

York EMS Station #33
FSR & Stormwater Management Report

Prepared for:

Thomas Brown Architects

Prepared by:



MGM Consulting Inc.

555 Industrial Drive
Suite 201
Milton, Ontario
L9T 5E1

File No. 2020-030

Date: July 29th, 2020

1st Revision Oct.13, 2023

2nd Revision March 19, 2024

3rd Revision June 26, 2024

1.0 Purpose of Report

MGM Consulting Inc. has been retained by Thomas Brown Architects Inc. to prepare a Functional Servicing and Stormwater Report to assess the site specific grading, servicing, and stormwater management requirements for a proposed EMS Station located at 2960 Teston Road in the City of Vaughan.

2.0 Existing Conditions

The existing site occupies an area of approximately 0.259 ha. The west portion of the site is currently vacant and partially tree covered with some grassed areas. The majority of the east portion of the site is paved. The site generally slopes from north to south, with existing elevations ranging from 253.91m in the north to 252.47 in the southeast corner of the site.

The existing site is indicated in Figure 1.

3.0 Existing Municipal Servicing

Based on record drawings provided by the City of Vaughan, existing municipal infrastructure relevant to the site and proposed development include:

- A 200 mm diameter sanitary sewer within the Teston Road right of way which flows from north to south to Giotto Crescent, with an invert elevation of 250.24 in an existing manhole at the southeast corner of the site,
- A 150 mm watermain on the north side of the Teston Road right of way,
- A 300 mm diameter storm sewer within the Teston Road right of way, which flows from west to east, with invert elevations in the order of 249 meters in the area fronting the site.

4.0 Proposed Site Grading

The proposed site grading will take into account the existing topography, perimeter elevations, the proposed vehicular accesses off of Teston Road, and as required to convey surface drainage to site storm structures, and provide sufficient frost cover on storm servicing. Slopes within the paved areas of the site are proposed to be between 1% and 5% which will provide safe, reasonable access for vehicles and pedestrians. Grading will also be completed such that all drainage is contained within the site and conveyed to the proposed internal storm system and proposed stormwater management features.

During severe storm events, or when an outlet is blocked, emergency overland flow will occur from the site at an elevation of 252.55 m. to the Teston Road right of way. The overflow elevation provided is approximately 600 mm below the proposed finished floor elevation of the proposed building.

Based on the grading indicated on Drawing CV-2, sufficient cover can be provided over proposed storm sewers for frost protection with sewer slopes at 0.5% or greater.

Grading surrounding the proposed building is as required to contain drainage, match existing elevations surrounding the site where possible and limit the height and extent of

perimeter retaining walls. Proposed grading also considers the requirement to provide reasonable access grades with maximum 5.0% slopes.

5.0 Proposed Storm Servicing

5.1 Minor Storm System

The proposed minor storm conveyance system includes a series of underground storm sewers, catchbasins and manholes which will convey surface flows from the internal paved areas (roads and driveways) to the existing storm service connection and the existing municipal storm sewer on Teston Road. Some components of the underground storm system have been oversized as required to provide additional on-site storage as required for stormwater management purposes as detailed in Section 6.1 of this report.

Roof drainage is proposed to be discharged to a proposed infiltration feature to promote infiltration, which is consistent with current Conservation Authority water balance objectives. Given that the proposed storm system will be used for on-site storage during severe storm events, foundation drainage, if required, is proposed to be provided using sump pumps, discharged to grade, and equipped with an approved power back up system.

The proposed storm servicing is indicated on the appended Drawing CV-3.

5.2 Major Storm System

During severe storm events, or when an outlet is blocked, overland flows from the site will be conveyed to the west limit of the site to the Teston Road right of way at an elevation of 252.55 m.

6.0 Proposed Stormwater Management

6.1 Stormwater Rate Controls and Site Storage

Peak rate storm controls are proposed as required to control the post development flows during the 5 to 100 year storm events, to the pre-development 5 year flow rate of 15.7 l/sec. Controlling the post development flows is achieved with the installation of a 75mm diameter orifice tube, installed at the outlet location of the proposed MH 1. The required on-site storage during the various storm events, is provided within the proposed internal storm system.

The design of the stormwater management rate controls is based on the calculations provided in Appendix A.

As indicated a 75 mm diameter orifice tube installed at the outlet of the proposed MH 1 will control flows during the 2 to 100 year storm events, to below the existing flow rates. During more severe storm events, or when an outlet is blocked, overland flow will occur at an elevation of 252.55 m at the Teston Road right of way.

The proposed site is indicated in Figure 2.

6.2 Quality Control

Options for stormwater quality controls include wet ponds, wetlands, bio-treatment areas, flatly graded grass swales, and package treatment units. A treatment train approach has been utilized to provide the quality control requirement which include a STC 300 package treatment unit, Catchbasin Manhole Shields and a 89m² rain garden which will capture and absorb runoff from impervious surfaces from approximately 430 m² of the site.

As indicated, based on the manufacturer's modelling software, the STC selected unit will remove and estimated 81% of the total suspended solids on an annual loading basis. The proposed treatment unit will be installed at the outlet from the internal storm system, and as such, it will provide the required stormwater quality treatment for runoff from all areas of the site. In addition to the STC unit, Catchbasin Manhole Shields will remove 60% to account for the remaining percentage, as certified by ETV, to reach a total of 80% TSS removal.

Modelling of the proposed treatment unit is included in Appendix B.

6.4 Erosion Control / Water Balance

The minimum erosion control / water balance requirement for watercourses with TRCA's jurisdiction is retention of the first 5mm of every rainfall event for all impervious surfaces.

As indicated in the appended calculations included in Appendix A, the required retention volume for erosion control / water balance is 8.9 m³. The proposed infiltration feature and rain garden will provide approximately 9.5m³, which exceeds the required retention volume. The estimated infiltration time of 35 hours is below the Sustainable Technologies Low Impact Development Stormwater Management Planning & Design Guide maximum drain time of 72 hours.

The LID capture areas are indicated on Figure 3.

6.5 Erosion and Sediment Control Requirements

In 2006, The Greater Golden Horseshoe Area Conservation Authorities prepared a guideline entitled "Erosion & Sediment Control Guideline for Urban Construction". Based on the guideline, all projects involving the removal of topsoil or site alteration requires an ESC (Erosion and Sediment Control) Plan in place prior to commencing construction. Failure to adhere to the plan could lead to the potential for prosecution under the various pieces of environmental legislation.

The following principles assist in creating an effective ESC Plan. (Ref. Erosion and Sediment Control Guidelines for Urban Construction)

- Adopt a multi-barrier approach to provide erosion and sediment control through erosion controls first.
- Retain existing ground cover and stabilize exposed soils with vegetation where possible.
- Limit the duration of soil exposure and phase construction where possible.
- Limit the size of disturbed areas by minimizing nonessential clearing and grading.
- Minimize slope length and gradient of disturbed areas.
- Maintain overland sheet flow and avoid concentrated flows.
- Store/stockpile soil away (e.g. greater than 15 meters) from watercourses, drainage features and top of steep slopes.
- Ensure contractors and all involved in the ESC practices are trained in ESC Plan, implementation, inspections, maintenance, and repairs.
- Adjust ESC Plan at construction site to adapt to site features.
- Assess all ESC practices before and after all rainfall and significant snowmelt events.

Sediment and erosion controls proposed for the subject development include:

- Construction of a mud mat at the construction entrance, which will assist in the removal of mud from construction vehicle tires before they exist the site,
- The installation of catchbasin sediment protection on any existing catchbasins in the vicinity of the site,
- The installation of silt control fencing around the perimeter of the site and the installation of a double row of silt control fencing along the top of bank at the south limit of the site.

7.0 Water Servicing

Water servicing for the proposed development will include a 150 mm diameter watermain which will provide a domestic water supply and supply to a proposed fire suppression sprinkler system within the proposed building as indicated on the site servicing plan.

Fire Flow and Water Demand Calculations are included in Appendix C & D respectively.

8.0 Sanitary Servicing

Sanitary servicing for the proposed development will be provided by a proposed 200 mm diameter sanitary sewer outletting to the existing sanitary manhole located at the south east corner of the site. Based on an available existing invert elevation of 250.24 m at the location of the proposed sanitary connection, a gravity based sanitary system can be provided.

Sanitary Flow Analysis is included in Appendix E.

9.0 Summary

The following summarizes the conclusions and recommendations based on the preceding analyses;

- Post development flows during the 5 to 100 year storm events can be controlled to below the allowable flow rates with the installation of a 75 mm diameter orifice tube, installed at the outlet of the proposed internal storm system,
- Sufficient on site storage is provided underground within the internal storm system as required during the 100 year storm event,
- Stormwater quality controls can be provided with the installation of a STC 300 package treatment unit installed at the outlet of the internal storm system, an 89m² rain garden, and catch basin shields installed in all catchbasin manholes within the site,
- Annual erosion control / water balance objectives can be met as required by the TRCA,
- Water servicing as required for fire protection and domestic water supply can be provided from the existing 150 mm municipal watermain within the Teston Road right of way,
- Sanitary servicing can be provided with a connection to the existing 200 mm diameter sanitary service located in the existing sanitary manhole adjacent to the Teston Road right of way,
- Sediment and erosion controls are to be provided during construction as required to contain sediments on site and reduce downstream erosion.

Prepared by:
MGM CONSULTING INC.

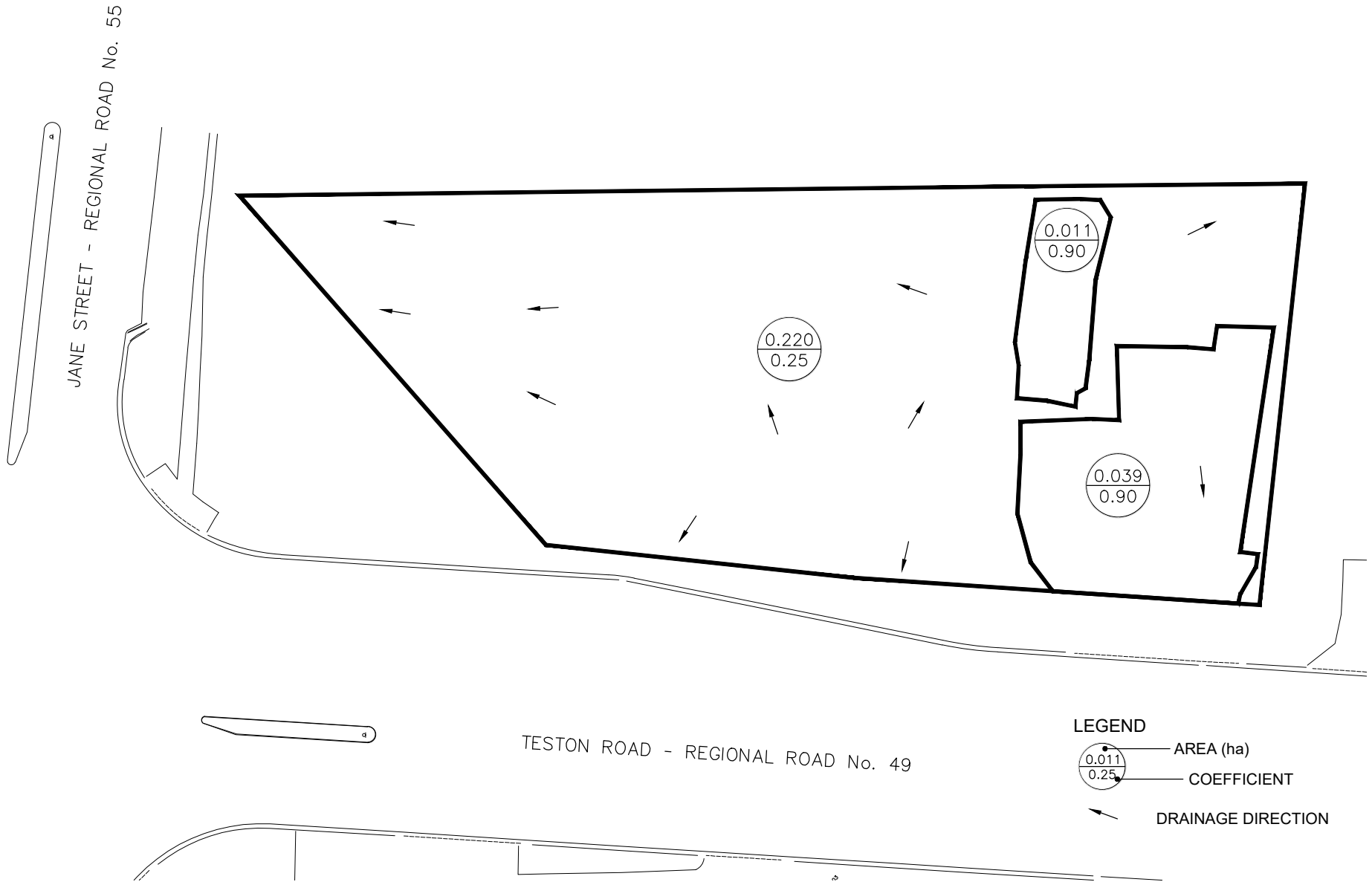


Blair Nock, CET



M.L.Stairs, P.Eng.

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Paramedic Response Station # 33
2960 Teston Road, Vaughan Ontario

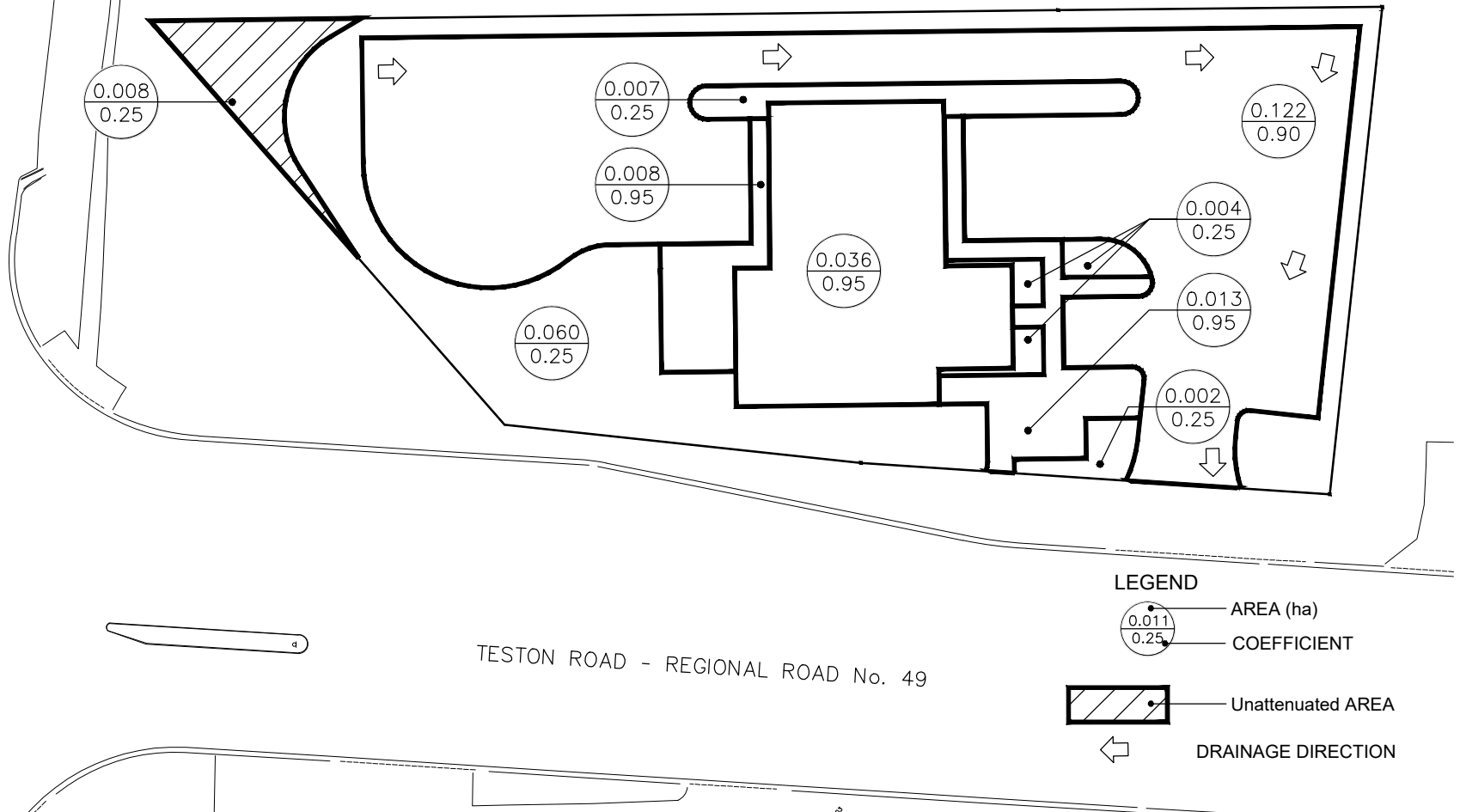
EXISTING STORM AREAS

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Figure No. 1

29 JULY 2020
NTS
2020-030-FIG1-3

JANE STREET - REGIONAL ROAD No. 55



Paramedic Response Station # 33
2960 Teston Road, Vaughan Ontario

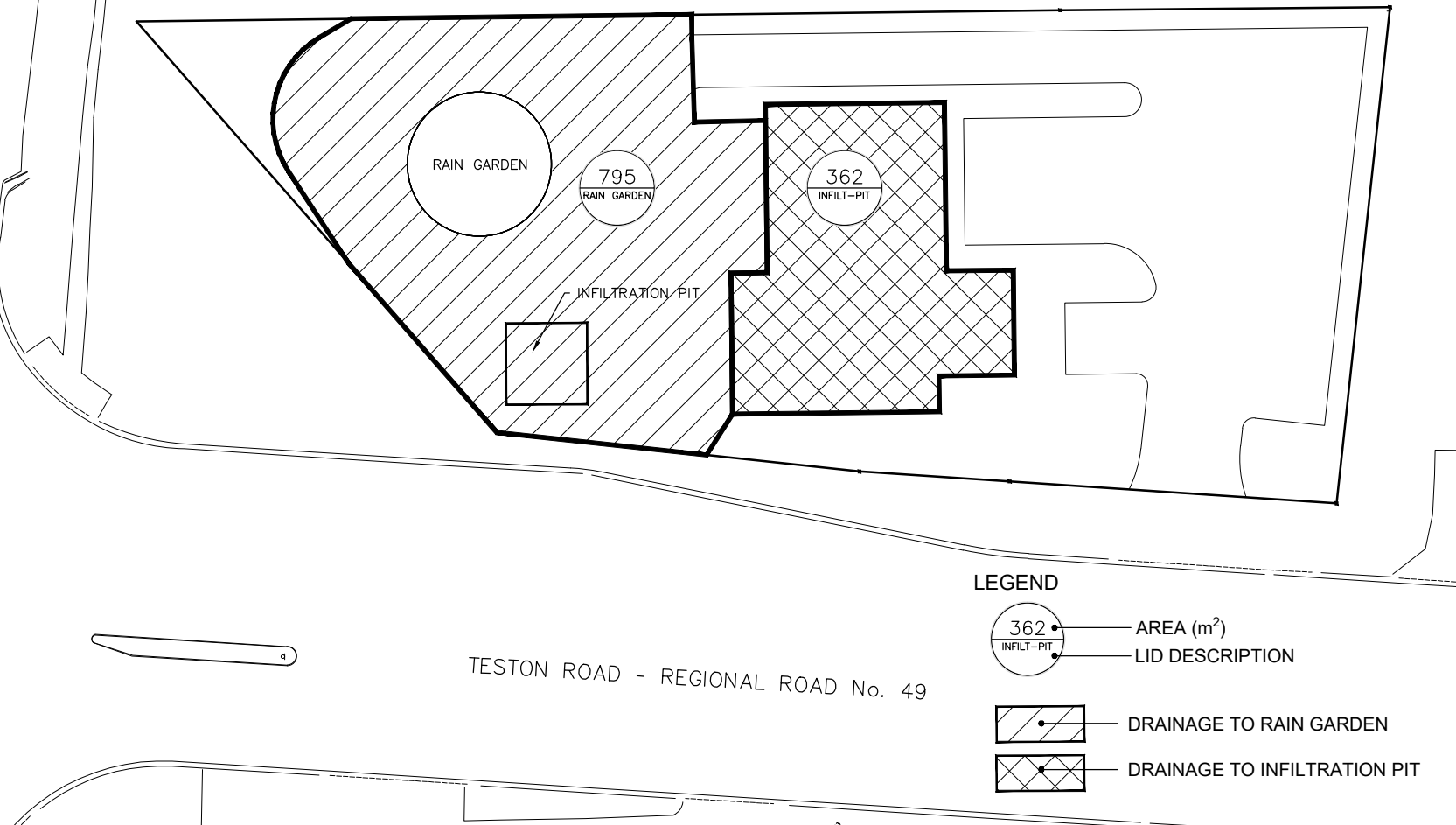
PROPOSED STORM AREAS

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Figure No. 2

29 JULY 2020
NTS
2020-030-FIG1-3

JANE STREET - REGIONAL ROAD No. 55



Paramedic Response Station # 33
2960 Teston Road, Vaughan Ontario

LID CATCHMENT AREAS

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Figure No. 3

MARCH 2024
NTS
2020-030-FIG1-3

APPENDIX A

STORMWATER MANAGEMENT CALCULATIONS

Appendix A
Detailed Stormwater Management Calculations

1.0 DRAINAGE CHARACTERISTICS

1.1 Existing Drainage Areas: (see Figure No. 1)

	Area (ha)	Storm Frequency			
		2, 5 and 10 yr "c"	25 yr. "c"	50 yr. "c"	100 yr. "c"
Grass/Landscape Areas	0.209	0.25	0.28	0.30	0.38
Asphalt Areas	0.050	0.90	0.99	1.00	1.00
Total Existing Areas	0.259	0.38	0.41	0.45	0.47

1.2 Proposed Drainage Areas (see Figure No. 2)

Attenuated Areas:

Grass/Landscape Areas	0.073	0.25	0.28	0.33	0.38
Asphalt	0.122	0.90	0.99	1.00	1.00
Roof	0.036	0.90	0.99	1.00	1.00
Concrete	0.020	0.95	1.00	1.00	1.00

<u>Attenuated Areas</u>	0.251	0.71	0.78	0.81	0.82
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Un-attenuated Area:

Grass	0.008	0.25	0.28	0.33	0.63
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Total Post Development Areas	0.259	0.70	0.77	0.79	0.81
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2.0 Allowable Post Development Flows

The post development flows during the 2 to 100 year storm events from the site are to be controlled to the pre-development rate (grass) at an initial Tc=15min.

The allowable flows from the site are as follows:

$$Q_5 = cIA/360 \quad \quad \quad \mathbf{0.0157 \text{ m}^3/\text{sec}}$$

3.1 FiveYear Storage Calculation

$$I_5 = \frac{1045.41}{(t+4.9)^{0.83}}$$

Rainfall Duration min.	s	5 Year Rainfall Intensity (I) mm/h	Attenuated Flow From Site m ³ /sec	Un-Attenuated Flow From Site m ³ /sec	Controlled Flow From Site* m ³ /sec	Aprox. Detention Volumes m ³
10	600	111.1	0.0560	0.0006	0.0126	26.4
15	900	87.3	0.0440	0.0005	0.0126	28.8
20	1200	72.5	0.0366	0.0004	0.0126	29.3
25	1500	62.3	0.0314	0.0003	0.0126	28.8

Based on the above, the required 5 year storage =

$$\mathbf{29.3 \text{ m}^3}$$

3.2 Ten Year Storage Calculation

$$I_{10} = \frac{1331.42}{(t+5.26)^{0.84}}$$

Rainfall Duration min.	s	10Year Rainfall Intensity (I) mm/h	Attenuated Flow From Site m ³ /sec	Un-Attenuated Flow From Site m ³ /sec	Controlled Flow From Site* m ³ /sec	Aprox. Detention Volumes m ³
10	600	134.9	0.0680	0.0007	0.0131	33.0
15	900	106.4	0.0536	0.0006	0.0131	36.5

Appendix A
Detailed Stormwater Management Calculations

20	1200	88.4	0.0445	0.0005	0.0131	37.8
25	1500	75.9	0.0383	0.0004	0.0131	37.8
30	1800	66.8	0.0337	0.0004	0.0131	37.1

Based on the above, the required 10 year storage = **37.8 m³**

3.3 Twenty Five Year Storage Calculation

$$I_{25} = \left| \frac{1045.41}{(t+4.9)^{0.83}} \right| \times 1.39$$

Rainfall Duration		25Year Rainfall Intensity (I)	Attenuated Flow From Site	Un-Attenuated Flow From Site	Controlled Flow From Site*	Aprox. Detention Volumes
min.	s	mm/h	m ³ /sec	m ³ /sec	m ³ /sec	m ³
10	600	154.4	0.0852	0.0009	0.0135	43.6
15	900	121.4	0.0670	0.0007	0.0135	48.8
20	1200	100.8	0.0556	0.0006	0.0135	51.2
25	1500	86.6	0.0478	0.0005	0.0135	52.2
30	1800	76.2	0.0420	0.0005	0.0135	52.1
35	2100	68.2	0.0376	0.0004	0.0135	51.4

Based on the above, the required 25 year storage = **52.2 m³**

3.4 Fifty Year Storage Calculation

$$I_{50} = \left| \frac{1045.41}{(t+4.9)^{0.83}} \right| \times 1.54$$

Rainfall Duration		50Year Rainfall Intensity (I)	Attenuated Flow From Site	Un-Attenuated Flow From Site	Controlled Flow From Site*	Aprox. Detention Volumes
min.	s	mm/h	m ³ /sec	m ³ /sec	m ³ /sec	m ³
10	600	171.0	0.0973	0.0013	0.0140	50.7
15	900	134.5	0.0765	0.0010	0.0140	57.1
20	1200	111.7	0.0635	0.0008	0.0140	60.4
25	1500	95.9	0.0546	0.0007	0.0140	61.9
30	1800	84.4	0.0480	0.0006	0.0140	62.3
35	2100	75.5	0.0429	0.0006	0.0140	61.9

Based on the above, the required 50 year storage = **62.3 m³**

3.5 One Hundred Year Storage Calculation

$$I_{100} = \left| \frac{1045.41}{(t+4.9)^{0.83}} \right| \times 1.69$$

Rainfall Duration		100 Year Rainfall Intensity (I)	Attenuated Flow From Site	Un-Attenuated Flow From Site	Controlled Flow From Site*	Aprox. Detention Volumes
min.	s	mm/h	m ³ /sec	m ³ /sec	m ³ /sec	m ³
10	600	187.7	0.1097	0.0026	0.0143	58.8
15	900	147.6	0.0863	0.0021	0.0143	66.6
20	1200	122.6	0.0716	0.0017	0.0143	70.8
25	1500	105.3	0.0615	0.0015	0.0143	73.1
30	1800	92.6	0.0541	0.0013	0.0143	74.0
35	2100	82.9	0.0484	0.0012	0.0143	74.1
40	2400	75.1	0.0439	0.0010	0.0143	73.6

Based on the above, the required 100 year site storage = **74.1 m³**

4.0 Orifice Calculation

A 75 mm diameter orifice tube is proposed to control peak storm flows as follows:

Orifice Equation: $Q = CA \cdot (2gh)^{1/2}$

Appendix A
Detailed Stormwater Management Calculations

Orifice diameter = 75 mm.
Orifice invert= 250.70 m.

A = cross sectional area of orifice = 0.00442 m²
g = gravitational acceleration 9.81 m/sec²
c = entrance loss coefficient 0.82
Orifice invert= 250.70 m
Orif. centreline elev = 250.74 m

5.0 Controlled Flow Calculations

5.1 Five-Year Controlled Flow Calculation

Est. 5 year ponding elevation = 251.35 m.
h = head = 0.61 m.

Based on the above, the controlled flow during the 5 year storm event Q5 = 0.0126 m³/sec.
Total flow (controlled flow + unattenuated flow) 0.0130 m³/sec.

5.2 Ten-Year Controlled Flow Calculation

Est. 10 year ponding elevation = 251.40 m.
h = head = 0.66 m.

Based on the above, the controlled flow during the 10 year storm event Q10 = 0.0131 m³/sec.
Total flow (controlled flow + unattenuated flow) 0.0136 m³/sec.

5.3 Twenty Five Year Controlled Flow Calculation

Est. 25 year ponding elevation = 251.45 m.
h = head = 0.71 m.

Based on the above, the controlled flow during the 25 year storm event Q25 = 0.0135 m³/sec.
Total flow (controlled flow + unattenuated flow) 0.0142 m³/sec.

5.4 Fifty Year Controlled Flow Calculation

Est. 50 year ponding elevation = 251.50 m.
h = head = 0.76 m.

Based on the above, the controlled flow during the 50 year storm event Q50 = 0.0140 m³/sec.
Total flow (controlled flow + unattenuated flow) 0.0147 m³/sec.

5.5 One Hundred Year Controlled Flow Calculation

100 Year Ponding Elevation = 251.53 m.
h = head = 0.79 m.

Based on the above, the controlled flow during the 100 year storm event Q100 = 0.0143 m³/sec.
Total flow (controlled flow + unattenuated flow) 0.0154 m³/sec.

Appendix A
Detailed Stormwater Management Calculations

6.0 On-Site Storage Provided

6.1 - 5 Year Storage

The detention volume available within the storm sewer pipes at the 5 year ponding level is as follows:

From	To	Size	Length	Vol. (m ³)
MH 1	CBMH 2	450	21.7	3.5
CBMH 2	MH 3	450	9.5	1.5
MH 3	CBMH 4	450	17.0	2.0
CBMH 4	MH 5	450	21.2	2.2
MH 5	CBMH 6	450	12.9	0.6
MH 1	CB 1	300	19.8	1.4

Storm Sewer Storage = **11.2 m³**

StormBrixx Stoarge **27.6 m³**

Total 5 year storage **38.8 m³** which exceeds the required 5 year detention volume

6.2 - 100 Year Storage

The detention volume available within the storm sewer pipes at the 100 year ponding level is as follows:

From	To	Size	Length	Vol. (m ³)
MH 1	CBMH 2	450	21.7	3.5
CBMH 2	MH 3	450	9.5	1.5
MH 3	CBMH 4	450	17.0	2.7
CBMH 4	MH 5	450	21.2	3.4
MH 5	CBMH 6	450	12.9	2.1
MH 1	CB 1	300	19.8	1.4

Storm Sewer Storage = **14.5 m³**

StormBrixx Stoarge **61.3 m³**

Total 100 year storage = **75.8 m³** which exceeds the required 100 year detention volume

7.0 Erosion Control/Water Balance Calculations

The minimum erosion control/water balance requirement for all watercourses's within TRCA's jurisdiction is the retention of 5mm of every rainfall event for all impervious areas of the site.

7.1 Required Erosion Control/Water Balance Volume

	Impervious Area (m ²)	Required retention from Impervious Surfaces (mm)	Volume to be Retained On- site (m ³)
Site Area	1780	5.00	8.90

See Figure 3 for LID Catchment Areas

7.2 Volume within infiltration pit

A 6.0m long x 6.0m wide x 0.35m deep infiltration pit will assist to provide the required erosion control/water balance. The volume available within the infiltration pit is as follows:

Volume of pit 6.0 x 6.0 x 0.35= 12.60 m³

Appendix A
Detailed Stormwater Management Calculations

Porosity of Stone	40.00 %
Available Storage in pit=	5.04 m ³

<u>7.3 Detention volume within rain garden</u>	4.50 m ³
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<u>7.4 Total detention volume =</u>	9.54 m ³
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7.4 Infiltration Time Calculation:

The estimated time to infiltrate water contained within the sand filter is as follows:

Depth of Pit =	350.00 mm	
"T" time =	60.00 min/cm.	Assumed T time for native soils
Time to infiltrate =	2100.00 min =	35.0 hours

Recommended drain time is 48 hours and maximum drain time is 72 hours - Sustainable Technologies Low impact Development Stormwater Management Planning & Design Guide

8.0 Stormwater management Summary

Allowable Site Release Rate (l/sec)	<u>15.7</u>
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Site Composition

Site Catchment Area (Ha)	<u>0.259</u>
Roof Area (Ha)	<u>0.04</u>
Controlled Pavement Area (Ha)	<u>0.12</u>
Un-Controlled Pavement Area (Ha)	<u>0.00</u>
Controlled Landscape Area (Ha)	<u>0.07</u>
Un-Controlled Landscape Area (Ha)	<u>0.008</u>

Roof Stormwater Management System

Total No. of Hoppers	<u>n/a</u>
Total No. of Weirs	<u>n/a</u>
Weir rating (L/sec/cm)	<u>n/a</u>
100 yr Storm Peak Release rate (L/sec)	<u>n/a</u>
Max. detention Storage Requirement (m ³)	<u>n/a</u>
Design Roof Slope	<u>n/a</u>
Max Roof Ponding Depth at Hopper (cm)	<u>n/a</u>
Avg. Roof Ponding Depth (mm)	<u>n/a</u>
Avg. Drawdown Time (hrs)	<u>n/a</u>

Site Orifice Controls

Location	<u>Downstream of MH 1</u>
Orifice diameter (mm)	<u>75</u>
Invert Elevation (m)	<u>250.70</u>
Centerline Elevation (m)	<u>250.74</u>
Downstream HGL	
Detention Storage TWL (m)	<u>251.53</u>
Design Head (m)	<u>0.79</u>
Design Peak (L/sec)	<u>15.7</u>
Q-Rel (L/sec)	<u>15.4</u>

Appendix A
Detailed Stormwater Management Calculations

Stormwater Management Analysis

Part A - Detention Volume Requirement

100 yr Required Detention Storage Volume (m ³)	74.1
Orifice Release Rate (l/sec)	14.3

Maximum Detention Storage Available

Catchment Areas	n/a
Design TWL	251.53
Surface Ponding	0.00
Pipe Storage	14.5
Structure Storage	61.3
Total	75.8

Part B - site Catchment Area Release Rate

Actual Site Release Rate: Orifice (L/s)	14.285
Uncontrolled (l/s)	1.151
Total (L/s)	15.4
Allowable Release Rate (L/s)	15.7

APPENDIX B

Treatment Unit Modelling

Brief Stormceptor Sizing Report - 2960 Teston Road

Project Information & Location			
Project Name	PRS #33 - STC	Project Number	2020-030
City	Vaughan	State/ Province	Ontario
Country	Canada	Date	7/28/2020
Designer Information		EOR Information (optional)	
Name	Blair Nock	Name	
Company	MGM Consulting Inc.	Company	
Phone #	905-567-8678	Phone #	
Email	blrnck2@gmail.com	Email	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	2960 Teston Road
Target TSS Removal (%)	80
TSS Removal (%) Provided	81
Recommended Stormceptor Model	STC 300

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	% TSS Removal Provided
STC 300	81
STC 750	88
STC 1000	89
STC 1500	90
STC 2000	92
STC 3000	93
STC 4000	94
STC 5000	95
STC 6000	96
STC 9000	97
STC 10000	97
STC 14000	98
StormceptorMAX	Custom

Sizing Details			
Drainage Area		Water Quality Objective	
Total Area (ha)	0.259	TSS Removal (%)	80.0
Imperviousness %	69.00	Runoff Volume Capture (%)	
Rainfall		Oil Spill Capture Volume (L)	
Station Name	TORONTO CENTRAL	Peak Conveyed Flow Rate (L/s)	34.11
State/Province	Ontario	Water Quality Flow Rate (L/s)	34.11
Station ID #	0100	Up Stream Storage	
Years of Records	18	Storage (ha-m)	Discharge (cms)
Latitude	43°37'N	0.000	0.000
Longitude	79°23'W	0.003	0.030
		0.005	0.034
Up Stream Flow Diversion			
		Max. Flow to Stormceptor (cms)	

Particle Size Distribution (PSD) The selected PSD defines TSS removal		
Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Notes
<ul style="list-style-type: none"> Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules. Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed. For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
<http://www.imbriumsystems.com/technical-specifications>

APPENDIX C

FUS Calculations



FIRE FLOW REQUIREMENT
YORK REGION PRS #33,
2690 Teston Road, Vaughan Ontario

Project # 2020-030
DATE: June 26, 2024

Design Note

For a building classified with a construction coefficient from 1.0 to 1.5, 100% of all floor areas are considered in determining the total effective area.

(Ref: Fire Underwriters Survey-Water Supply for Public Fire Protection,2020)

Effective Area

237.0 m²

Base Flow Calculation

A= Effective area

237 m²

C= Ordinary

1

F= Required fire flow

3,387 L/min.

Flow Rounded up to nearest 1,000

3,000 L/min

Flow 'F' Adjustments

			Credits (L/min)	Charges (L/min)	Flow Adjusted
Occupancy Adjustment					
	%				
Limited combustible	-15%		-450		2,550
Sprinkler Adjustments					
Sprinklered as per NFPA 13	Yes	-30%	-900		
Standard Water Supply	Yes	-10%	-300		
Fully supervised watersupply	No				1,350
Exposure Adjustments					
Exposure	Sep. (m)	Charge			
North	28	10%			
East	>30	0%			
South	>30	0%			
West	>30	0%			
Total Exposure Charge		10%		300	1,650

Total Required Flow (Flow Rounded up to nearest 1,000) L/min = 2000 L/min

or

33 L/s

APPENDIX D

Water Demand Calculations

City of Vaughan Water Demand Analysis
York Region PRS #33 - 2960 Teston Road, Vaughan ON

Population Type	Average Consumption Rate (l/cap/day)	Number of Employees ¹	Daily Consumption (L/day)	Peak Hour	Max Day Factor
Employment	300	10	3000	3	1.8
	Water Demands				
	Demand Type		Demand (l/s)		
	Average Day Flow (l/s)		0.035		
	Maximum Day Flow (l/s)		0.063		
	Peak Hour Flow (l/s)		0.104		
	Fire Flow (l/s)		250		
	Maximum Day Plus Fire Flow (l/s)		250.063		
	Maximum Demand Flow (l/s)		250.167		

¹ Employee count based on 5 Male & 5 Female

Note: Fire flow based on City of Vaughan's Institutional requirement of 250 l/s

APPENDIX E

Sanitary Flow Analysis

City of Vaughan Wastewater Flow Analysis - Pre - Post Development Analysis
York Region PRS #33 - 2960 Teston Road, Vaughan ON

PRE-DEVELOPMENT							
Population Type	Average Wastewater Flow Rate (l/cap/day)		Population*	Flow (l/day)	Peak Factor	Site Area (Ha)	Infiltration Allowance (l/sec/Ha)
Residential	370		8	2960	4.00	0.269	0.26
<div>Peaking Factor</div> <div>$K = 1 + \frac{14}{4+p^{0.5}} = 4.27$</div> <div>(max peaking factor = 4.0)</div>							
Sanitary Flow	0.03	l/sec					
Peaking Factor	0.14	l/sec					
Infiltration	0.07	l/sec					
Peak Sanitary Flow	0.21	l/sec					
* Pre-development population based on 2 single family dwellings @ 4 persons/dwelling							

POST-DEVELOPMENT							
Population Type	Average Wastewater Flow Rate (l/cap/day)		Number of Employees	Flow (l/day)	Peak Factor	Site Area (Ha)	Infiltration Allowance
Employment	370		10	3700	4.00	0.269	0.26
<div>Peaking Factor</div> <div>$K = 1 + \frac{14}{4+p^{0.5}} = 4.24$</div> <div>(max peaking factor = 4.0)</div>							
Sanitary Flow	0.04	l/sec					
Peaking Factor	0.17	l/sec					
Infiltration	0.07	l/sec					
Peak Sanitary Flow	0.24	l/sec					

APPENDIX F

Drawings CV-1, CV-2 & CV-3

1. THE INLET PUMP HEAD MUST BE COVERED WITH REINFORCED FIBER GLASS OR CLEAR DISCHARGE FROM THE DRAIN IS TO BE RELEASED TO A RECEPTED LOCATION. SHOULD BE PROVIDED. THE SEDIMENT BAS SHOULD BE LOCATED AT LEAST 15M AWAY FROM THE RECEIVING BODY. THERE MUST BE CONTROLS PLANNING PROPOSED, AN AFTER-HOURS THOUGHT SHOULD BE ASSIGNED TO SETTLEMENT POND, SEDIMENTATION TANK, ETC. IS FUNCTIONING PROPERLY.
2. EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE EVALUATED ON A WEEKLY BASIS AND AFTER ANY STORM EVENT, ANY REPAIRS REQUIRED ARE EROSION AND SEDIMENT CONTROL METHODS ARE TO BE CONTINUOUSLY EVALUATED, AND UPGRADES ARE TO BE IMPLEMENTED WHEN NECESSARY.
3. ADDITIONAL EROSION AND SEDIMENT CONTROL MATERIALS (E. G. SILT FENCE, EROSION MATS, AND REPAIRS ... ETC.) ARE TO BE KEPT ON SITE FOR EMERGENCIES AND REPAIRS.
4. GRANTING OF RICA PERMITS DOES NOT ABSOLVE THE PROPONENT/APPLICANT AND ITS ASSIGNED AGENTS FROM ITS/HER RESPONSIBILITIES TO COMPLY WITH ALL APPLICABLE MUNICIPAL BY-LAWS AND PART X (SUSLS) OF THE ENVIRONMENTAL PROTECTION ACT.
5. IF, IN THE OPINION OF THE AUTHORITY, THE CONDITIONS OF THE PERMIT ARE NOT BEING COMPLIED WITH, THE APPROVAL DOES NOT EXEMPT THE PROPONENT/APPLICANT FROM THE REQUIREMENTS OF THE OTHER FEDERAL, PROVINCIAL OR MUNICIPAL STATUTES, REGULATIONS OR BY-LAWS, OR ANY RIGHTS UNDER COMMON LAW.
6. EROSION AND SEDIMENT CONTROL (ESC) PLANS IS A DYNAMIC DOCUMENT. SITE DEVELOPMENTS OR CHANGES ON SITE, ANY DEVIATION FROM APPROVED PLANS MUST BE RESIGNED BY A QUALIFIED PROFESSIONAL.
7. IT IS EVERYONE'S RESPONSIBILITY TO PREVENT CONSTRUCTION RELATED FEATURES FROM IMPACTING ADJACENT RESOURCES AND OTHER NATURAL FEATURES.
8. PLEASE REFER TO ESC GUIDELINE FOR URBAN CONSTRUCTION (DECEMBER 2006) FOR THE DESIGN AND DESIGN ALTERNATION OF ESC.
9. ON A FILLING OF SEDIMENT LANE RAINOFF FROM TEMPORARY PONDS) IS TO HAVE AFTER-HOURS CONTACT NUMBER IS TO BE VISIBLY POSTED ON-SITE FOR EMERGENCIES. ALL THE PLANS SHOULD HAVE NAME AND CONTACT INFO OF THE PERSON RESPONSIBLE FOR ESC MEASURES.
10. ALL ESC MEASURES SHOULD BE REPORTED TO MINISTRY OF ENVIRONMENT (SILT ACTION CENTER) AT:
1 800 268 6900.

CONSTRUCT "MUD-MAT" AS INDICATED AND MAINTAIN UNTIL SITE IS MUD TRACKED ONTO EXISTING ROADWAYS FROM THE SITE IS TO BE REMOVED ON A DAILY BASIS.
CONSTRUCT AND MAINTAIN SILT FENCING UNTIL SITE IS STABILIZED.
PREVENT EROSION OF MATERIAL STOCKPILES.
DURING WORK STOPPAGES OR INCLEMENT WEATHER, PLUG ENDS OF OPEN SEWERS TO PREVENT DOWNSTREAM SEDIMENTATION.

WATER SERVICE CONNECTION TO BE DECOMMISSIONED BY PLUGGING THE WATERMAIN SERVICE AT THE MAIN, REMOVING THE VALVE BOX EXTENSIONS, BACKFILLING & SURFACE RESTORATION

12. STRAW BALES, CLEAN STONES, BRICKS, ETC.) ARE TO BE KEPT ON SITE FOR EMERGENCIES AND REPAIRS.
13. GRADING, SLOPING AND PERMIT DOCS. TO BE SUBMITTED TO THE DISTRICT ENGINEER FOR REVIEW AND APPROVAL. THE DISTRICT ENGINEER IS TO COMPLY WITH ALL APPLICABLE NUTRIENT BY-LAWS AND PART 3 (SPILLS) OF THE ENVIRONMENTAL PROTECTION ACT, R.S.O. 1990.
14. THE DISTRICT ENGINEER HAS THE AUTHORITY TO WITHDRAW THE PERMIT ANYTIME IF IN THE OPINION OF THE AUTHORITY, THE CONDITIONS OF THE PERMIT ARE NOT BEING COMPLIED WITH. THIS WITHDRAWAL DOES NOT EXEMPT THE DISTRICT ENGINEER FROM THE REQUIREMENTS OF THE ENVIRONMENTAL PROTECTION ACT, FEDERAL, PROVINCIAL OR MUNICIPAL STATUTES, REGULATIONS OR BY-LAWS.
15. CONCRETE NOTHUR UNDER CONCRETE LAYER) PLAN IS A DYNAMIC DOCUMENT, WHICH MAY BE SUBJECT TO CHANGE OR MODIFICATIONS AS A RESULT OF CHANGES IN THE PROJECT OR CHANGES IN THE QUALITY OF MATERIALS. IT IS THE RESPONSIBILITY OF THE DESIGNER TO PREVENT CONSTRUCTION RELATED PROBLEMS FROM IMPACTING AQUIFER RESOURCES AND OTHER NATURAL RESOURCES.
16. PLEASE REFER TO ESC GUIDELINE FOR URBAN CONSTRUCTION (DECEMBER 2006) FOR THE DESIGN AND DESIGN ALTERATION OF ESC.
17. THE DISTRICT ENGINEER HAS THE AUTHORITY TO REMOVE (BARRIQUADE POINTS) TO THE CREEK IS ALLOWED AT ANY TIME.
18. AFTER THE WORKS COMPLETION, THE PERMIT IS TO BE RETURNED TO SITE FOR THE PERSON RESPONSIBLE FOR ESC MEASURES.
19. ANY VIOLATION OF THE PERMIT IS TO BE REPORTED TO MINISTRY OF ENVIRONMENT AND CLIMATE ACTION.
20. 1 800 268 6980.

1. CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND VEGETATIVE COVER IS ESTABLISHED.

2. ALL SILT FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION COMMENCING.

9. CONTRACTOR MUST REMOVE EROSION AND SEDIMENTATION FENCING PRIOR TO COMPLETION OF PROJECT. CONTRACTOR TO HAVE EROSION AND SEDIMENTATION FENCE INSPECTED WHEN VEGETATION HAS ESTABLISHED, BUT PRIOR TO FENCE BECOMING OVERGROWN. ENGINEER'S REPRESENTATIVE TO DETERMINE IF VEGETATION HAS REACHED THE CRITICAL POINT AND WILL THEN INSTRUCT CONTRACTOR TO REMOVE FENCE.

1. EROSION CONTROL STRUCTURES TO BE MONITORED REGULARLY AND ANY DAMAGE REPAIRED IMMEDIATELY. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 1/3 THE HEIGHT OF THE FENCE.
2. OWNERS REPRESENTATIVE TO MONITOR EROSION CONTROL STRUCTURES TO ENSURE FENCING IS INSTALLED AND MAINTENANCE IS PERFORMED TO CITY REQUIREMENTS.

DOUBLE WRAP
WOVEN
GEOTEXTILE

CATCHBASIN SEDIMENT PROTECTION

1. TO BE INSTALLED ON ALL CATCHBASINS AND MAINTAINED BETWEEN APRIL AND DECEMBER. REMOVE FOR WINTER SEASON.
2. WOMEN GEOTEXTILE TO HAVE EQUIVALENT OPENING SIZE BETWEEN 0.15mm AND 0.25mm.
3. WOMEN GEOTEXTILE TO BE REPLACED PERIODICALLY WHEN ACCUMULATED SEDIMENTS INTERFERE WITH DRAINAGE.

CONTRACTOR TO CONTACT MGM CONSULTING INC. IMMEDIATELY SHOULD THERE BE ANY CONFLICTS BETWEEN EXISTING CONDITIONS AND PROPOSED GRADING AND/OR SERVING DESIGN, OR CONFLICTS IN CONSTRUCTING THE WORK AS PER THE INTENT OF THE APPROVED DESIGN PRIOR TO CONSTRUCTION.

- NOTE:
1. ALL WORK TO CONFORM TO THE LATEST MUNICIPAL STANDARDS AND SPECIFICATIONS. MATERIALS TO BE USED SHALL BE APPROVED ON A PROVISIONAL BASIS.
2. ALL DISBURSED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER.
3. CONTRACTORS TO LOCATE AND PROTECT ALL EXISTING SERVICES AND UTILITIES PRIOR TO AND DURING CONSTRUCTION
4. CONTRACTOR TO LOCATE AND CONFIRM ALL EXISTING UTILITIES AND SERVICE LINES.
5. CONTRACTORS TO ENSURE ADEQUATE CLEARANCE FROM ALL EXISTING SERVICES AND UTILITIES
6. CONTRACTOR TO CONFIRM ALL EXISTING INVERTS PRIOR TO INTERNAL SURVEYING.

KEY MAP
MTS

SAGE STREET

HAWTHORN ROAD

SITE

North arrow pointing up.

BENCHMARK
ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC
DATUM(GSD-28.78) AND ARE DERIVED FROM THE CITY OF
VAUGHAN BENCHMARK No. 34-9 HAVING A PUBLISHED ELEVATION
OF 234.364 METRES
TOPOGRAPHICAL SURVEY PROVIDED BY J.D. BARNES LIMITED, DATED
GEO. 06/23, 2019 REFERENCE # 19-21-356-00

2960 TESTON ROAD, VAUGHAN ONTARIO

CLIENT

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO COMMENCEMENT OF THE WORK. ANY DISCREPANCY SHALL BE REPORTED TO THE CONSULTANT.

RECHITT

THOMAS BROWN
ARCHITECTS

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PROFESSIONAL SEAL



REMOVALS AND EROSION & SEDIMENT CONTROL PLAN

CITY FILE # DA 20.037

ORIENTA

2020.07.29

SCALE: 1:200

DRAWN BY: BN

406 ST

PROJECT

000-0707

RAIWIN

CV 1

