwound stormwater chamber, will provide quality control for runoff before leaving the site. During detailed design further sustainable stormwater features can be explored to improve the quality control on-site. Some of these features include permeable pavers, increased depth topsoil, and lot-level LID features.

6.3 Water Balance

Retention of the first 5 mm of rainfall for private development areas is required by the City of Mississauga Development Requirements Manual (September 2016) to achieve the water balance criteria.

Water balance for catchments 202 and 203 will be achieved through infiltration of stormwater runoff over the proposed landscaped area. Catchment 201 will infiltrate or store the 5mm storage in the bottom of the underground stormwater chamber. Final groundwater elevations will determine the ultimate design of the chamber and therefore dictate whether the water balance can be infiltrated or must be stored and reused on-site. The water balance storage must accommodate 5mm across the impervious area of catchment 201 and therefore 9.5 m^3 (i.e. 0.19 ha * 5 mm) must be infiltrated or stored.

The geotechnical report or hydrogeological report will be provided at the detailed design phase for Site Plan Approval to decide if infiltration is practicable per groundwater level and soil percolation rate. If not, a dedicated water balance chamber will be designed for on-site landscaping irrigation.

7.0 Erosion and Sediment Controls During Construction

Erosion and sediment controls will be installed prior to the beginning of any construction activities. They will be maintained until the site is stabilized or as directed by the Site Engineer and/or the City of Mississauga. Erosion and sediment controls will be inspected after each significant rainfall event and maintained in proper working condition. The following erosion and sediment controls will be included during construction on the site:

Heavy Duty Silt Fencing

Silt fencing 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 to prevent mud tracking from the site onto surrounding lands and the perimeter roadway network. All construction traffic will be restricted to this access only.

Sediment Control Devices

Additionally, TRCA approved storm drain inlet protection is to be used on all internal catchbasins and external catchbasins directly abutting or immediately downstream during construction of the subject property.

8.0 Conclusions and Recommendations

The proposed development can be serviced for water, sanitary, and stormwater in accordance with the City of Mississauga requirements and standards. Best efforts have been provided to improve the drainage conditions on-site and ultimately the peak flows entering the stormwater system holistically are reduced. Our conclusions and recommendations include:

1. Water demand for the proposed development will be provided using a 150 mm diameter PVC watemain connected at two points to the existing 300 mm diameter watermain in Etude Drive.

2. A private hydrant is proposed to provide fire protection for the development.

3. Sanitary servicing for the proposed development will be provided using a 150 mm diameter sanitary sewer extending form the existing 250 mm diameter sanitary sewer on Goreway Drive. Individual laterals will branch off the proposed sewer to service each unit.

4. Stormwater runoff from catchments 202 and 203 will flow uncontrolled to Etude Drive and Goreway Drive. Stormwater runoff from catchment 201 will flow controlled into the City of Mississauga municipal storm system on Goreway Drive.

5. Best efforts have been applied to provide quantity control while improving existing drainage conditions. Best efforts include using the smallest feasible orifice pipe in catchment 201 and providing oversized storage to promote stormwater retention.

6. External drainage currently ponds on-site and ultimately spills to the south. A proposed berm and conveyance swale will improve the existing drainage condition.

7. Water quality requirements for catchments 202 and 203 will be provided through landscaping. Water quality in catchment 201 will be provided using an oil-grit-separator. Opportunities to explore additional sustainable stormwater features will be explored during detailed design.

8. Approximately 10 m^3 of "dead storage" is provided within the underground stormwater chamber to account for the water balance requirement of 5 mm.

9. Erosion and Sediment Controls will be implemented on-site during construction and will be maintained until the site is stabilized.

Based on the above conclusions, we support the proposed development application from the perspective of water supply, sanitary servicing, and stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

N. Segal

Nicole Segal, M.M.Sc., E.I.T.
Land Development

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APPENDIX A

Water and Sanitary Demand Design and Calculations

Project: 7170 Goreway Drive | **Created By:** JH | **Date:** 2017-09-29
Project No.: 1346-4573 | **Checked By:** KJF | **Updated:** 2017-09-29

Domestic Sanitary Design Flow

			Notes & References
Site Area:	0.4068	ha	
Population Density:	175	persons/ha	Region of Peel Public Works Design Criteria Manual - Sanitary Sewer (2009)
Population:	71		

Design Parameters

Average Flow (L/capita/d)	
302.8	Region of Peel Public Works Design Criteria Manual - Sanitary Sewer (2009)

Sanitary Design Flow:

	Average Daily Flow =	302.8	L/capita/d	Average Daily Flow = Average Daily Flow (L/cap./day) * population / 86400
	Average Daily Flow =	**0.25**	L/s	
Harmon Peak Factor:	M =	**4.28**		M = 1 + 14 / (4 + (p/1000)^.5)
	Peak Flow =	**1.07**	L/s	Peak Flow = Average Daily Flow * M
Infiltration Flow:	Infiltration =	0.20	L/ha/s	Region of Peel Public Works Design Criteria Manual - Sanitary Sewer (2009)
	Total Infiltration =	**0.08**	L/s	
	Total Peak Flow =	**1.15**	L/s	Total Peak Flow = Peak Flow + Total Infiltration

Summary Table

Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)
0.25	4.28	1.07	0.08	1.15

Project: 7170 Goreway Drive | **Created By:** JC | **Date:** 2017-09-29
Project No.: 1346-4573 | **Checked By:** JH | **Updated:** 2019-04-30

Domestic Water Demand

			Notes & References
Site Area:	0.41	ha	
Population Density:	175	persons/ha	Region of Peel Public Works Design Criteria Manual - Sanitary Sewer (2009)
Population:	71		

Design Parameters

Average Demand (L/capita/d)	
280	Region of Peel Public Works Watermain Design Criteria (2010)

Water Demand:

Average Daily Demand =	19,933	L/day	
	0.23	**L/s**	
Peaking Factors			
Max Day =	2.0		Region of Peel Public Works Watermain Design Criteria (2010)
Peak Hour =	3.0		
Average Day =	0.23	L/s	
Max Day =	**0.46**	L/s	Max Day = Average Day Demand * Max Day
Peak Hour =	**0.69**	L/s	Peak Hour = Average Day Demand * Peak Hour

Municipality	Average Daily Water Demand (L/s)	Max Day Demand (L/s)	Peak Hourly Demand (L/s)
Region of Peel	0.23	0.46	0.69

CROZIER & ASSOCIATES Consulting Engineers

Project:	7170 Goreway Drive	**Created By:**	HL	**Date:**	2017-10-05
Project No.:	1346-4573	**Checked By:**	NS	**Updated:**	2019-04-30

Fire Flow Calculations - Fire Underwriters Survey Method

Notes:

1. The development will use wood-frame construction (C-value = 1.0).
2. Total gross-floor-area (GFA) is based on Block 1, from Site Plan A-01a by JARDIN DESIGN GROUP INC, dated April 11, 2019
3. The building is assumed to have no sprinkler protection.
4. The building is classified as a low hazard occupancy per the appendix of the Water Supply for Public Fire Protection (1999) by FUS.

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

F = 220 * C * sqrt A

where:

F = the required fire flow in litres per minute

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

A = the total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building considered

Proposed Development: **Building Wood Frame Construction** (Worse case for the flow calculation)

A =	1,498 sq. m GFA	Block 1 GFA	1,498 sq. m
C =	1.0	Block 2 GFA	500 sq. m
		Block 3 GFA	500 sq. m

Therefore, F= 9,000 L/ min (rounded to nearest 1000 L/min)

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No.1 may be reduced by as much as 25% for occupancies having low contents fire hazard or be increased by up to 25% surcharge for occupanies having a high fire hazard.

Non-Combustible	-25%	Free Burning	+15%
Limited Combustible	-15%	Rapid Burning	+25%
Combustible	No Charge		

Combustible:			0% Addition
	0	**L/min**	**Addition**

Note: Flow determined shall not be less than 2,000 L/min

CROZIER & ASSOCIATES Consulting Engineers

Project: 7170 Goreway Drive **Created By:** HL **Date:** 2017-10-05
Project No.: 1346-4573 **Checked By:** NS **Updated:** 2019-08-02

Fire Flow Calculations - Fire Underwriters Survey Method

3. Sprinklers: The value obtained in No. 2 may be reduced by up to 50% for complete automatic sprinkler protection.

No automatic sprinklers:

0 L/min reduction

4. Exposure: To the value obtained in No. 2, a percentage should be added for structures exposed within 45 metres by the fire area under consideration. The percentage shall depend on the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s), and the effect of hillside locations on the possible spread of fire.

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

Exposed Buildings					
Direction	Distance	Charge	Surcharge		
North	26.5	10%	900	L/min	2-hr rating fire wall
East	>45	0%	0	L/min	
South	8.5	20%	1800	L/min	
West	17	15%	1350	L/min	
Total Surcharge:			**4050**	**L/min**	

Determine Required Fire Flow

1.	9,000	base fire flow
2.	0	reduction
3.	0	reduction
4.	4,050	surcharge

Required Flow: **13,000 L/min, or**
216.7 L/s
3,432.0 USGPM

Required Duration of Fire Flow	
Flow Required (L/min)	Duration (hours)
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	2.00
12,000	2.50
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

APPENDIX B

Stormwater Management Design and Calculations

Project:	7170 Goreway Drive	Date: 2019.08.30
Project No.:	1346-4573	Designed By: HL
		Checked By: NS

MODIFIED RATIONAL METHOD - Release rate

MUNICIPALITY: City of Toronto

Orifice Type:	Tube	
Invert Elevation:	164.40	m
Diameter of Orifice:	75	mm
Area of Orifice (A):	0.0044	sq.m
Orifice Coefficient (Cd):	0.82	
Calculation of Head		
Centroid Elevation:	164.44	m
Water Elevation:	166.80	m
Upstream Head*, (h):	2.36	m
Qa:	**(Cd)(A)(2gh)^0.5**	
Actual Controlled Discharge, Qa:	**0.025**	**cms**
	24.66	**L/s**

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

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 (102)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**[1]
Pervious	0.14	1400	**0.25**	**0.25**
Impervious	0.00	0	**0.90**	**0.00**
Total Site	**0.14**	**1400**	**-**	**0.25**

Note: Pre development flows to Goreway consist of only Catchment 102

Post - Development Conditions (Controlled Subcatchment 201)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.11	1054	**0.25**	**0.09**
Impervious	0.19	1851	**0.90**	**0.57**
Total Site	**0.29**	**2905**	**-**	**0.66**

Post - Development Conditions (Uncontrolled Subcatchment 202)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.05	528	**0.25**	**0.13**
Impervious	0.05	458	**0.90**	**0.42**
Total Site	**0.10**	**986**	**-**	**0.55**

Post - Development Conditions (Uncontrolled Subcatchment 203)				
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.02	179	**0.25**	**0.25**
Impervious	0.00	0	**0.90**	**0.00**
Total Site	**0.02**	**179**	**-**	**0.25**

Equations:

Peak Flow

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

Intensity

$$i(T_d) = A / (T + B)^{\wedge}C$$

Modified Rational Calculations - Peak Flows Summary

Return Period	Pre-development				Post-development Peak Flows (Site) (m3/s)			
	Adjusted C_{pre}	Adjusted C_{post}	$Q_{pre\ (Catchment\ 102)}$ (m^3/s)	$Q_{pre\ (Catchment\ 101 + 102)}$ (m^3/s)	$Q_{post\ (Uncontrol\ 202)}$	$Q_{post\ (Uncontrol\ 203)}$	$Q_{post\ (Controlled\ 201)}$	Q_{total}
2 yr	0.250	0.614	0.006	0.042	0.009	0.001	0.025	0.035
5 yr	0.250	0.614	0.008	0.057	0.012	0.001	0.025	0.038
10 yr	0.250	0.614	0.010	0.070	0.015	0.001	0.025	0.041
25 yr	0.275	0.676	0.012	0.088	0.019	0.002	0.025	0.046
50 yr	0.300	0.737	0.015	0.108	0.023	0.002	0.025	0.050
100 yr	0.313	0.768	0.017	0.124	0.027	0.002	0.025	0.054

Sub-Catchment 201 Uncontrolled Post Peak Flows (m^3/s)

Return Period	Adjusted C_{post}	Q_{post}
2 yr	0.664	0.032
5 yr	0.664	0.043
10 yr	0.664	0.054
25 yr	0.731	0.068
50 yr	0.797	0.082
100 yr	0.830	0.095

Sub-Catchment 203 Uncontrolled Post Peak Flows (m^3/s)

Return Period	Adjusted C_{post}	Q_{post}
2 yr	0.250	0.001
5 yr	0.250	0.001
10 yr	0.250	0.001
25 yr	0.275	0.002
50 yr	0.300	0.002
100 yr	0.313	0.002

Sub-Catchment 202 Uncontrolled Post Peak Flows (m^3/s)

Return Period	Adjusted C_{post}	Q_{post}
2 yr	0.552	0.009
5 yr	0.552	0.012
10 yr	0.552	0.015
25 yr	0.607	0.019
50 yr	0.662	0.023
100 yr	0.690	0.027

Equations:

Peak Flow

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

CROZIER & ASSOCIATES Consulting Engineers

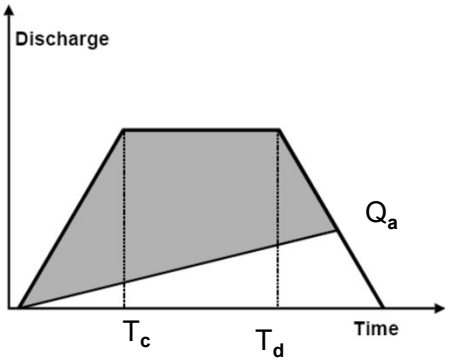
Project: 7170 Goreway Drive **Created By:** HL **Date:** 2019-05-02
Project No.: 1346-4573 (R.01) **Checked By:** **Updated:** 2019-08-30

Modified Rational Calculations - Storage

Control Criteria

Q_{post} = 0.025 m^3/s Flow Rate using minimum 75mm diameter orifice

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	242.53	300	0.164	34.3
10	176.31	600	0.119	52.9
15	140.69	900	0.095	63.3
20	118.12	1200	0.080	69.8
25	102.41	1500	0.069	74.1
30	90.77	1800	0.061	77.0
35	81.77	2100	0.055	79.0
40	74.58	2400	0.050	80.2
45	68.68	2700	0.046	80.8
50	63.75	3000	0.043	81.1
55	59.56	3300	0.040	80.9
60	55.95	3600	0.038	80.5
65	52.81	3900	0.036	79.9
70	50.03	4200	0.034	79.0
75	47.58	4500	0.032	78.0
80	45.38	4800	0.031	76.8
85	43.39	5100	0.029	75.5
90	41.60	5400	0.028	74.0
Required Storage Volume:				**81.1**



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
CONSULTING ENGINEERS

7170 GOREWAY DRIVE
STORM SEWER DESIGN SHEET

10 YEAR DESIGN STORM - CITY OF MISSISSAUGA[1]

A	1010	B	4.6	C	0.78

PROJECT: 7170 Goreway Drive
PROJECT No.: 1346-4573
FILE: Storm Sewer Design
DATE: August 28, 2019
Revised: August 30, 2019
Design: HL/NRS

INITIAL TIME OF CONCENTRATION (min) 15.00

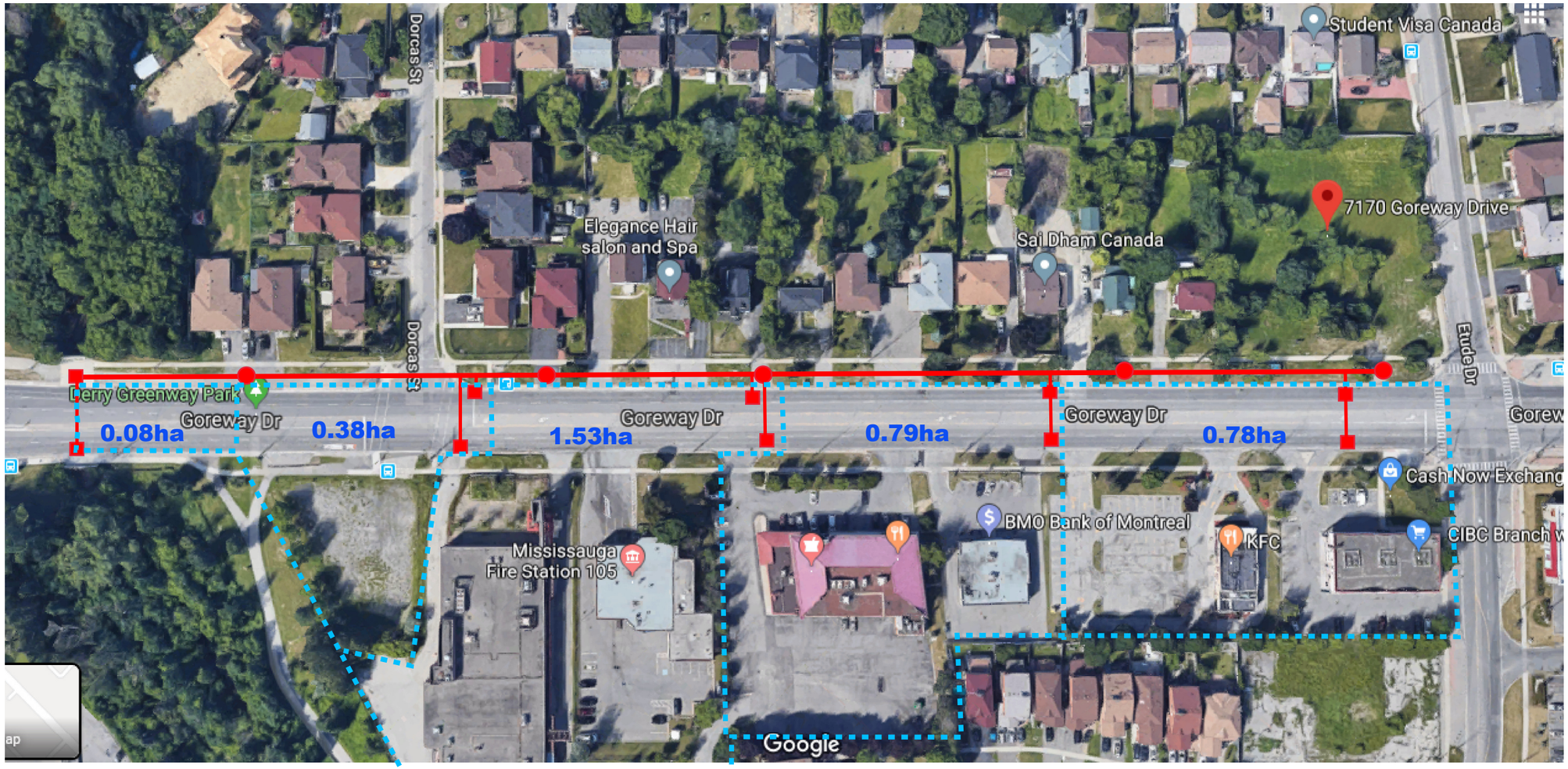
MANNINGS "n" 0.013

STREET	FROM MH	TO MH	AREA (Ha)	RUN-OFF	A x C	Cummul. A x C	TIME OF CONC.	I	Q	CONSTANT CONTROLLED Q	ACCUM. CONSTANT Q	TOTAL Q	LENGTH	SLOPE	PIPE DIA.	VEL.	INITIAL Tc	TIME OF CONC	ACC. TIME OF CONC.	CAPACITY	% Capacity
DOWNSTREAM STORM SEWER ANALYSIS																					
Gereway Dr. (Existing)	EX. MH 1	EX. MH 2	0.78	0.30	0.24	0.24	15	99.2	0.06	-	-	0.06	60	0.92	450	1.72	15	0.58	15.6	**0.273**	24%
	EX. MH 2	EX. MH 3	0.79	0.30	0.24	0.47	15.6	96.9	0.13	-	-	0.13	110	0.77	450	1.58	15.6	1.16	16.75	**0.251**	51%
	EX. MH 3	EX. MH 4	1.53	0.30	0.46	0.93	16.7	92.8	0.24	-	-	0.24	65	0.92	450	1.72	16.7	0.63	17.38	**0.274**	88%
	EX. MH 4	EX. MH 5	0.38	0.30	0.11	1.04	17.4	90.7	0.26	-	-	0.26	92	0.92	525	1.91	17.4	0.80	18.18	**0.413**	64%
	EX. MH 5	Bridge	0.08	0.30	0.02	1.07	18.2	88.2	0.26	-	-	0.26	50	0.92	525	1.91	18.2	0.44	18.61	**0.413**	63%
Gereway Dr. (Proposed)	EX. MH 1	EX. MH 2[2]	0.78	0.30	0.24	0.24	15	99.2	0.06	0.03	0.03	0.09	60	0.92	450	1.72	15	0.58	15.6	**0.273**	33%
	EX. MH 22	EX. MH 3	0.79	0.30	0.24	0.47	15.6	96.9	0.13	0.00	0.03	0.15	110	0.77	450	1.58	15.6	1.16	16.75	**0.251**	61%
	EX. MH 3	EX. MH 4	1.53	0.30	0.46	0.93	16.7	92.8	0.24	0.00	0.03	0.26	65	0.92	450	1.72	16.7	0.63	17.38	**0.274**	97%
	EX. MH 4	EX. MH 5	0.38	0.30	0.11	1.04	17.4	90.7	0.26	0.00	0.03	0.29	92	0.92	525	1.91	17.4	0.80	18.18	**0.413**	70%
	EX. MH 5	Bridge	0.08	0.30	0.02	1.07	18.2	88.2	0.26	0.00	0.03	0.29	50	0.92	525	1.91	18.2	0.44	18.61	**0.413**	69%

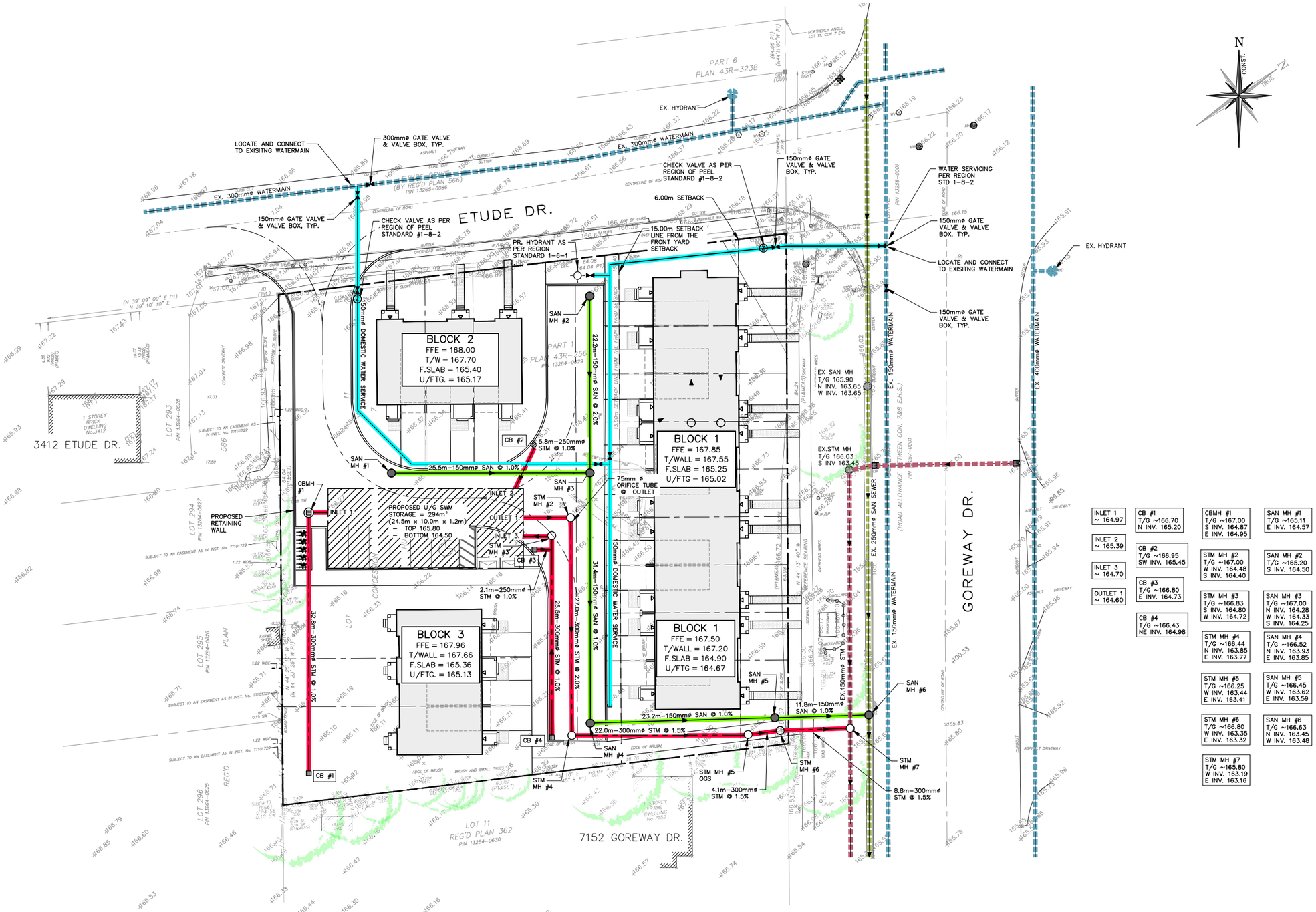
Notes:
1. A, B, and C coefficients as per City of Mississauga Design Requirements.
2. Constant controlled Q is 0.025 L/s, calculated using 75mm orfice tube for 7170 Goreway Drive.
3. Assuming runoff coefficient C is 0.30 for all the drainage site.
4. Assuming the residential buildings on Goreway do not contribute runoff to the external storm sewer. The contributing area includes commercial/industrial buildings and road of Goreway Drive.


41
49
40
WEST
AIRPORT
ROAD
AIRPORT
ROA
STREET
ROAD
BATH
THAMESGATE
DRIVE
841
E.H.S.
AMPTON
PRODUCTION RD.
DRIVER RD.
PEDIGREE CT.
STUDLEY
T-4
HARROW
ST.
HULL
YORK
ST.
IRONSTONE CT.
RIPON
ST.
SCARBORO
ST.
T-4
BEVERLEY ST.
43M-1593
COLLETT RD.
SILLS RD.
HOLMESIDE
BENAVON
REDSTONE
CHINOOK
DRIVE
BONAVENTURE DR.
CHURCHILL
AVENUE
McNAUGHTON
VICTORY CRESCENT
LANDEN CT.
IRESON CT.
MERRITT AVE.
PURNELL CT.
HAROLD SHEARD DR.
SILLS RD.
CORAL DR.
ROAD
LAFONTAINE
BALLAD DR.
GDNS.
816
MANION ROAD
REDSTONE ROAD
NETHERWOOD ROAD
COWIE CT.
ROAD
952
PRIORY
ALMADALE CT.
CRESCENT
BRANCH
VICTORY CRESCENT
MIMICO
CREEK
NATIONAL
REDBANK CRES.
MOHICAN CT.
436
CON.7
MOODIE CT.
CRES.
806
MALLBRIDGE
TASMAN CT.
LANCASTER
828
REDFOX AVE.
ROAD
MORNING
REINDEER
DRIVE
NEWBOUND CT.
CODLIN AVE.
DERRY
470
PICKFAIR DRIVE
ROAD
LULLY CT.
ROSELLE CRES.
952
SHALLFORD
ROAD
ETUDE
NETHERWOOD
S.D.
CLARA
LANGWORTHY
DRIVE
BRANDON
LEGION ROAD
ROAD
PROFESSIONAL
COURT
43M-926
MICHAUD AVE.
CAPRICORN CRESCENT
VERNOR DRIVE
STAR
TWILIGHT
CAMBRETT DR.
ANAKA
DRIVE
NATIONAL
CAPRICORN
ONEASLE AVE.
568
797
JOLLIFFE
DRIFTON
804
CRES.
LEHIGH
DRIVE
ROAD
McKECHNIE CT.
DRIVE
851
844
CRESCENT
M-23
CHIPLEY
DWIGGIN GATE
DRIVE
AVE.
LOHENGRIN CT.
952
KITTRIDGE
DRIVE
566
DRIVE
CRES.
HERMITAGE RD.
CRES.
DRIVE
ROAD
SONJA
MINOTOLA AVE.
362
DOOLEY DRIVE
AVE.
807
CATALPA ROAD
EAST
DORCAS
ST.
GOREWAY
GOREWAY
GOREWAY
DRIVE
CON.8
808
MIMICO
CREEK
DALEWOOD
DRIVE
EAST
43M-8
NAS

2019.08.30 External Drainage Plan
(refer to Mississauga Storm Sewer Network 2018 Z48)



FIGURES



LEGEND

- PROPERTY LINE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED WATER SERVICE LATERAL (XXmmø)
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED CHECK VALVE IN CHAMBER
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY SEWER & MANHOLE

INLET 1	~ 164.97	
INLET 2	~ 165.39	
INLET 3	~ 164.70	
OUTLET 1	~ 164.60	

CB #1	T/G ~166.70 N INV. 165.20
CB #2	T/G ~166.95 SW INV. 165.45
CB #3	T/G ~166.80 E INV. 164.73
CB #4	T/G ~166.43 NE INV. 164.98

CBMH #1	T/G ~167.00 S INV. 164.87 E INV. 164.95
STM MH #2	T/G ~167.00 W INV. 164.48 S INV. 164.40
STM MH #3	T/G ~166.83 S INV. 164.80 W INV. 164.72
STM MH #4	T/G ~166.44 N INV. 163.85 E INV. 163.77
STM MH #5	T/G ~166.25 W INV. 163.44 E INV. 163.41
STM MH #6	T/G ~166.80 W INV. 163.35 E INV. 163.32
STM MH #7	T/G ~165.80 W INV. 163.19 E INV. 163.16

SAN MH #1	T/G ~165.11 E INV. 164.57
SAN MH #2	T/G ~165.20 S INV. 164.50
SAN MH #3	T/G ~167.00 N INV. 164.28 W INV. 164.33 S INV. 164.25
SAN MH #4	T/G ~166.52 N INV. 163.93 E INV. 163.85
SAN MH #5	T/G ~166.45 W INV. 163.62 E INV. 163.59
SAN MH #6	T/G ~166.63 N INV. 163.45 W INV. 163.48

No.	ISSUE / REVISION	YYYY/MMM/DD
3	ISSUED FOR 4TH SUBMISSION ZBA/OPA	2019/OCT/30
2	ISSUED FOR 3RD SUBMISSION ZBA/OPA	2019/SEPT/30
1	ISSUED FOR 2nd SUBMISSION ZBA/OPA	2019/AUG/30
0	ISSUED FOR ZBA/OPA	2017/DEC/15

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE DERIVED FROM THE CANADIAN GEODETIC DATUM BENCHMARK No. 448

ELEVATION = 162.55m

SURVEY NOTES:

SURVEY COMPLETED BY J.H. GELBLOOM SURVEYING LIMITED. (2017/MAY/08)
PROJECT No.: 17-089

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
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 JARDIN DESIGN GROUP INC.
DRAWING No.: A-01, REV.2 (2019/APR/11)
PROJECT No.: 17-18

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.

ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
EXISTING INVERTS FROM AS-BUILT DRAWINGS 20065-D, 40529-D

Project

7170 GOREWAY DRIVE
CITY OF MISSISSAUGA

Drawing

PRELIMINARY
SITE SERVICING PLAN

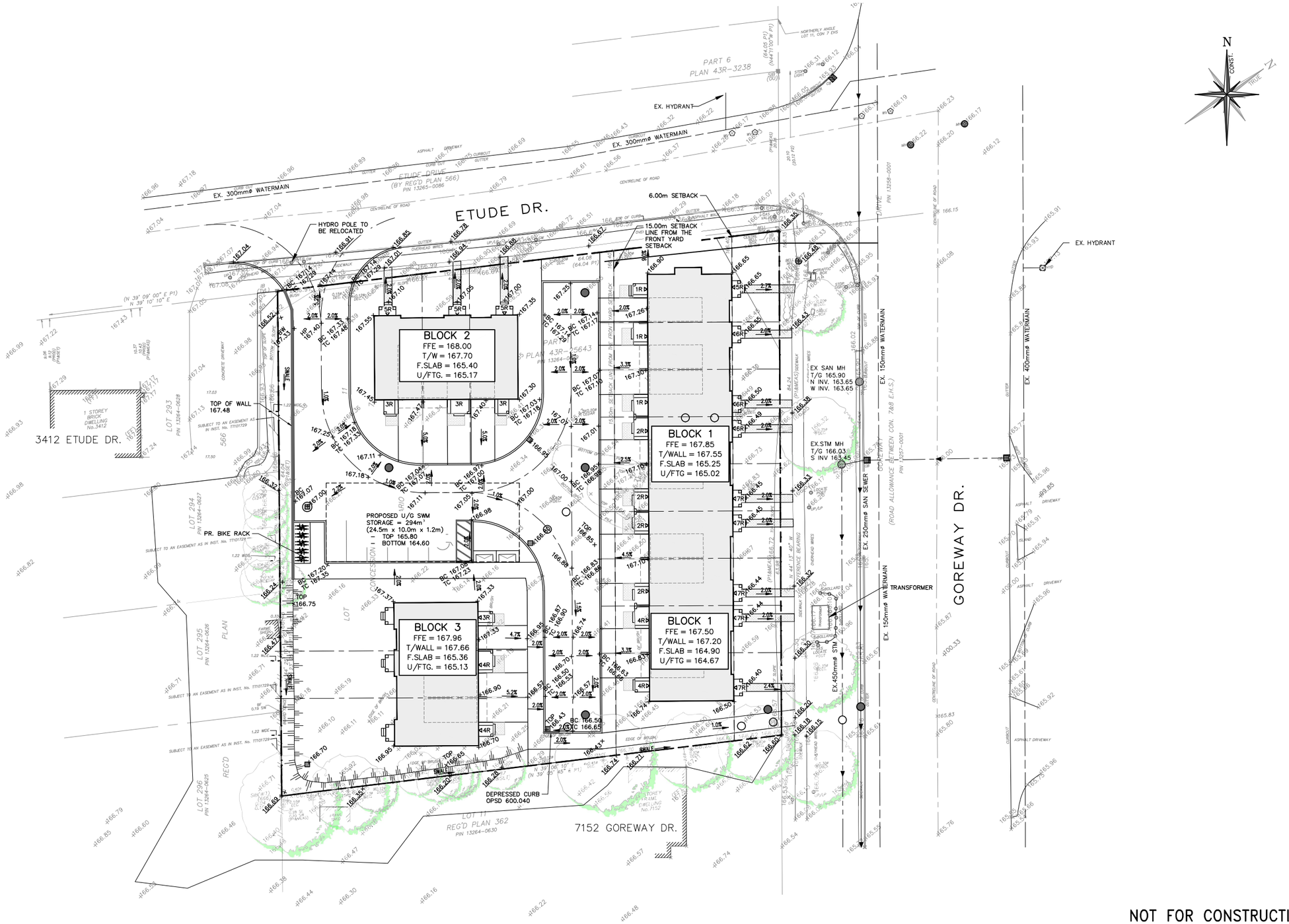
NOT FOR CONSTRUCTION

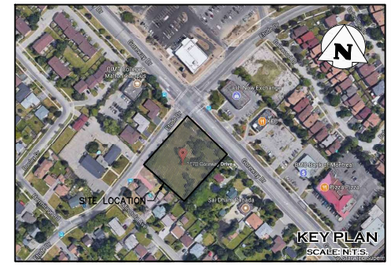
Stamp

PRELIMINARY

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	Design	Project No.	
J.K.	J.K.		1346-4573
Check	Check	Scale	Dwg.
S.C.S.	L.T.	1: 250	FIG. 1





LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING FENCE
- EXISTING HYDRO POLE
- 215.00 EXISTING GRADE
- 215.00 PROPOSED GRADE
- 215.00 PROPOSED GRADE (TO MATCH EXISTING)
- BUILDING ENTRANCE (PERSONNEL DOOR)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- PROPOSED RETAINING WALL

No.	ISSUE / REVISION	YYYY/MMM/DD
3	ISSUED FOR 4TH SUBMISSION ZBA/OPA	2019/OCT/30
2	ISSUED FOR 3RD SUBMISSION ZBA/OPA	2019/SEPT/30
1	ISSUED FOR 2nd SUBMISSION ZBA/OPA	2019/AUG/30
0	ISSUED FOR ZBA/OPA	2017/DEC/15

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ELEVATION = 162.55m

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DRAWING No.: A–01, REV.2 (2019/APR/11)
PROJECT No.: 17–18

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EXISTING INVERTS FROM AS–BUILT DRAWINGS 20065–D, 40529–D

Project

7170 GOREWAY DRIVE
CITY OF MISSISSAUGA

Drawing

PRELIMINARY
SITE GRADING PLAN

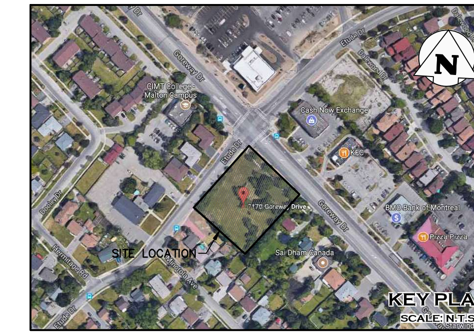
NOT FOR CONSTRUCTION

Stamp

PRELIMINARY

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	Design	Project No.	
J.K.	J.K.		1346–4573
Check	Check	Scale	Dwg.
S.C.S.	L.T.	1: 250	FIG. 2



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING FENCE
- EXISTING GRADE (×215.00)
- EXISTING DRAINAGE CATCHMENTS
- EXISTING DRAINAGE CATCHMENT I.D. (ID; A | RC) — AREA (ha) | RC
- EXISTING DRAINAGE DIRECTION
- DEVELOPMENT LIMITS
- ROW RUNOFF DIRECTION

No.	ISSUE / REVISION	YYYY/MMM/DD
3	ISSUED FOR 4TH SUBMISSION ZBA/OPA	2019/OCT/30
2	ISSUED FOR 3RD SUBMISSION ZBA/OPA	2019/SEPT/30
1	ISSUED FOR 2nd SUBMISSION ZBA/OPA	2019/AUG/30
0	ISSUED FOR ZBA/OPA	2017/DEC/15

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE DERIVED FROM THE CANADIAN GEODETIC DATUM BENCHMARK No. 448

ELEVATION = 162.55m

SURVEY NOTES:

SURVEY COMPLETED BY J.H. GELBLOOM SURVEYING LIMITED. (2017/MAY/08)
PROJECT No.: 17-089

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
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 JARDIN DESIGN GROUP INC.
DRAWING No.: A-01, REV.2 (2019/APR/11)
PROJECT No.: 17-18

DRAWING NOTES:

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ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
EXISTING INVERTS FROM AS-BUILT DRAWINGS 20065-D, 40529-D

Project

7170 GOREWAY DRIVE
CITY OF MISSISSAUGA

Drawing

PRE-DEVELOPMENT DRAINAGE PLAN

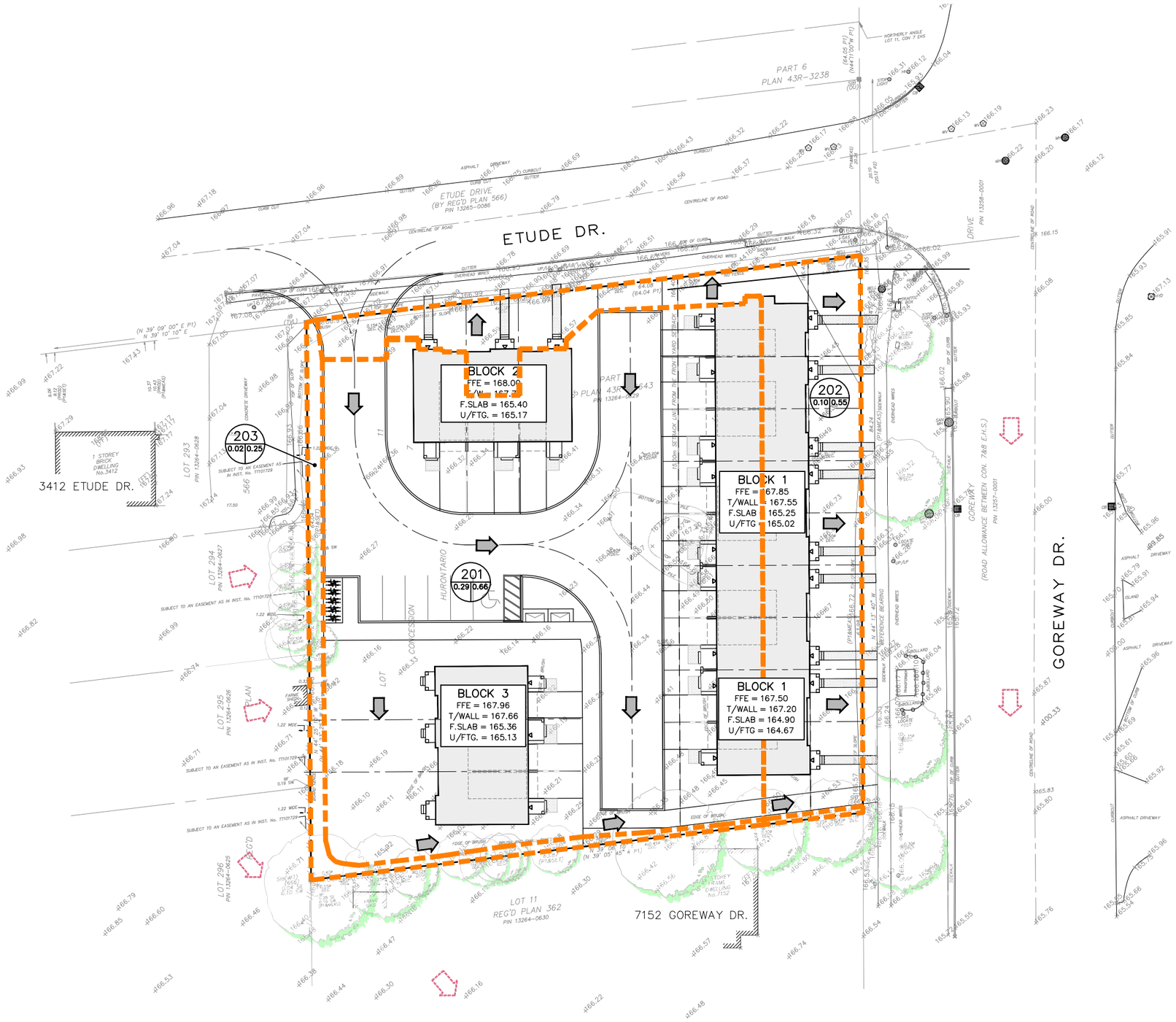
NOT FOR CONSTRUCTION

Stamp | Stamp

PRELIMINARY

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	J.K.	Design	J.K.	Project No.	1346-4573
Check	S.C.S.	Check	L.T.	Scale 1:250	Dwg. FIG. 3



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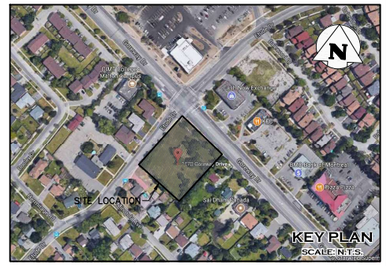
CONST.

RIVE



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING FENCE
- EXISTING GRADE
- PROPOSED DRAINAGE CATCHMENTS
- ID / A | IMP — CATCHMENT I.D.; AREA (ha) | % IMP
- OVERLAND FLOW DIRECTION
- EXISTING DRAINAGE DIRECTION
- DEVELOPMENT LIMITS
- ROW RUNOFF DIRECTION

No.	ISSUE / REVISION	YYYY/MMM/DD
3	ISSUED FOR 4TH SUBMISSION ZBA/OPA	2019/OCT/30
2	ISSUED FOR 3RD SUBMISSION ZBA/OPA	2019/SEPT/30
1	ISSUED FOR 2nd SUBMISSION ZBA/OPA	2019/AUG/30
0	ISSUED FOR ZBA/OPA	2017/DEC/15

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE DERIVED FROM THE CANADIAN GEODETIC DATUM BENCHMARK No. 448

ELEVATION = 162.55m

SURVEY NOTES:

SURVEY COMPLETED BY J.H. GELBLOOM SURVEYING LIMITED. (2017/MAY/08)
PROJECT No.: 17-089

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
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 JARDIN DESIGN GROUP INC.
DRAWING No.: A-01, REV.2 (2019/APR/11)
PROJECT No.: 17-18

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.

ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
EXISTING INVERTS FROM AS-BUILT DRAWINGS 20065-D, 40529-D

Project

7170 GOREWAY DRIVE
CITY OF MISSISSAUGA

Drawing

POST-DEVELOPMENT
DRAINAGE PLAN

NOT FOR CONSTRUCTION

Stamp

PRELIMINARY

Stamp

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	Design	Project No.	
J.K.	J.K.	1346-4573	
Check	Check	Scale	Dwg.
S.C.S.	L.T.	1: 250	FIG. 4

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