FUNCTIONAL SERVICING REPORT

PROPOSED PLACE OF WORSHIP DEVELOPMENT
(File: OZ 19 2)

AT
900 Eglinton Avenue East
City of Mississauga

Prepared for
Antrix Architects Inc.

Jan 30, 2020	Re-Issued for OP and ZBL Amendment Application
Feb 03, 2019	Issued for OP and ZBL Amendment Application

REVISIONS

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1.0 INTRODUCTION

Flora Designs Inc. has been retained by Antrix Architects Inc. to prepare a Functional Servicing Report for the Proposed Place of Worship Development located at 900 Eglinton Avenue East, City of Mississauga, Ontario (**Appendix "A"**), in accordance with the engineering design standards provided by the City of Mississauga, Region of Peel, and the MOE Stormwater Management Planning and Design Manual 2003.

This report is prepared in support of Proposed Zoning By-law Amendment Application by Zelinka Priamo Ltd. and Antrix Architects Inc. The purpose of this report is to provide site-specific information for the City and Region's review with respect to the infrastructure required to support the proposed development regarding storm drainage, sanitary discharge and water supply.

An inventory of the existing infrastructure in the area of proposed development was carried out. This report discusses the existing services together with the servicing requirements for the proposed development.

2.0 SITE DESCRIPTION

The proposed development site is located at 900 Eglinton Avenue East, City of Mississauga, Ontario (**Appendix "A"**). The site is bounded as follows:

- Eglinton Avenue to the North,
- Existing commercial plaza to the East and South,
- Future commercial/industrial developments to the West.

The site is approximately 3,453.65 m^2 (0.35 hectares) in size. Currently an existing residential dwelling is located on the property. The existing establishment on site is serviced by the existing private infrastructure of storm sewer belongs to an existing commercial plaza located at 4626 Tomken Road, Region's infrastructure of watermain located within the road allowance of Eglinton Avenue East, and a private sub-surface disposal facility.

3.0 SITE PROPOSAL

The Site Plan Application proposes to demolish the existing residential dwelling and re-develop the site with a new Place of Worship development including 2 level underground parking garage. Reduced versions of site survey drawing, site plan drawing, and architectural building elevations has been illustrated in **Appendix "A"**. Please refer to the building and site statistics provided by Antrix Architects Inc.

In the post-development condition, this development application proposes to make use of the existing 300mm dia storm service provided from the private infrastructure of storm sewer belongs to an existing commercial plaza located at 4626 Tomken Road. This development application also proposes to abandon and remove an existing water service and a private septic system and propose new sanitary and water services from the existing regional infrastructure of

sanitary sewer and watermain located within the road allowance of Winchester Drive in accordance with the Region of Peel design standards.

4.0 STORMWATER MANAGEMENT AND DRAINAGE

4.1 Design Criteria

The proposed development will meet the Province of Ontario standards as set out in the MOE Stormwater Management Planning and Design Manual 2003 (SWMPD), Region of Peel Storm Sewer Design Criteria and local Engineering Standards provided by the City of Mississauga in the Development Requirements Manual. A brief summary of design criteria are as follows;

- For new developments, return frequency values for design shall be 10-year for the minor system and 100-year for the major system.
- The City of Mississauga Rainfall Intensity Curves (City Standard Drawing No. 2111.010) are to be used for analysis **(Appendix "B")**.
- Post-development peak flows for all events from the site should be controlled to the peak flow resulting from the target pre-development conditions during respective storm events.
- Stormwater should be treated to Enhanced Protection levels as defined in the MOE SWM Planning & Design Manual (2003).
- Runoff from 5mm rainfall event is to be retained on site to reduce the discharge during small events.
- An overland flow route shall be provided to direct runoff in excess of the 100-year storm to a safe outlet.
- Maximum detention depth in parking areas during the 100-year storm event is not to exceed 250mm.
- Per the engineering design parameters established by Adamson Lawson Surbray Associates Ltd. (ALSAL) and Lethbridge Lawson Inc. (LLI) for the existing commercial plaza located at 4626 Tomken Road, the site area occupied by this development is accounted to contribute stormwater discharge to the private storm sewer network belongs to commercial plaza considering a runoff coefficient of C=0.75. However, per the City of Mississauga design guidelines, the maximum value of runoff coefficient (C) used in calculating the pre-development peak runoff and the post-development allowable release is limited to 0.50.

4.2 Existing Conditions

Currently an existing residential dwelling is located on the property. Based on review of the topographic survey and a site visit, we have concluded that, the major and minor system flows from the site area travels towards the south property limits through overland sheet flow, which subsequently generates uncontrolled discharge into the private infrastructure of storm sewer belongs to the existing commercial plaza located at 4626 Tomken Road. In accordance with the design documents for the adjoining future industrial development located at 4598 Tomken Road prepared by Skira & Associates Ltd. (Skira), the stormwater runoff from the upstream lands belongs to the South boulevard of Eglinton Avenue East sheet flows through this property. Subsequently, this external flow

generates uncontrolled discharge to the same private infrastructure of storm sewer belongs to the existing commercial plaza located at 4626 Tomken Road. Excerpt from the design documents prepared by ALSAL, LLI and Skira as well as the pre-development surface condition and drainage area for this site has been illustrated in **Appendix "B"**.

For calculating the pre-development discharge rates and runoff for 10-Year and 100-year storm events, Time of Concentration (Tc) for the pre-development drainage areas is based on minimum value of Tc provided in the City of Mississauga design guidelines. Based on the pre-development surface condition, the calculated value of composite runoff co-efficient is 0.78, which is greater than the maximum value of "C" (0.50) allowed for calculation of the post-development allowable discharge rate per the Development Requirements Manual 2016. Therefore, a value of C=0.50 is used in calculation of the post-development allowable release. The input parameters used to model the target pre-development condition are provided in **Table-1** below, and detailed pre-development runoff coefficient calculations have been illustrated in **Appendix "B".**

Table-1 Pre-development Input Parameters

Catchment #	Drainage Area	Runoff Coefficient	Adjustment Factor " F "		Time of Concentration
	"A" in Hector	"C"	**10-year**	**100-year**	"Tc" in Minute
CA-1-Pre	0.35	0.50	1.00	1.25	15

The pre-development peak flow is calculated using the City of Mississauga Rainfall Intensity Curves using the Rational Method. The results of the pre-development peak flow calculations are provided in **Table-2** below, and detailed calculations have been illustrated in **Appendix "B".**

Table-2 Pre-development Peak Flows

Catchment #	Peak Flow (m^3/s)	
	10-year	**100-year**
CA-1-Pre	0.048	0.084

4.3 Stormwater Management

In the post-development condition, the site grading is designed to provide an un-obstructed flow path through this site for the upstream external flow in compliance with the pre-development flow pattern. Therefore, the upstream drainage area is excluded in the post-development flow calculations.

In the post-development condition, there are uncontrolled site areas contributing to the total storm discharge from the site. Therefore, entire site area is divided into two primary drainage systems; "Controlled" (CA-1-Post) and "Uncontrolled" (CA-2-Post). The storm runoff from the catchment area CA-1-

Post) will be controlled in-line with the pre-development allowable release rate during respective rainfall events and discharged to the private infrastructure of storm sewer belongs to the existing commercial plaza located at 4626 Tomken Road. The post-development surface condition and drainage area for this site have been illustrated in **Appendix "B"**.

For calculating the post-development discharge rates and runoff for 10-Year and 100-Year storm events, Inlet time of Concentration (Tc) and weighted runoff coefficient (C) is calculated similar to the pre-development calculations. Input parameters used to model the target post-development condition are provided in **Table-3** below and detailed calculations have been illustrated in **Appendix "B"**.

Table-3 Post-development Input Parameters

Catchment #	Drainage Area	Runoff Coefficient	Adjustment Factor " F "		Time of Concentration
	"A" in Hector	"C"	**10-year**	**100-year**	"Tc" in Minute
CA-1-Post	0.30	0.74	1.00	1.25	15
CA-2-Post	0.05	0.25	1.00	1.25	15

Results of the post-development peak flow calculations by considering minimum Tc and IDF data same as the pre-development flow calculations are provided in **Table-4** below, and detailed post-development flow calculations have been illustrated in **Appendix "B".**

Table-4 Post-development Peak Flows

Catchment #	Peak Flow (m^3/s)	
	10-year	**100-year**
CA-1-Post	0.061	0.108
CA-2-Post	0.004	0.006
TOTAL	**0.065**	**0.114**

The post-development peak flow targets will be achieved using a combination of surface storage, UG Storage Tank and detention storage in the storm sewer system. Site grading for the controlled portion of the site area (CA-1-Post) has been designed to capture runoff from the site using a series of on-site catch basins. When the flow is greater than the allowable peak discharge rate through an orifice, the storm sewer system will surcharge and the excess runoff volume will be stored in the UG Storage Tank, storm sewer pipes and catchments of surface storage surrounding the relevant catch basins and catch basin manholes. A summary of the storage volumes available on site at variable stage elevations are provided in **Table-5** below and detailed calculations have been illustrated in **Appendix "B".**

Table-5 Available Stage Storage Summary

Stage Elevation	Stage Storage Volume (m^3)				
	CB-MH	Pipe	Surface	UG-1	Total
143.00	2.23	3.19	0.00	13.50	**18.92**
143.75	2.23	3.19	0.00	27.00	**32.42**
143.90	2.23	3.19	1.90	29.70	**37.03**

The post-development Stormwater Management will be justified by discussing the following stormwater controls:

4.3.1 Quantity Control

Stormwater quantity control is typically implemented to minimise the potential for downstream flooding, stream bank erosion and overflow of infrastructure. As per minimum standards provided in the Development Requirements Manual 2016, the post-development peak flows for all events from the site should be controlled to the peak flow resulting from the target pre-development condition during respective storm events.

Modified Rational Method calculations were undertaken to determine the peak flows and required storage volume from the proposed site during 10-Year and 100-Year storm events. This method calculates the storage volume using the composite runoff coefficient and the allowable release rate based on rainfall intensities over a three-hour storm event. A summary of the post-development peak flow and storage required analysis is provided in **Table-6** below and detailed calculations have been illustrated in **Appendix "B".**

Table-6 Post-development Peak Flow and Storage Required Analysis

Storm Event	Allowable Release Rate (m^3/s)	Runoff from Controlled Area (m^3/s)	Runoff from Uncontrolled Area (m^3/s)	Total Peak Runoff (m^3/s)	Available Storage Volume (m^3)	Storage Volume Used (m^3)
10-year	0.048	0.043	0.004	0.047	32.42	15.87
100-year	0.084	0.071	0.006	0.077	37.03	33.07

The post-development peak flow targets will be achieved by controlling discharge from the site area using a 160mm dia orifice plate installed at the outlet of storm manhole CBMH#1. Detailed calculations for the orifice rating have been illustrated in **Appendix "B".**

A total of 32.42 m^3 storage volume is provided below the lowest surface elevation of 143.75 through the CB/MH, Storm Sewer and UG Storage Tank. A total of 15.87 m^3 storage volume is used during 10-year storm event, which is less than the available storage volume below lowest surface elevation. The storage used summary confirms that the surface

ponding will not occur within any portion of the site area during minor storm events.

4.3.2 Quality Control

In accordance with the City of Mississauga requirements, enhanced (Level 1) water quality protection is typically implemented to treat runoff from the site. The subject site contains surface and underground parking, therefore, an oil-grit separator will to be required to provide quality control treatment. The exact sizing and model of the oil-grit separator will be provided at the detailed engineering design stage in conjunction with the submission of the site plan application.

4.3.3 Water Balance

The water balance criteria provided by the City of Mississauga in the Development Requirements Manual requires 5mm of rainfall shall be diverted from the storm sewer system through infiltration, evapotranspiration, or rainwater reuse. The objective of water balance criteria is to capture and manage annual rainfall on-site to preserve the pre-development hydrology.

A 5mm of rainfall over the entire site area equates to a required site balance volume of 17.50 m^3. In order to meet the water balance requirements, this development application proposes to implement rainwater harvesting system consist of a storage tank within underground parking level-2 with an approx 25.20 m^3 volume to fulfill the deficit in site water balance. The rainwater harvesting system will capture runoff from the building roof and store it in a cistern tank located within the underground parking garage. The water stored in this tank will be used for irrigation or toilet flushing. The design of water balancing solutions will be established at the detailed engineering design stage in conjunction with the submission of the site plan application and in co-ordination with the project mechanical engineer.

4.4 Down Stream Capacity

In the pre-development condition, this site contributes to the existing private infrastructure of storm sewer belongs to the existing commercial plaza located at 4626 Tomken Road. Since, the post-development peak flow for all events from the site are controlled to the target pre-development allowable release, there will be no need to map the downstream capacity of the existing private infrastructure of storm sewer belongs to the existing commercial plaza.

4.5 External Flow from Upstream Lands

In the pre-development condition, the stormwater runoff from the upstream lands belongs to the South boulevard of Eglinton Avenue East sheet flows through this property. In accordance with the design documents for the adjoining future industrial development located at 4598 Tomken Road prepared by Skira & Associates Ltd. (Skira), the stormwater runoff from the upstream

lands will generate uncontrolled discharge to the private infrastructure of storm sewer belongs to the existing commercial plaza located at 4626 Tomken Road. Excerpt from the design documents prepared by ALSAL, LLI and Skira as well as the post-development surface condition and drainage area has been illustrated in **Appendix "B"**.

In the post-development condition, this development application proposes to construct a swale within private property belongs to 900 Eglinton Avenue and divert external uncontrolled stormwater flow together with the uncontrolled discharge from the catchment area CA-2-Post at the same location of storm inlet belongs to the existing commercial plaza located at 4626 Tomken Road.

For calculating the post-development stormwater flow contributing to the new conveyance swale during 10-Year and 100-Year storm events, Inlet time of Concentration (Tc) and weighted runoff coefficient (C) is calculated in accordance with the City of Mississauga guidelines. Input parameters used to model the target post-development condition are provided in **Table-7** below and detailed calculations have been illustrated in **Appendix "B"**.

Table-7 Post-development Input Parameters – Contributing to New Swale

Catchment #	Drainage Area	Runoff Coefficient	Adjustment Factor " F "		Time of Concentration
	"A" in Hector	"C"	10-year	100-year	"Tc" in Minute
CA-101-Post	1.10	0.25	1.00	1.25	15
CA-102-Post	0.36	0.25	1.00	1.25	15
CA-2-Post	0.05	0.25	1.00	1.25	15

The post-development peak flow contributing to the new conveyance swale is calculated using the City of Mississauga Rainfall Intensity Curves using the Rational Method. The results of the peak flow calculations are provided in **Table-8** below, and detailed calculations have been illustrated in **Appendix "B".**

Table-8 Post-development Peak Flows – Contributing to New Swale

Catchment #	Peak Flow (m^3/s)	
	10-year	100-year
CA-101-Post	0.076	0.134
CA-102-Post	0.025	0.044
CA-2-Post	0.004	0.006
TOTAL	**0.105**	**0.184**

The results are summarised accounting all major and minor system flow from the upstream lands as well as catchment area CA-2-Post will be conveyed by the new swale. The conveyance capacity of the new swale is designed considering entire 0.184 m^3/s flow. Detailed calculations for the swale capacity have been illustrated in **Appendix "B".**

5.0 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

Construction activity, especially operations involving the handling of earthen material, dramatically increases the availability of particulate matter for erosion and transport by surface drainage. In order to mitigate the adverse environmental impacts caused by the release of silt--laden stormwater runoff into receiving watercourses, measures for erosion and sediment control are required for construction sites. The impact of construction on the environment is recognized by the Greater Golden Horseshoe Area Conservation Authorities. “Erosion & Sediment Control Guidelines for Urban Construction” released by Authority in December 2006, provides guidance for the preparation of effective erosion and sediment control plans.

Control measures must be selected in light of the erosion potential of the site. It is important to have site modifications and implementations on a staged basis to reflect the site's activities. Furthermore, the effectiveness of control measures decreases with sediment loading as a result inspection and maintenance is recommended. The selection, implementation, inspection, and maintenance of the control features are summarized as follows:

5.1 Control Measures

On relatively small sites, measures for erosion and sediment control typically include the use of silt fencing, mud mats and sediment traps. The description of the sediment controls to be implemented on the subject site is as follows.

- Installation of ***Silt Fences*** adjacent to all property limits subject to drainage from the development area prior to topsoil stripping and in other locations, such as at the bases of topsoil stockpiles.
- Installation of ***Mud Mats*** at all construction entrances prior to commencing earthworks to minimize the tracking of mud onto municipal roads.
- Installation of ***Sediment Traps*** at all catch basins and area drain locations once the storm sewer system has been constructed to prevent silt-laden runoff from entering the municipal storm sewer system.

5.2 Construction Sequencing

The schedule of construction activities with respect to sediment controls is as follows:

- Installation of the silt fences prior to any other activities on the site.
- Construction of temporary mud mats at all construction access.
- Demolition of existing building and parking lot.
- Excavation of site area for construction of underground parking garage and disposal of all the surplus materials off site.
- Installation of site servicing and underground utilities.
- Construction of building, parking lot and driveways.
- Restoration / re-vegetation of disturbed areas either with temporary measures such as mulch or seeding or with final landscape and paving.
- Removal of the sediment controls following stabilization of disturbed areas.

5.3 Inspection & Maintenance

In order to ensure that the erosion and sediment control measures operate effectively, regular monitoring together with periodic cleaning (e.g. removal of accumulated silt), maintenance and/or re-construction is strongly recommended. Inspections of all the erosion and sediment controls on the construction site should be undertaken with the following frequency:

- On a weekly basis
- After every rainfall event
- After significant snow melt events
- Prior to forecasted rainfall events

If damaged control measures are found, they should be repaired and/or replaced within 48 hours. Site inspection staff and construction managers should refer to the Erosion and Sediment Control Inspection Guide (2008) prepared by the Greater Golden Horseshoe Area Conservation Authorities. This Inspection Guide provides information related to the inspection reporting, problem response and proper installation techniques.

6.0 SANITARY DRAINAGE SYSTEM

Currently an existing residential dwelling is located on the property. The existing establishment on site is serviced by a private sub-surface disposal facility.

6.1 Proposed Population Density

In the post-development condition, the maximum anticipated population accountable are 25 persons in accordance with the Sanitary Sewer Design Criteria Manual provided by the Region of Peel. Detailed population density calculations have been illustrated in **Appendix "C".**

6.2 Proposed Sanitary Drainage System

Similar to the design documents for the adjoining future industrial development located at 4598 Tomken Road prepared by Skira & Associates Ltd. (Skira), the proposed sanitary discharge flows from the site in accordance with the Sanitary Sewer Design Criteria Manual provided by the Region of Peel is estimated at 13.07 L/s. Detailed post-development sanitary flow calculations and excerpts from the adjoining future industrial development sanitary drainage area plan has been illustrated in **Appendix "C".**

6.3 Proposed Sanitary Service

This development application proposes to remove existing private sub-surface disposal facility and provide a new sanitary service from the existing regional infrastructure of 250mm dia sanitary sewer located within the road allowance of Winchester Drive. The propose sanitary service shall be constructed within a private easement provided on future industrial development site located at 4598 Tomken Road and connected to an existing regional sanitary manhole MH#2A located within road allowance of Winchester Drive.

7.0 WATER SUPPLY SYSTEM

Currently an existing residential dwelling is located on the property. The existing establishment on site is serviced by the Region's existing infrastructure of watermain located within the road allowance of Eglinton Avenue East.

7.1 Existing Water Supply System

The water supply requirement for the existing land use was not analysed.

7.2 Proposed Water Supply Requirements

The post-development water supply requirement is calculated in accordance with the Watermain Design Criteria Manual provided by the Region of Peel. This manual provides peaking factors to calculate peak hour and maximum day based on Ministry of Environment Guidelines.

The estimated water consumption of approximately 0.09 L/s with a peak hourly demand of 0.27 L/s will be required to service proposed development with domestic water based on population density calculated in section 6.1 and proposed land use. Detailed calculations have been illustrated in **Appendix "D"**.

The City of Mississauga requires fire flow calculations based on the Water Supply for Public Fire Protection Guidelines provided by the Fire Underwriters Survey (FUS). The fire flow required for proposed development is estimated at 66.67 L/s for 4 hours, delivered with a residual pressure of not less then 140 kilopascals. Detailed calculations have been illustrated in **Appendix "D"**.

A flow and pressure test will be performed on the nearest hydrant to the site prior to building permit application to determine compliance with the minimum requirement for suppression outlined in the FUS.

7.3 Proposed Water Service

In order to serve the proposed development for domestic and fire water supply requirements, this development application proposes to remove existing domestic water service and provide a new 200mm dia fire and domestic combine water service from the existing municipal infrastructure of 300mm dia watermain located within the road allowance of Winchester Drive. The propose water service shall be constructed within a private easement provided on future industrial development site located at 4598 Tomken Road and connected to an existing 300mm dia regional watermain in proximity to an existing sanitary manhole MH#2A located within road allowance of Winchester Drive.

The proposed water service will split at property line into 100mm dia domestic water service and 200mm dia fire service in accordance with the Region of Peel engineering design guidelines. The actual required minimum size of domestic water service and water meter in accordance with the domestic water flow calculated based on fixture unit counts per OBC will be established at the

detailed engineering design stage in conjunction with the submission of the site plan application and in co-ordination with the project mechanical engineer.

Since the parking garage extends under the full site area, the private domestic water service and fire line will enter the meter / sprinkler room in the parking garage level. The internal private network of fire and domestic water mains will be routed within the parking garage in co-ordination with the project mechanical engineer at the detailed engineering design stage. This development application also proposes to install a new fire hydrant on private property that will be connected with private network of fire main routed inside UG parking garage.

A Siamese connection is to be installed along the face of the building and within 45m distance of the new fire hydrant. The exact location of the water service connection will be established at the detailed engineering design stage in conjunction with the submission of the site plan application and in co-ordination with the project mechanical engineer.

8.0 CONCLUSIONS AND RECOMMENDATIONS

This report is to be read in conjunction with Proposed Zoning By-law Amendment Application submission materials for the project proposal known as Proposed Place of Worship Development located at 900 Eglinton Avenue East, City of Mississauga, Ontario. Based on our investigation, we conclude and recommend the following:

8.1 STORM

1. The value of runoff coefficient C=0.50 is used for the post-development allowable release calculations.
2. The entire site area is divided into two primary drainage systems; “Controlled” (CA-1-Post) and “Uncontrolled” (CA-2-Post).
3. The post-development peak flow targets will be achieved with the help of detention storage in the storm sewer pipes, UG storage tank and catchments of surface storage surrounding the relevant catch basins and catch basin manholes.
4. The post-development peak flow targets will be achieved by controlling discharge from the controlled portion of the site area (CA-1-Post) using a 160mm dia orifice plate installed at the outlet of the storm manhole CBMH#1.
5. The storage used summary confirms that the surface ponding will not occur within any portion of the site area during minor storm events.
6. Total 33.07 m^3 of storage is used out of 37.03 m^3 storage volume provided during 100-year storm event.
7. The implementation of rainwater harvesting system consist of 25.20 m^3 volume will fulfill water balance deficit of 17.50 m^3.
8. The exact sizing and model of the oil-grit separator will be provided at the detailed engineering design stage in conjunction with the submission of the site plan application .

9. A new swale will be constructed within private property belongs to 900 Eglinton Avenue to divert external uncontrolled flow together with the uncontrolled discharge from the catchment area CA-2-Post at the same location of storm inlet belongs to the existing commercial plaza located at 4626 Tomken Road.
10. This development application proposes to make use of the existing 300mm dia storm service provided from the private infrastructure of storm sewer belongs to an existing commercial plaza located at 4626 Tomken Road.
11. Erosion and Sediment controls are to be implemented during construction to prevent silt-laden runoff from leaving the site in accordance with the "Erosion & Sediment Control Guidelines for Urban Construction".

8.2 SANITARY

1. The proposed peak sanitary discharge from the site is calculates as 13.07 L/s.
2. This development application proposes to remove existing private sub-surface disposal facility and provide a new sanitary service from the existing regional infrastructure of 250mm dia sanitary sewer located within the road allowance of Winchester Drive.
3. The propose sanitary service shall be constructed within a private easement provided on future industrial development site located at 4598 Tomken Road and connected to an existing regional sanitary manhole MH#2A located within road allowance of Winchester Drive.

8.3 WATER

1. The estimated water consumption of approximately 0.09 L/s with a peak hourly demand of 0.27 L/s will be required to service proposed development with domestic water.
2. The fire flow required for the proposed development is estimated at 66.67 L/s for 4 hours, delivered with a residual pressure of not less then 140 kilopascals.
3. This development application proposes to remove existing domestic water service and provide a new 200mmØ fire and domestic combine water service from the existing municipal infrastructure of 300mm dia watermain located within the road allowance of Winchester Drive.
4. The propose water service shall be constructed within a private easement provided on future industrial development site located at 4598 Tomken Road and connected to an existing regional watermain in proximity to an existing sanitary manhole MH#2A located within road allowance of Winchester Drive.
5. The water service will split at property line into 100mmØ domestic water service and 200mmØ Fire service in accordance with the Region of Peel engineering design guidelines.
6. A flow and pressure test will be performed on the nearest hydrant to the site prior to building permit application to determine compliance with the minimum requirement for suppression outlined in the FUS.

We trust that this report satisfies the requirements of the City of Mississauga and Region of Peel with respect to the subject development. Should you have any questions, please feel free to contact the undersigned.

Yours truly,
FLORA DESIGNS INC.

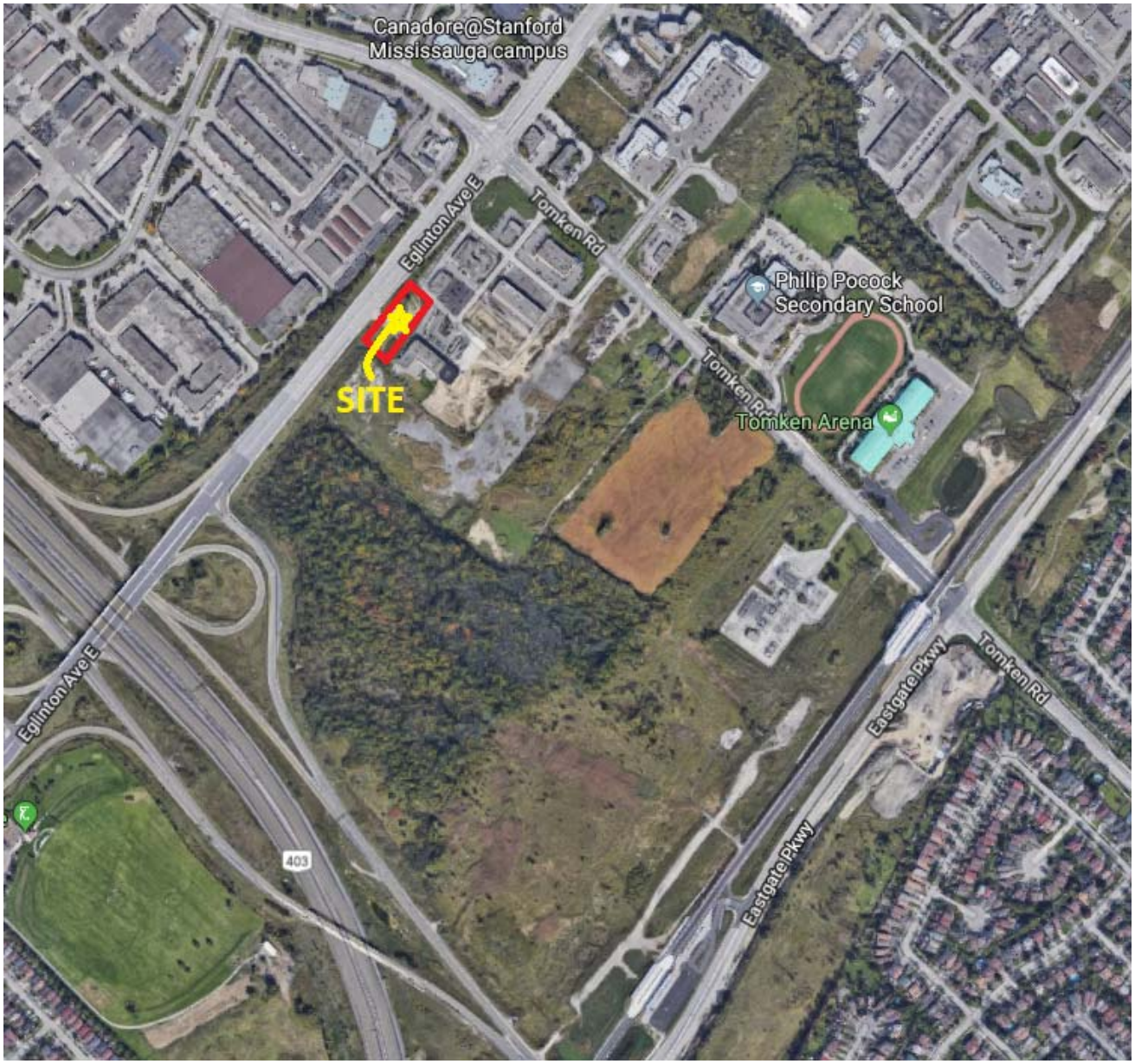
Chirag C. Patel, P.Eng, PMP
Senior Project Manager

Appendix "A" Plans

- Location Map
- Site Survey Drawing
- Architectural Site Plan
- Architectural Floor Plans
- Architectural Elevations
- Proposed Conceptual Servicing Plan

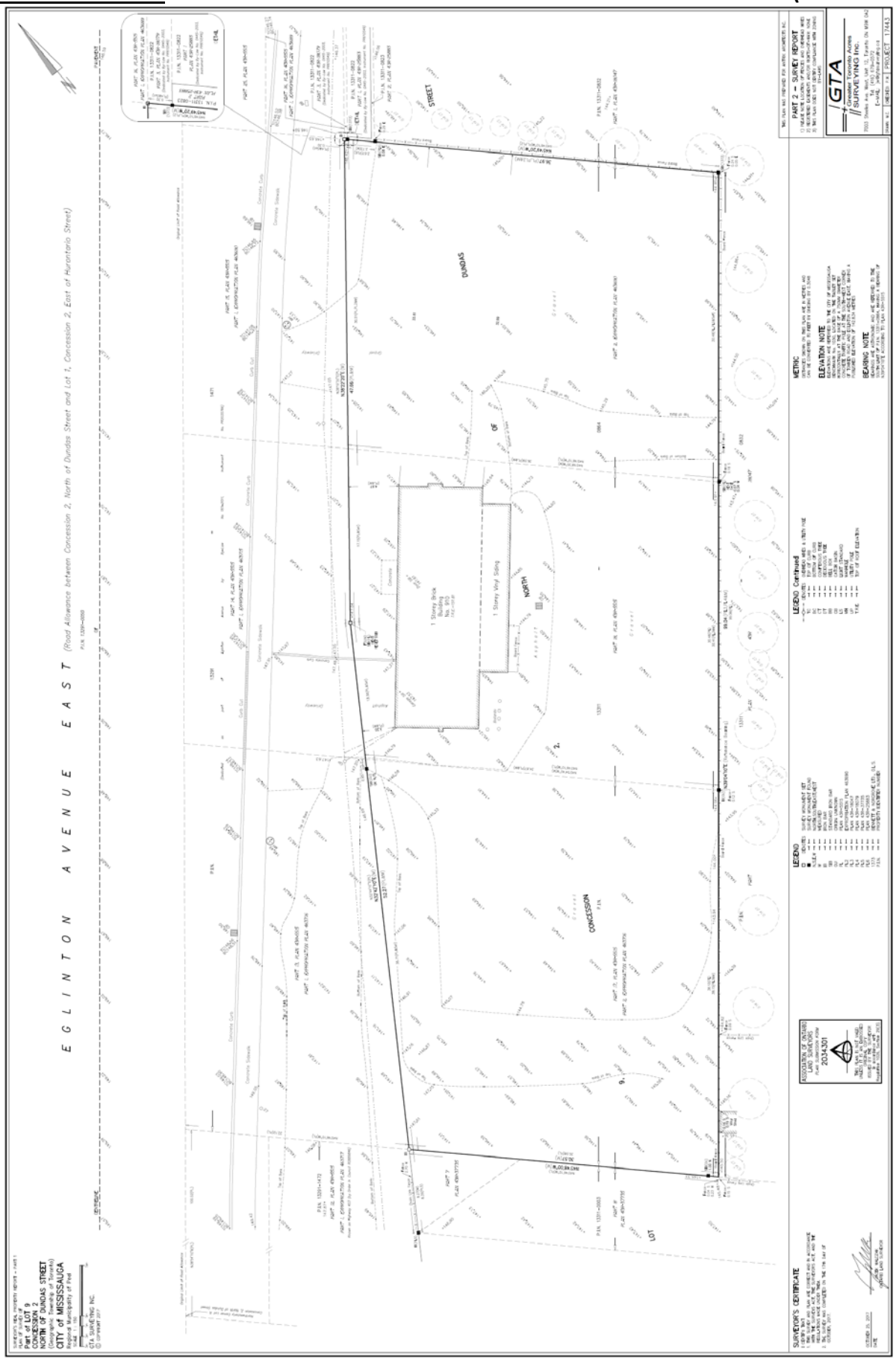
LOCATION MAP

(Not to Scale)



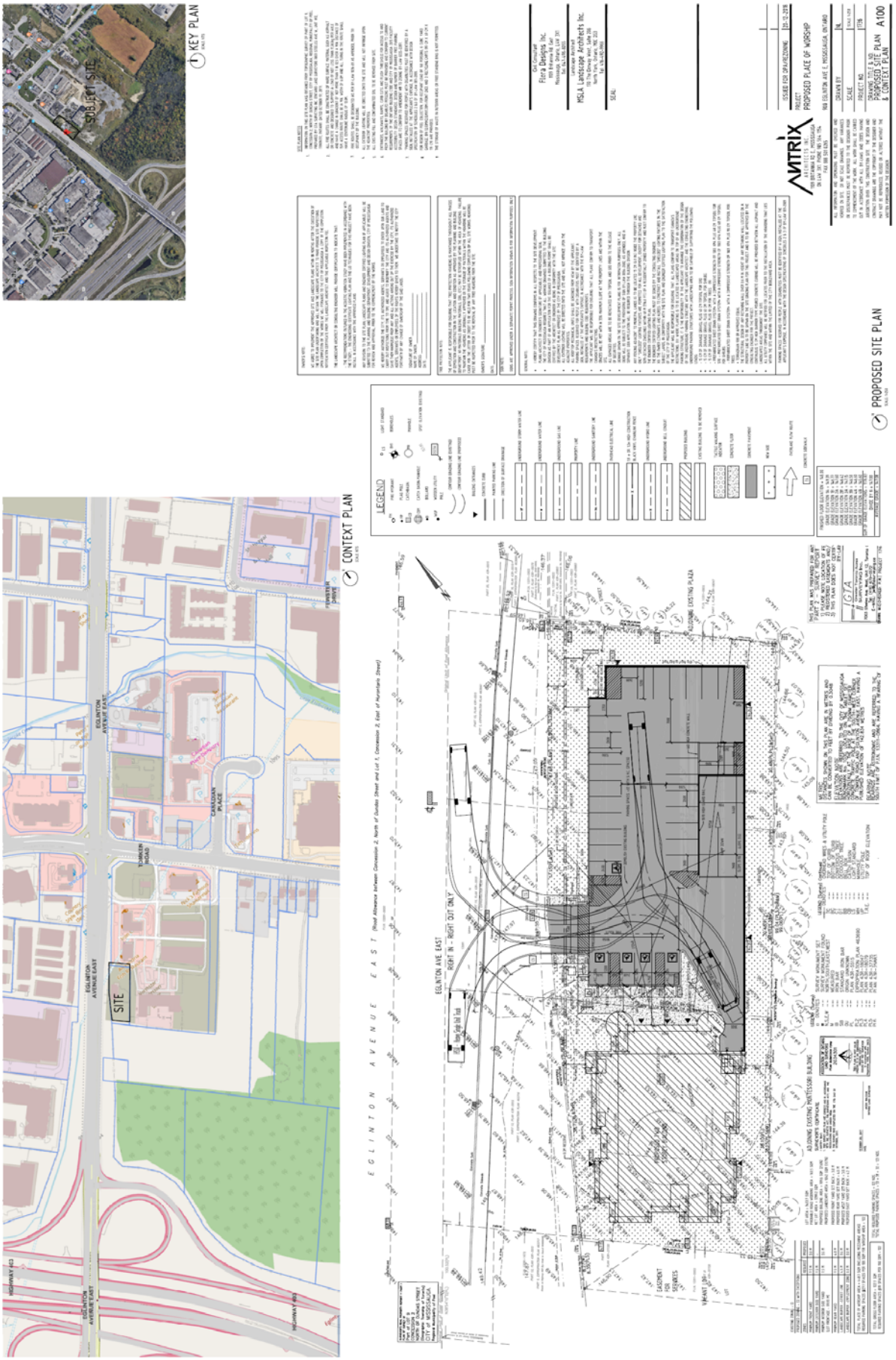
SITE SURVEY DRAWING

(Not to Scale)



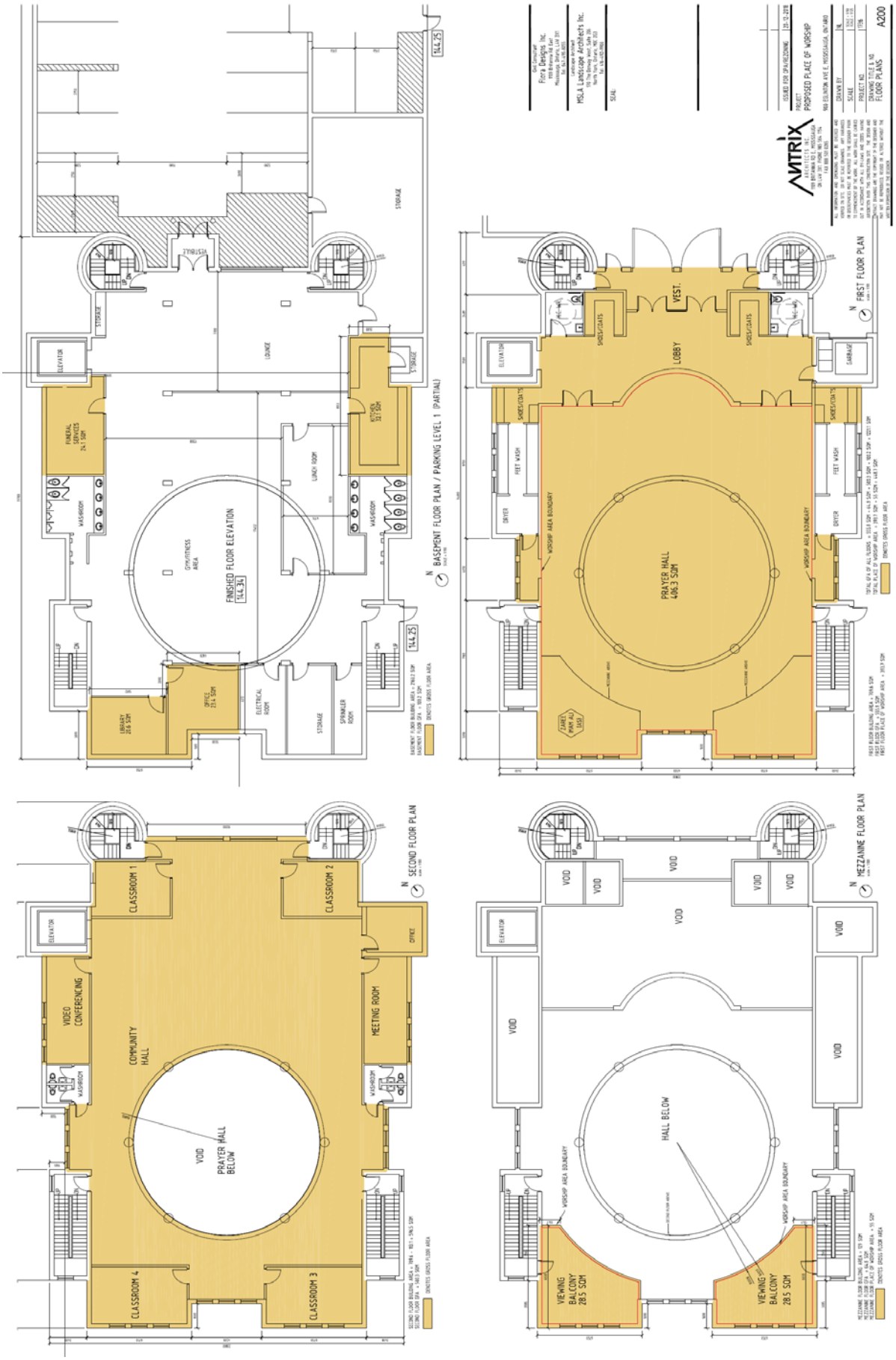
ARCHITECTURAL SITE PLAN

(Not to Scale)



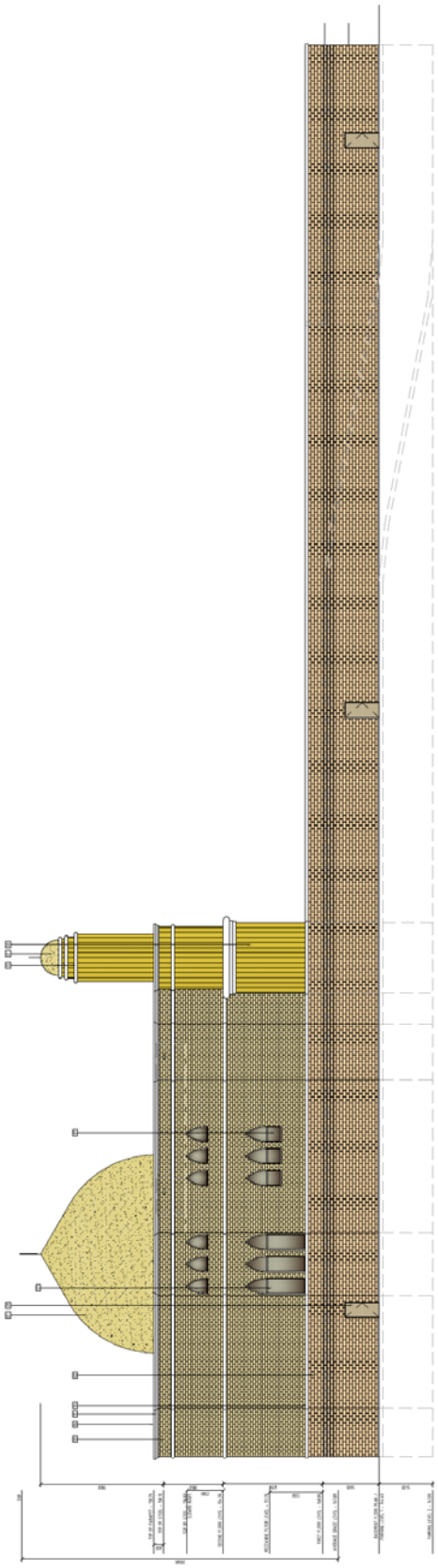
ARCHITECTURAL FLOOR PLANS

(Not to Scale)



ARCHITECTURAL ELEVATIONS

(Not to Scale)



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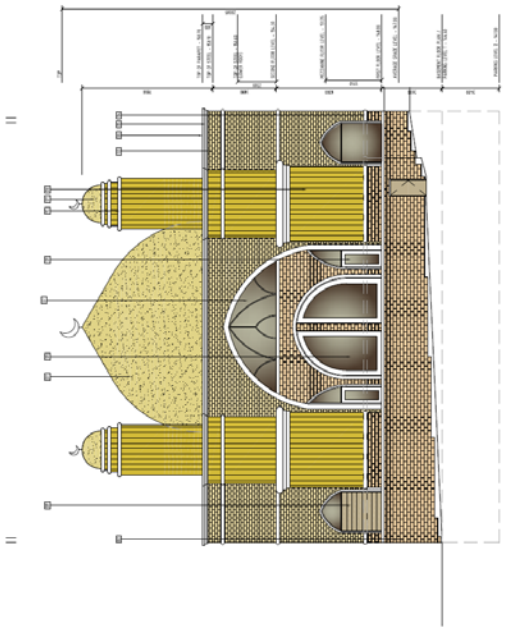
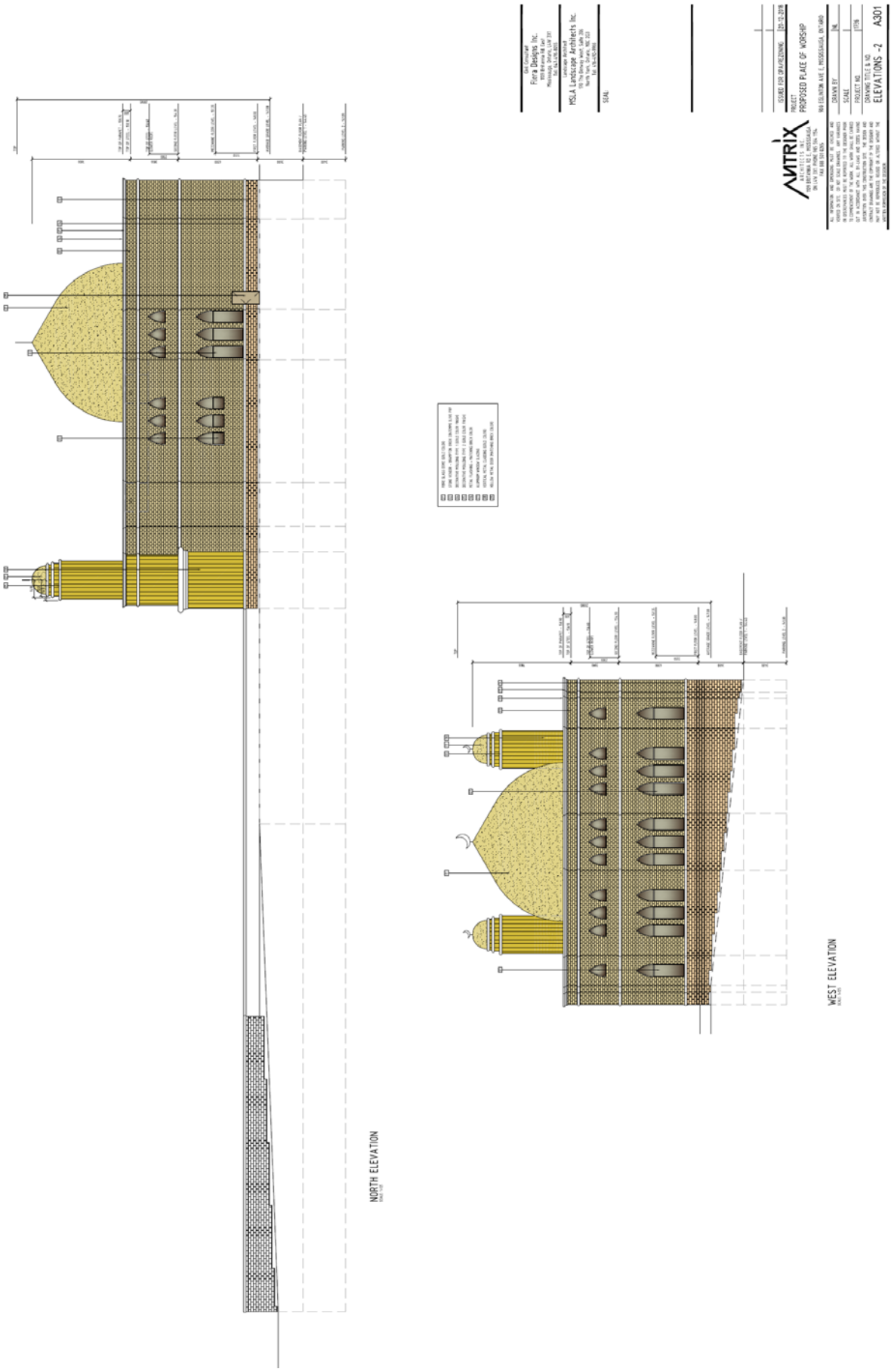
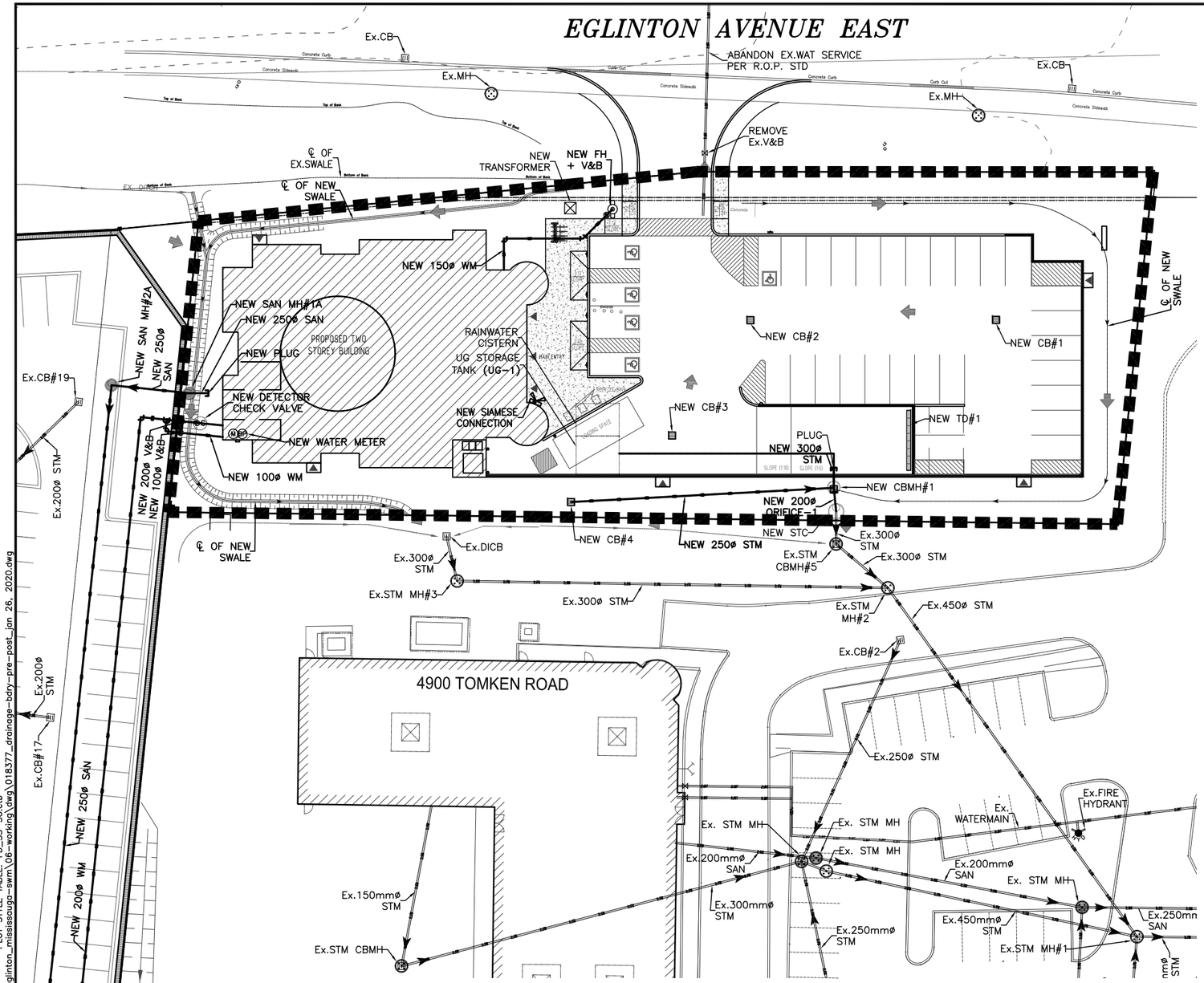


EAST ELEVATION


NORTH ELEVATION
WEST ELEVATION
MSLA Landscape Architects Inc.
ISSUED FOR OPA/REZONING
PROPOSED PLACE OF WORSHIP
ELEVATIONS - 2
A301



N
PROJECT NORTH
TRUE NORTH

LEGEND

- NEW MANHOLE
- EX. MANHOLE
- NEW CATCH BASIN
- EX. CATCH BASIN
- EX. FIRE HYDRANT
- NEW FIRE HYDRANT
- EX. WATER VALVE
- NEW WATER VALVE
- OVERLAND FLOW PATH
- RETAINING WALL
- DRAINAGE BOUNDARY
- SUB-CATCHMENT BOUNDARY
- CA-1 CATCHMENT AREA #
- Ex.SAN EX. SANITARY SEWER
- Ex.STM EX. STORM SEWER
- Ex.WAT EX. WATERMAIN
- STM NEW STORM SEWER
- SAN NEW SANITARY SEWER
- WAT NEW WATERMAIN

FLORA DESIGNS INC.
Complete civil engineering design solutions
1109 BRITANNIA ROAD EAST
MISSISSAUGA, ON L4W 3X1
PH:(647)496-8055 www.floradesigns.net

PROJECT:
PROPOSED PLACE OF WORSHIP
900 EGLINTON AVENUE EAST, MISSISSAUGA, ON

DRAWING TITLE:
PROPOSED CONCEPTUAL SERVICING PLAN

DATE	ISSUED
JAN 2019	.
JOB NUMBER	DRAWN BY
FD-018377	AT
SCALE	CHECKED BY
N.T.S.	CP
SHEET NUMBER	CSS-01

(11x17)

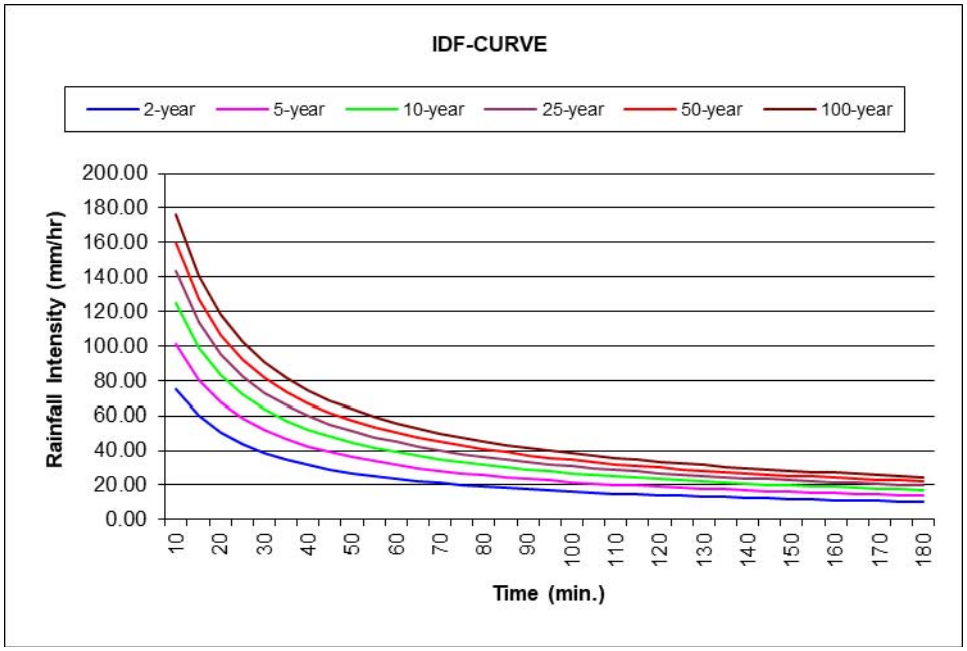
CREATED: Jan 20, 2019
DRAWING NAME: d:\flora_designs\project_work\018377_ontrix_900 eglinton_mississauga-swm\06-working\dwg\018377_drainage-bdry-pre-post_jan 26, 2020.dwg
MODIFIED: Jan 26, 2020
PLOT STYLE TABLE: FD_SS-SG.ctb

Appendix "B" Stormwater Management

- IDF Curve of City of Mississauga
- Runoff Coefficient Calculations
- Storm Drainage Plan – Adjoining Development – 4626 Tomken Road
- Storm Servicing Plan – Adjoining Development – 4900 Tomken Road
- Storm Sewer Design Sheet – Adjoining Development – 4900 Tomken Road
- Storm Drainage Plan – Adjoining Development – 4598 Tomken Road
- Pre-development Storm Drainage Plan
- Pre-development Peak Flow Calculations
- Post-development Storm Drainage Plan
- Post-development Sub-Catchment Area Plan
- Post-development Peak Flow Calculations
- Stag-Storage Calculations
- Post-development Site Flow and Storage Required Summary – 10-Year Storm
- Post-development Site Flow and Storage Required Summary – 100-Year Storm
- Orifice Rating Calculations
- Post-development External Storm Drainage Plan
- Post-Development Peak Flow Calculations – External Area Contributing to New Swale
- External Flow Conveyance Swale Capacity/Velocity Calculations For 100-Year Storm
- Proposed Storm Servicing Plan

IDF CURVE - CITY OF MISSISSAUGA (In accordance with Standard Drawing No.2111.010)

Parameters	Return Period					
	2-year	5-year	10-year	25-year	50-year	100-year
Coefficient (A)	610.00	820.00	1010.00	1160.00	1300.00	1450.00
Coefficient (B)	4.60	4.60	4.60	4.60	4.70	4.90
Exponent (C)	-0.78	-0.78	-0.78	-0.78	-0.78	-0.78



RUNOFF COEFFICIENT CALCULATIONS

Section 2.01.01.01, Development Requirements Manual 2016, City of Mississauga

Character of Surface	Runoff Coeff. "C"
Sodded Areas	0.25
Asphalt, Concrete, Roofs and Parking Lots	0.90

Pre-Development Drainage Area

Catchment #	Area (m^2)		Area (ha)		% Imp.	Runoff Coeff.
	Imp.	Total	Imp.	Total		
CA-1-Pre	2826.60	3453.65	0.28	0.35	81.84	0.78
TOTAL	**2826.60**	**3453.65**	**0.28**	**0.35**	**81.84**	**0.78**

Post-Development Drainage Area

Catchment #	Area (m^2)		Area (ha)		% Imp.	Runoff Coeff.
	Imp.	Total	Imp.	Total		
CA-1-Post	2252.59	3001.00	0.23	0.30	75.06	0.74
CA-2-Post	3.00	452.65	0.00	0.05	0.66	0.25
	2255.59	**3453.65**	**0.23**	**0.35**	**65.31**	**0.00**

Post-Development Sub-Catchment Areas of CA-1-Post

Inlet Location	Area (m^2)		Area (ha)		% Imp.	Runoff Coeff.
	Imp.	Total	Imp.	Total		
CB-1	432.58	432.58	0.04	0.04	100.00	0.90
CB-2	720.13	727.59	0.07	0.07	98.97	0.89
CB-3	250.05	250.05	0.03	0.03	100.00	0.90
CB-4	0.67	106.12	0.00	0.01	0.63	0.25
TD-1	125.49	125.49	0.01	0.01	100.00	0.90
ROOF-BLDG	709.58	709.58	0.07	0.07	100.00	0.90
CBMH-1	14.09	649.59	0.00	0.06	2.17	0.26
	2252.59	**3001.00**	**0.23**	**0.30**	**75.06**	**0.74**

Post-Development External Catchment Areas

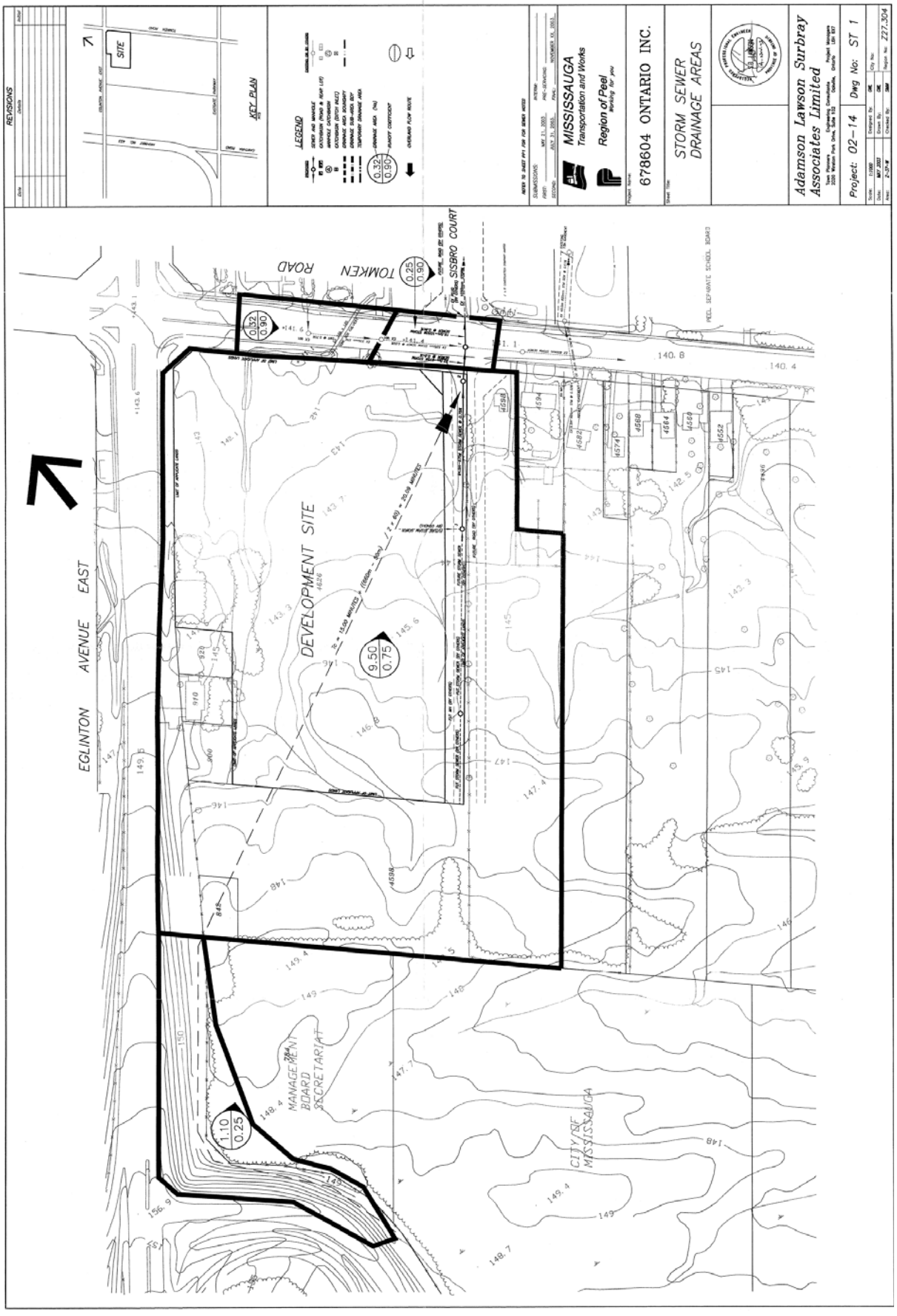
Inlet Location	Area (m^2)		Area (ha)		% Imp.	Runoff Coeff.
	Imp.	Total	Imp.	Total		
CA-101-Post	0.00	11024.00	0.00	1.10	0.00	0.25
CA-102-Post	0.00	3639.98	0.00	0.36	0.00	0.25
	0.00	**14663.98**	**0.00**	**1.47**	**0.00**	**0.25**

Runoff Coefficient (C)

C = 0.90 i + 0.25 (1 - i), Where i=Imperviousness Ratio

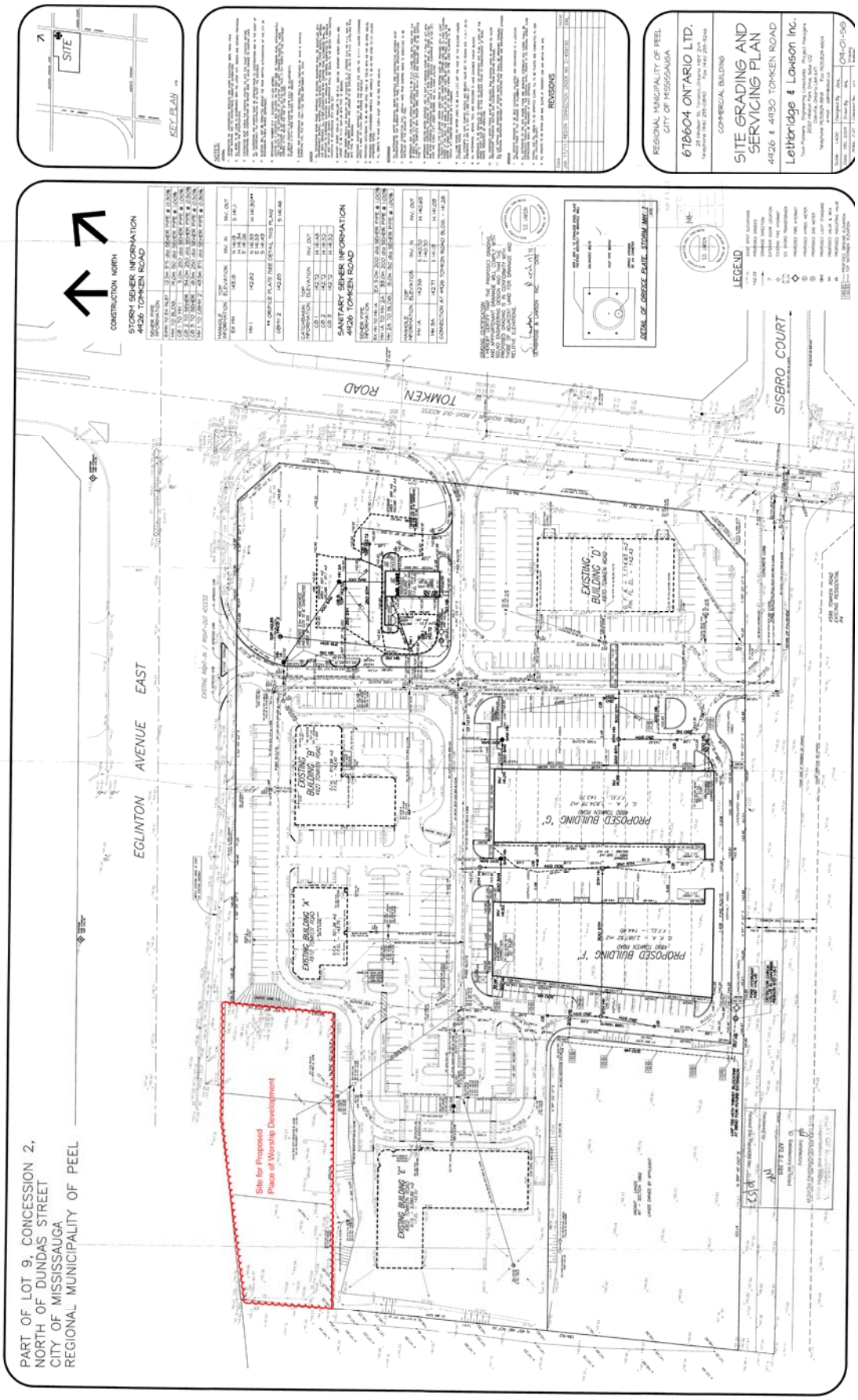
STORM DRAINAGE PLAN – ADJOINING DEVELOPMENT – 4626 TOMKEN ROAD (Not to Scale)

(Ref: Excerpts from design documents prepared by ALSAL)



STORM SERVICING PLAN – ADJOINING DEVELOPMENT – 4900 TOMKEN ROAD (Not to Scale)

(Ref: Excerpts from design documents prepared by LLI)



STORM SEWER DESIGN SHEET – ADJOINING DEVELOPMENT – 4900 TOMKEN ROAD

(Ref: Excerpts from design documents prepared by LLI)

DEVELOPMENT Northstar Montessori School
CONSULTANT Lethbridge Lawson Inc.
MAJOR DRAINAGE AREA Little Etobicoke Creek

CITY OF MISSISSAUGA
STORM SEWER DESIGN CALCULATIONS

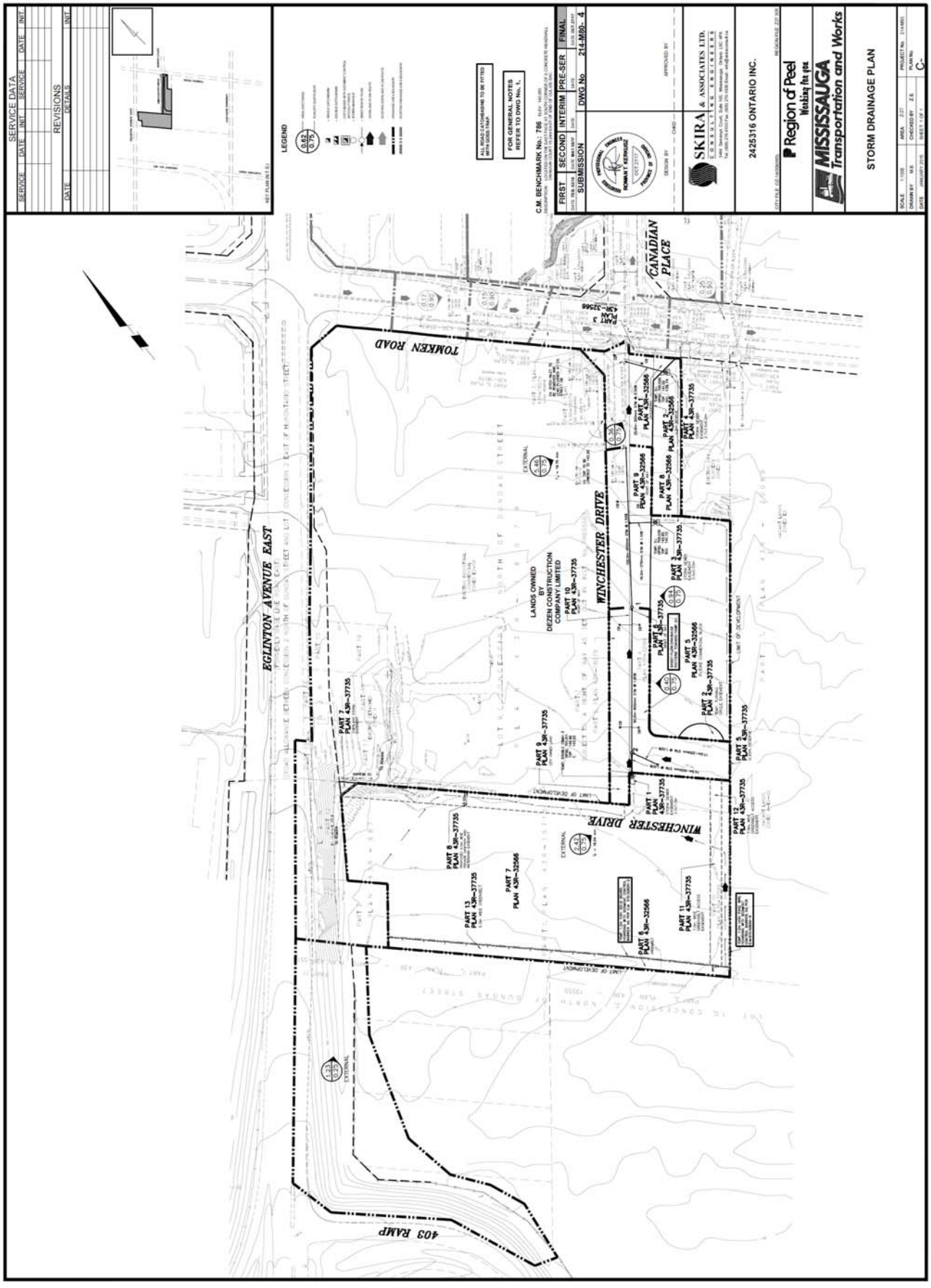
Return Period 10 Yr Storm | File No. | 06-27 | Sheet 1 of 1
Type of Pipe Concrete | Date | January 4, 2007
'n' factor 0.013 | By | GWL
ALS Location 06-27 | Revised

Location	MH	MH	Drainage Area	Run Off Coeff	Imp Area	Accum Drainage Area	Accum Imp Area	Time of Flow	Time of Entry	Time of Conc	Rainfall Intensity	Expected Flow l/s	Slope	Diameter	Length	Velocity	Capacity l/s	Upstream Invert	D'stream Invert	Time in Section	Remarks
	MHCB4	MH 1	0.268	0.75	0.201	0.268	0.201			15.00	99.17	55.810	1.20	300	59.0	1.51	110.416	143.16	142.45	0.65	
	CB 1	MH 1	0.122	0.75	0.092	0.122	0.092			15.00	99.17	25.406	1.00	250	1.5	1.22	61.982	143.15	143.13	0.02	
	CB 2	MH 1	0.047	0.75	0.035	0.047	0.035			15.00	99.17	9.788	1.90	250	34.0	1.69	85.436	143.15	142.50	0.34	
	CB 3	MH 1	0.072	0.75	0.054	0.072	0.054			15.00	99.17	14.994	2.65	250	24.5	1.99	100.899	143.15	142.50	0.21	
	MH 1	EX MH	0.000	0.75	0.000	0.509	0.382			15.65	96.67	103.336	2.90	450	30.5	3.08	506.145	142.30	141.42	0.16	
	PLUG	MHCB5	0.348	0.75	0.261	0.348	0.261			15.00	99.17	72.470	1.00	300	2.0	1.38	100.795	141.95	141.93	0.02	
	MHCB5	EX MH	0.050	0.75	0.038	0.398	0.299			15.02	99.07	82.803	1.00	600	7.0	2.19	640.158	141.90	141.83	0.05	

Record 15

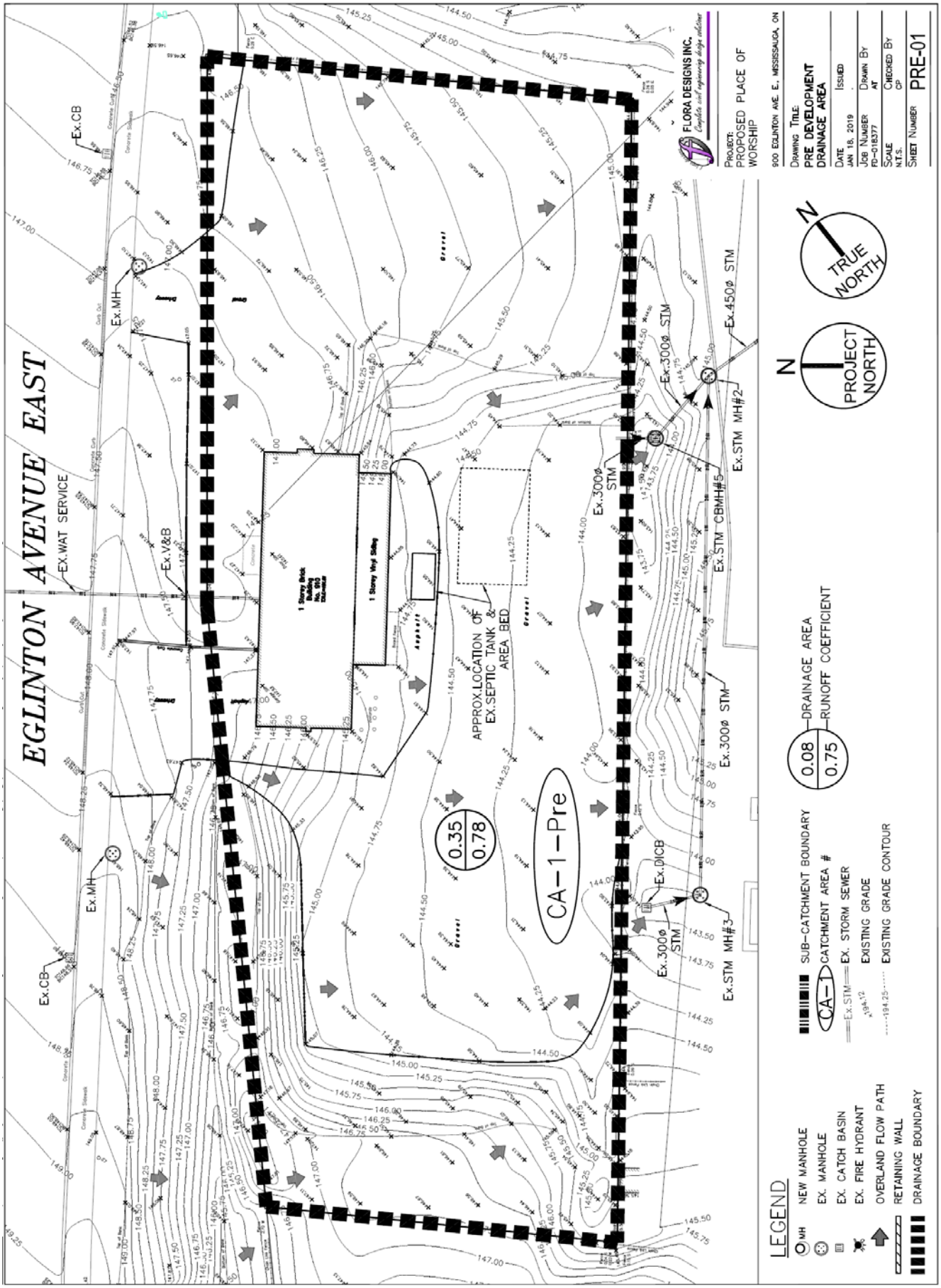
STORM DRAINAGE PLAN – ADJOINING DEVELOPMENT – 4598 TOMKEN ROAD (Not to Scale)

(Ref: Excerpts from design documents prepared by Skira)



PRE-DEVELOPMENT STORM DRAINAGE PLAN

(Not to Scale)



PRE-DEVELOPMENT PEAK FLOW CALCULATIONS

Catchment #	Drainage Area	Runoff Coefficient	Adjustment Factor " F "		Time of Concentration
	"A" in Hector	"C"	10-year	100-year	"Tc" in Minute
CA-1-Pre	0.35	0.50	1.00	1.25	15

Rational Method Calculation:

Q = 2.78 F C I A Where: Q = Design Flow (Liter/sec)
F = Adjustment Factor
C = Runoff Coefficient
I = Rainfall Intensity (mm/h)
A = Drainage Area (Hectors)

Event 10 yr

IDF Data Set, City of Mississauga

Coefficient, a =	1010.00
Coefficient, b =	4.60
Exponent, c =	-0.78

*(I) = a * (Tc + b)^c*

Catchment #	A (ha)	I (mm/h)	C	Q (L/s)	Q (m^3/s)
CA-1-Pre	0.35	99.17	0.50	47.61	0.048

Event 100 yr

IDF Data Set, City of Mississauga

Coefficient, a =	1450.00
Coefficient, b =	4.90
Exponent, c =	-0.78

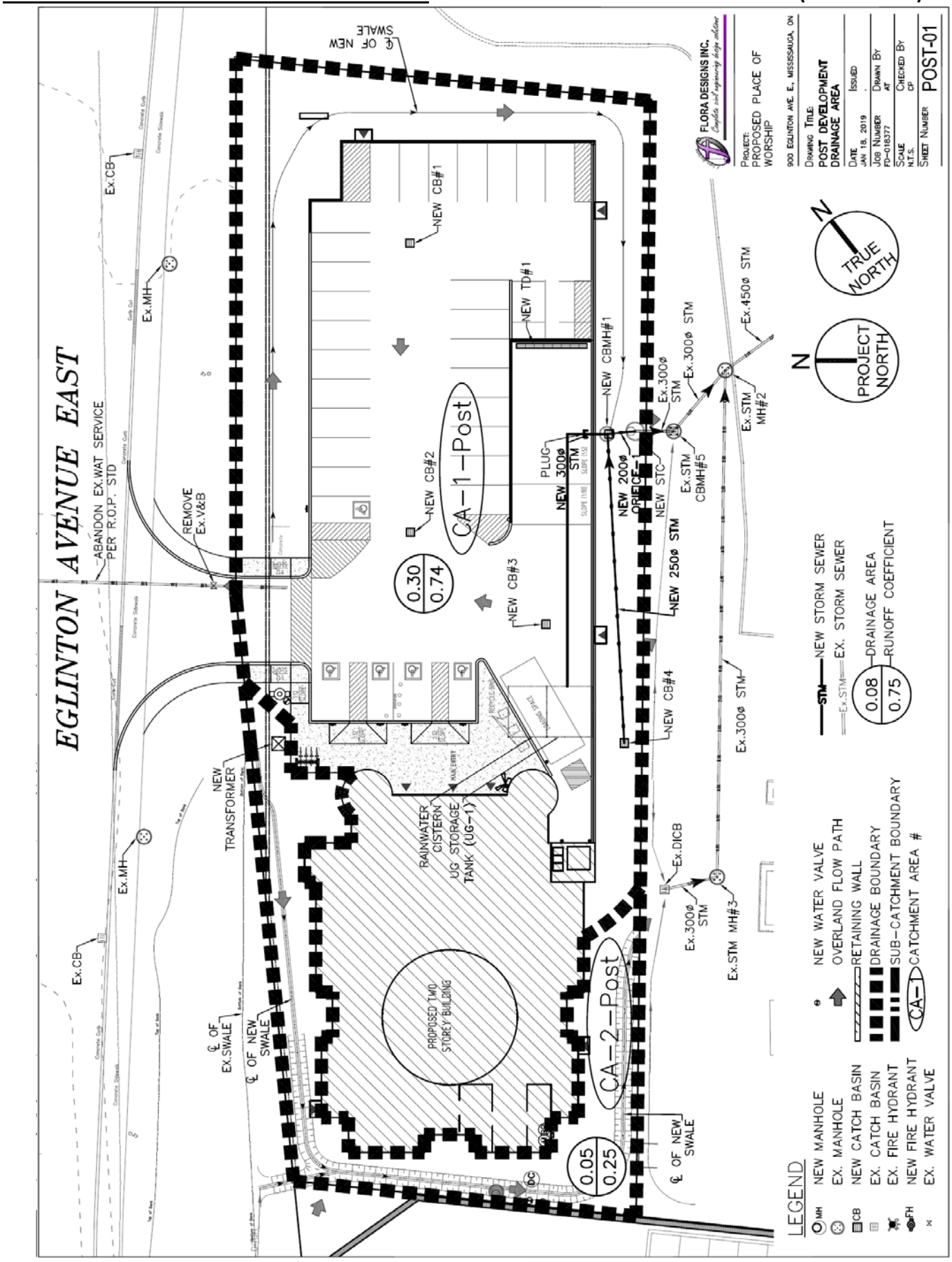
*(I) = a * (Tc + b)^c*

Catchment #	A (ha)	I (mm/h)	C	Q (L/s)	Q (m^3/s)
CA-1-Pre	0.35	140.69	0.50	84.42	0.084

NOTE: Maximum value of "C" used in calculating Pre-development peak runoff rate is limited to "0.5" (Section 2.01.01.01, Development Requirements Manual 2016)

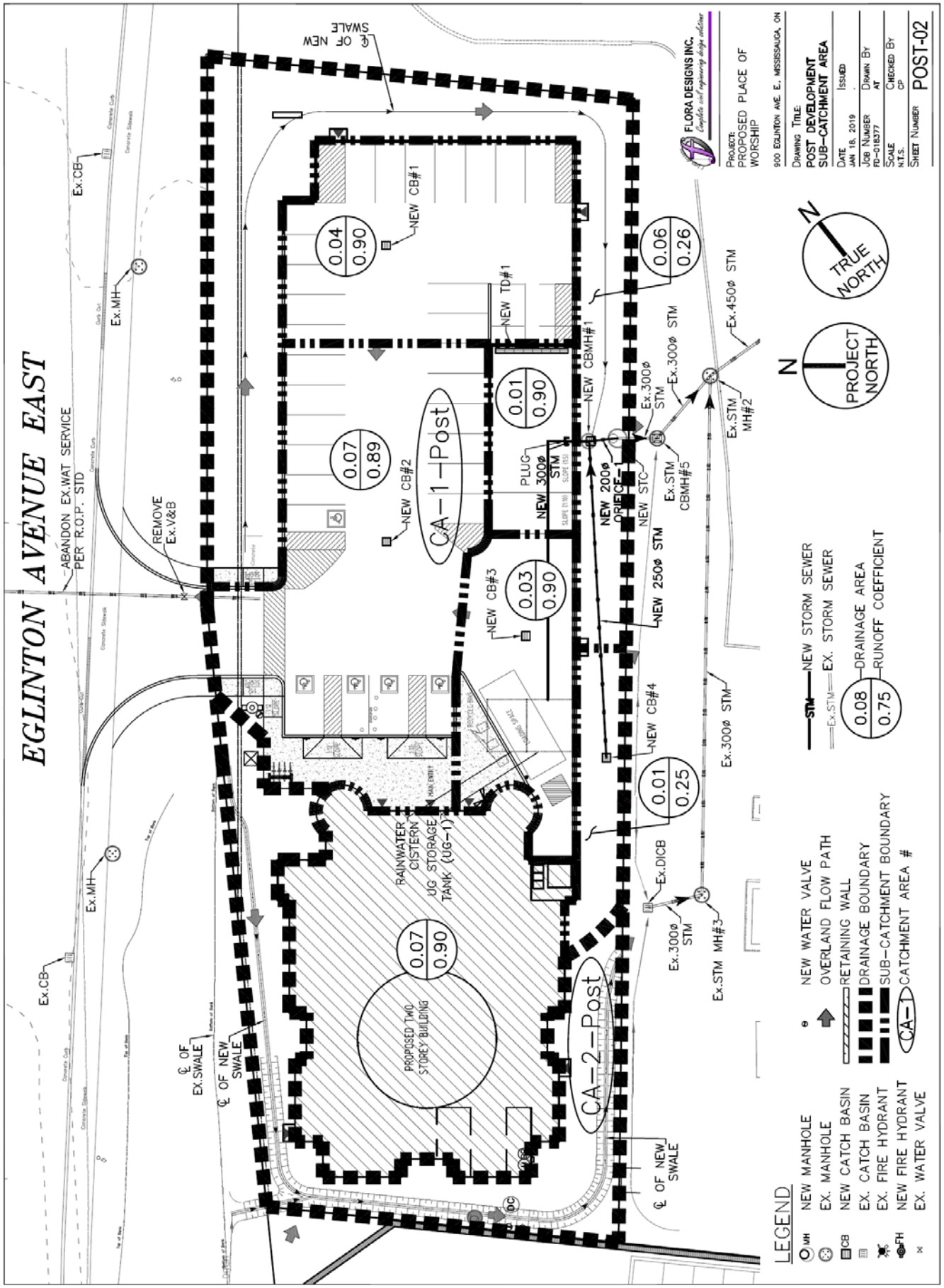
POST-DEVELOPMENT STORM DRAINAGE PLAN

(Not to Scale)



POST-DEVELOPMENT SUB-CATCHMENT AREA PLAN

(Not to Scale)



POST-DEVELOPMENT PEAK FLOW CALCULATIONS

Catchment #	Drainage Area	Runoff Coefficient	Adjustment Factor " F "		Time of Concentration
	"A" in Hector	"C"	**10-year**	**100-year**	"Tc" in Minute
CA-1-Post	0.30	0.74	1.00	1.25	15
CA-2-Post	0.05	0.25	1.00	1.25	15

Rational Method Calculation:

Q = 2.78 F C I A Where: Q = Design Flow (Liter/sec)
F = Adjustment Factor
C = Runoff Coefficient
I = Rainfall Intensity (mm/h)
A = Drainage Area (Hectors)

Event 10 yr

IDF Data Set, City of Mississauga

Coefficient, a =	1010.00
Coefficient, b =	4.60
Exponent, c =	-0.78

*(I) = a * (Tc + b)^c*

Catchment #	A (ha)	I (mm/h)	C	Q (L/s)	Q (m^3/s)
CA-1-Post	0.30	99.17	0.74	61.03	0.061
CA-2-Post	0.05	99.17	0.25	3.51	0.004

Event 100 yr

IDF Data Set, City of Mississauga

Coefficient, a =	1450.00
Coefficient, b =	4.90
Exponent, c =	-0.78

*(I) = a * (Tc + b)^c*

Catchment #	A (ha)	I (mm/h)	C	Q (L/s)	Q (m^3/s)
CA-1-Post	0.30	140.69	0.74	108.23	0.108
CA-2-Post	0.05	140.69	0.25	6.22	0.006

STAGE-STORGAE CALCULATIONS

Orifice Invert = 142.07
Stage = 143.00
Storage Depth = 0.93 m

CB & MH Storage:

ID	RIM Elevation (m)	INV Elevation (m)	Stage Elevation (m)	Water Depth (m)	Nominal MH Dia (mm)	MH Diameter (m)	Area (m^2)	Storage Volume (m^3)
CB-1	125.60	124.10	125.60	1.50	CB	N/A	0.36	0.54
CBMH-1	125.00	123.55	125.00	1.45	1200	1.22	1.17	1.69
Total CB & MH Storage Volume								**2.23**

Pipe Storage:

Pipe Dia. (m)	Pipe Length (m)	From				To				Storage Volume (m^3)
		ID	Invert Elevation (m)	Water Depth (m)	Area (m^2)	ID	Invert Elevation (m)	Water Depth (m)	Area (m^2)	
0.25	27.48	CB-1	142.29	0.25	0.05	CBMH-1	142.15	0.25	0.05	1.37
0.30	25.95	CBMH-1	142.15	0.30	0.07	Tank	142.25	0.30	0.07	1.82
Total Pipe Storage Volume										**3.19**

Surface Storage:

ID	RIM Elevation (m)	HWL (m)	Surface Area @ HWL (m^2)	Stage Elevation (m)	Ponding Depth (m)	Storage Volume (m^3)
CB-1	143.80	143.90	9.68	143.00	0.00	0.00
CBMH-1	143.75	143.90	18.91	143.00	0.00	0.00
Total Surface Storage Volume						**0.00**

UG Storage Tank:

ID	Top Elevation (m)	INV Elevation (m)	Depth (m)	Storage Volume (m^3)
UG-1	143.90	142.25	0.75	13.50
Total Tank Storage Volume				**13.50**

TOTAL STAGE STORAGE AT ELEVATION	143.00	=	18.92	m^3

Orifice Invert = 142.07
Stage = 143.75
Storage Depth = 1.68 m

CB & MH Storage:

ID	RIM Elevation (m)	INV Elevation (m)	Stage Elevation (m)	Water Depth (m)	Nominal MH Dia (mm)	MH Diameter (m)	Area (m^2)	Storage Volume (m^3)
CB-1	125.60	124.10	125.60	1.50	CB	N/A	0.36	0.54
CBMH-1	125.00	123.55	125.00	1.45	1200	1.22	1.17	1.69
Total CB & MH Storage Volume								**2.23**

Pipe Storage:

Pipe Dia. (m)	Pipe Length (m)	From				To				Storage Volume (m^3)
		ID	Invert Elevation (m)	Water Depth (m)	Area (m^2)	ID	Invert Elevation (m)	Water Depth (m)	Area (m^2)	
0.25	27.48	CB-1	142.29	0.25	0.05	CBMH-1	142.15	0.25	0.05	1.37
0.30	25.95	CBMH-1	142.15	0.30	0.07	Tank	142.25	0.30	0.07	1.82
Total Pipe Storage Volume										**3.19**

Surface Storage:

ID	RIM Elevation (m)	HWL (m)	Surface Area @ HWL (m^2)	Stage Elevation (m)	Ponding Depth (m)	Storage Volume (m^3)
CB-1	143.80	143.90	9.68	143.75	0.00	0.00
CBMH-1	143.75	143.90	18.91	143.75	0.00	0.00
Total Surface Storage Volume						**0.00**

ADS Sanitite UG Storage:

ID	Top Elevation (m)	INV Elevation (m)	Depth (m)	Storage Volume (m^3)
UG-1	143.90	142.25	1.50	27.00
Total Tank Storage Volume				**27.00**

TOTAL STAGE STORAGE AT ELEVATION	143.75	=	32.42	m^3

Orifice Invert = 142.07
Stage = 143.90
Storage Depth = 1.83 m

CB & MH Storage:

ID	RIM Elevation (m)	INV Elevation (m)	Stage Elevation (m)	Water Depth (m)	Nominal MH Dia (mm)	MH Diameter (m)	Area (m^2)	Storage Volume (m^3)
CB-1	125.60	124.10	125.60	1.50	CB	N/A	0.36	0.54
CBMH-1	125.00	123.55	125.00	1.45	1200	1.22	1.17	1.69
Total CB & MH Storage Volume								**2.23**

Pipe Storage:

Pipe Dia. (m)	Pipe Length (m)	From				To				Storage Volume (m^3)
		ID	Invert Elevation (m)	Water Depth (m)	Area (m^2)	ID	Invert Elevation (m)	Water Depth (m)	Area (m^2)	
0.25	27.48	CB-1	142.29	0.25	0.05	CBMH-1	142.15	0.25	0.05	1.37
0.30	25.95	CBMH-1	142.15	0.30	0.07	Tank	142.25	0.30	0.07	1.82
Total Pipe Storage Volume										**3.19**

Surface Storage:

ID	RIM Elevation (m)	HWL (m)	Surface Area @ HWL (m^2)	Stage Elevation (m)	Ponding Depth (m)	Storage Volume (m^3)
CB-1	143.80	143.90	9.68	143.90	0.10	0.48
CBMH-1	143.75	143.90	18.91	143.90	0.15	1.42
Total Surface Storage Volume						**1.90**

ADS Sanitite UG Storage:

ID	Top Elevation (m)	INV Elevation (m)	Depth (m)	Storage Volume (m^3)
UG-1	143.90	142.25	1.65	29.70
Total Tank Storage Volume				**29.70**

TOTAL STAGE STORAGE AT ELEVATION	**143.90**	**=**	**37.03**	**m^3**

Stage Storage Summary

Stage Elevation	Stage Storage Volume (m^3)				
	CB-MH	Pipe	Surface	UG-1	Total
143.00	2.23	3.19	0.00	13.50	**18.92**
143.75	2.23	3.19	0.00	27.00	**32.42**
143.90	2.23	3.19	1.90	29.70	**37.03**

POST-DEVELOPMENT SITE FLOW AND STORAGE REQUIRED SUMMARY - 10-YEAR STORM

Actual Release Rate (RR)	43.35	L/s
Actual Release Volume per 5-min. Interval	13.00	m^3

10-year Design Storm (I = a * (Tc + b)^c)

a =	1010.00
b =	4.60
c =	-0.78

Catchment #	CA-1-Post
Area (ha) =	0.30
C =	0.74
Adj. Factor (F) =	1.00

1	2	3	4	5	6
Time (min.)	**Rainfall Intensity (mm/hr)**	**Storm Runoff (m^3/s)**	**Storm Runoff Volume (m^3)**	**Released Volume (m^3)**	**Storage Volume (m^3)**
	(2)=a*((1)+b)^c	(3)=[(2)*A*F*C]/360	(4)=(3)*(1)*60	(5)=(RR)*(1)*60	(6)=(4)-(5)
15	99.17	0.061	54.88	39.01	**15.87**
20	83.06	0.051	61.29	52.02	9.27
25	71.90	0.044	66.32	65.02	1.29
30	63.66	0.039	70.46	78.03	0.00
35	57.30	0.035	73.99	91.03	0.00
40	52.22	0.032	77.07	104.04	0.00
45	48.07	0.030	79.80	117.04	0.00
50	44.60	0.027	82.27	130.04	0.00
55	41.65	0.026	84.52	143.05	0.00
60	39.11	0.024	86.59	156.05	0.00
65	36.91	0.023	88.50	169.06	0.00
70	34.96	0.021	90.29	182.06	0.00
75	33.24	0.020	91.97	195.07	0.00
80	31.69	0.019	93.55	208.07	0.00
85	30.31	0.019	95.04	221.07	0.00
90	29.05	0.018	96.46	234.08	0.00
95	27.90	0.017	97.81	247.08	0.00
100	26.86	0.017	99.10	260.09	0.00
105	25.90	0.016	100.33	273.09	0.00
110	25.01	0.015	101.51	286.10	0.00
115	24.19	0.015	102.65	299.10	0.00
120	23.43	0.014	103.74	312.11	0.00
125	22.72	0.014	104.80	325.11	0.00
130	22.06	0.014	105.82	338.11	0.00
135	21.44	0.013	106.81	351.12	0.00
140	20.86	0.013	107.77	364.12	0.00
145	20.32	0.012	108.69	377.13	0.00
150	19.80	0.012	109.60	390.13	0.00
155	19.32	0.012	110.47	403.14	0.00
160	18.86	0.012	111.33	416.14	0.00
165	18.42	0.011	112.16	429.15	0.00
170	18.01	0.011	112.96	442.15	0.00
175	17.62	0.011	113.75	455.15	0.00
180	17.24	0.011	114.52	468.16	0.00

POST-DEVELOPMENT SITE FLOW AND STORAGE REQUIRED SUMMARY - 100-YEAR STORM

Actual Release Rate (RR)	71.40	L/s
Actual Release Volume per 5-min. Interval	21.42	m^3

100-year Design Storm (I = a * (Tc + b)^c)

a =	1450.00
b =	4.90
c =	-0.78

Catchment #	CA-1-Post
Area (ha) =	0.30
C =	0.74
Adj. Factor (F) =	1.25

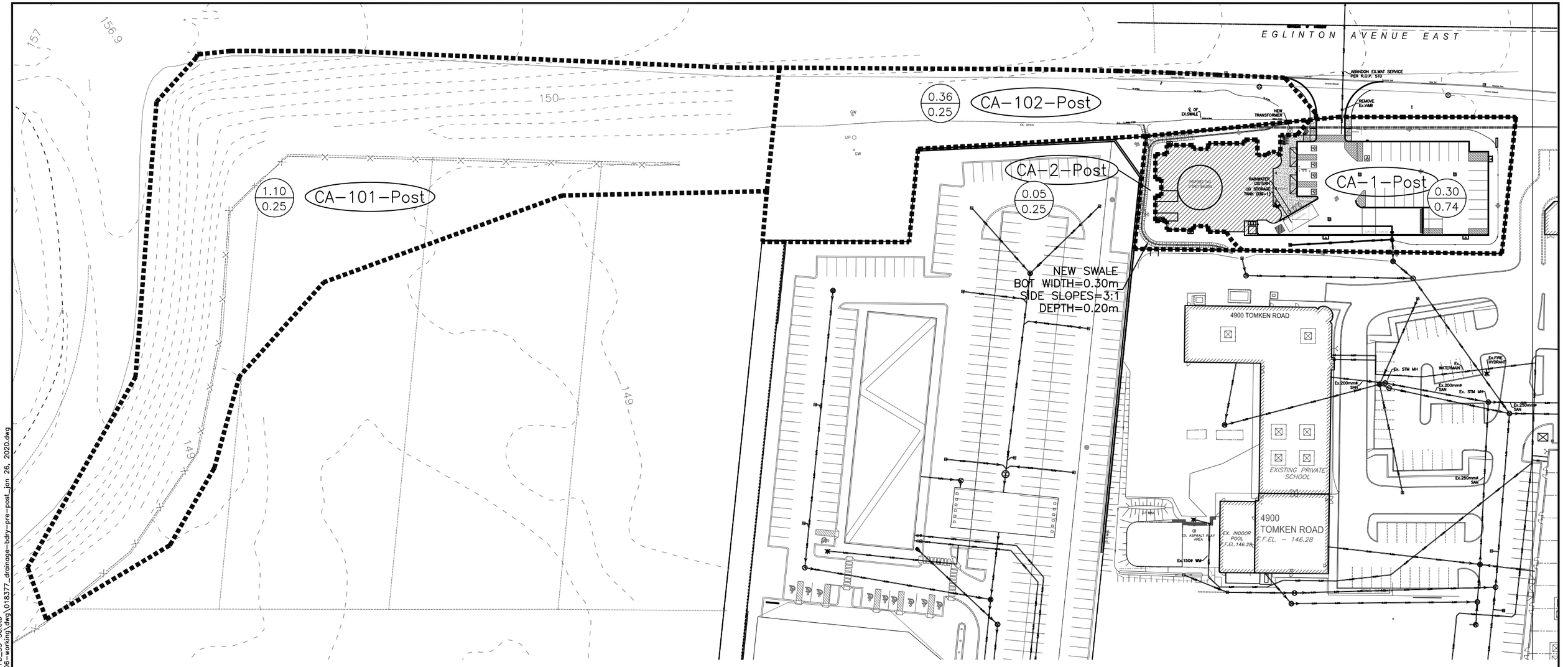
1	2	3	4	5	6
Time (min.)	**Rainfall Intensity (mm/hr)**	**Storm Runoff (m^3/s)**	**Storm Runoff Volume (m^3)**	**Released Volume (m^3)**	**Storage Volume (m^3)**
	(2)=a*((1)+b)^c	(3)=[(2)*A*F*C]/360	(4)=(3)*(1)*60	(5)=(RR)*(1)*60	(6)=(4)-(5)
15	140.69	0.108	97.33	64.26	**33.07**
20	118.12	0.091	108.95	85.68	23.27
25	102.41	0.079	118.08	107.10	10.98
30	90.77	0.070	125.59	128.52	0.00
35	81.77	0.063	131.99	149.94	0.00
40	74.58	0.057	137.58	171.36	0.00
45	68.68	0.053	142.54	192.78	0.00
50	63.75	0.049	147.01	214.20	0.00
55	59.56	0.046	151.08	235.62	0.00
60	55.95	0.043	154.83	257.04	0.00
65	52.81	0.041	158.29	278.46	0.00
70	50.03	0.038	161.53	299.88	0.00
75	47.58	0.037	164.56	321.30	0.00
80	45.38	0.035	167.41	342.72	0.00
85	43.39	0.033	170.11	364.14	0.00
90	41.60	0.032	172.67	385.56	0.00
95	39.97	0.031	175.11	406.98	0.00
100	38.47	0.030	177.44	428.40	0.00
105	37.10	0.029	179.66	449.82	0.00
110	35.84	0.028	181.80	471.24	0.00
115	34.66	0.027	183.85	492.66	0.00
120	33.58	0.026	185.83	514.08	0.00
125	32.57	0.025	187.73	535.50	0.00
130	31.62	0.024	189.57	556.92	0.00
135	30.73	0.024	191.36	578.34	0.00
140	29.90	0.023	193.08	599.76	0.00
145	29.12	0.022	194.75	621.18	0.00
150	28.39	0.022	196.38	642.60	0.00
155	27.69	0.021	197.96	664.02	0.00
160	27.04	0.021	199.50	685.44	0.00
165	26.41	0.020	200.99	706.86	0.00
170	25.82	0.020	202.45	728.28	0.00
175	25.26	0.019	203.87	749.70	0.00
180	24.73	0.019	205.26	771.12	0.00

ORIFICE RATING CALCULATIONS

Orifice-1 (At Outlet of CBMH-1)

Orifice Plate Diameter, D_O =	160	mm
Orifice Invert =	142.07	m
Orifice Coefficient, C =	0.63	
Orifice sectional area, A_O =	0.02010	m^2
Elev at Centre of Orifice =	142.15	m
Acceleration due to gravity, g =	9.81	m/s^2

Stage Elevation (m)	Head (m)	Storage Provided (m^3)	Orifice Flow (m^3/s)
142.07	0.00	0.00	0.000
143.00	0.85	18.92	0.052
143.75	1.60	32.42	0.071
143.90	1.75	37.03	0.074



LEGEND

- NEW MANHOLE
- EX. MANHOLE
- NEW CATCH BASIN
- EX. CATCH BASIN
- EX. FIRE HYDRANT
- NEW FIRE HYDRANT
- EX. WATER VALVE
- NEW WATER VALVE
- OVERLAND FLOW PATH
- RETAINING WALL
- DRAINAGE BOUNDARY
- SUB-CATCHMENT BOUNDARY
- CA-1 CATCHMENT AREA #
- STM NEW STORM SEWER
- Ex.STM EX. STORM SEWER
- 0.08 / 0.75 DRAINAGE AREA / RUNOFF COEFFICIENT

N PROJECT NORTH

N TRUE NORTH

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PROJECT:
PROPOSED PLACE OF WORSHIP

900 EGLINTON AVENUE EAST, MISSISSAUGA, ON

DRAWING TITLE:
POST DEVELOPMENT EXTERNAL DRAINAGE AREA

DATE	ISSUED
JAN 2019	.
JOB NUMBER	DRAWN BY
FD-018377	AT
SCALE	CHECKED BY
N.T.S.	CP
SHEET NUMBER	POST-03

(11x17)

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MODIFIED: Jan 26, 2020
PLOT STYLE TABLE: FD_SS-SG.ctb

POST-DEVELOPMENT PEAK FLOW CALCULATIONS – EXTERNAL AREA CONTRIBUTING TO NEW SWALE

Catchment #	Drainage Area	Runoff Coefficient	Adjustment Factor " F "		Time of Concentration
	"A" in Hector	"C"	**10-year**	**100-year**	"Tc" in Minute
CA-101-Post	1.10	0.25	1.00	1.25	15
CA-102-Post	0.36	0.25	1.00	1.25	15
CA-2-Post	0.05	0.25	1.00	1.25	15

Rational Method Calculation:

Q = 2.78 F C I A Where: Q = Design Flow (Liter/sec)
F = Adjustment Factor
C = Runoff Coefficient
I = Rainfall Intensity (mm/h)
A = Drainage Area (Hectors)

Event 10 yr

IDF Data Set, City of Mississauga

Coefficient, a =	1010.00
Coefficient, b =	4.60
Exponent, c =	-0.78

*(I) = a * (Tc + b)^c*

Catchment #	A (ha)	I (mm/h)	C	Q (L/s)	Q (m^3/s)
CA-101-Post	1.10	99.17	0.25	75.81	0.076
CA-102-Post	0.36	99.17	0.25	24.81	0.025
CA-2-Post	0.05	99.17	0.25	3.51	0.004
	TOTAL			**104.13**	**0.105**

Event 100 yr

IDF Data Set, City of Mississauga

Coefficient, a =	1450.00
Coefficient, b =	4.90
Exponent, c =	-0.78

*(I) = a * (Tc + b)^c*

Catchment #	A (ha)	I (mm/h)	C	Q (L/s)	Q (m^3/s)
CA-101-Post	1.10	140.69	0.25	134.45	0.134
CA-102-Post	0.36	140.69	0.25	44.00	0.044
CA-2-Post	0.05	140.69	0.25	6.22	0.006
	TOTAL			**184.66**	**0.184**

EXTERNAL FLOW CONVEYANCE SWALE CAPACITY/VELOCITY CALCULATIONS FOR 100-YEAR STORM

Swale Capacity Q =	**$1/n * A * R^{2/3} * S^{1/2}$**	
Where, n =	Manning's Roughness Coefficient	
R =	Hydraulic Radius (m) = Area/Wetted Perimeter	
S =	Longitudinal Slope (m/m)	
A =	Cross Sectional Area of Flow (m^2)	

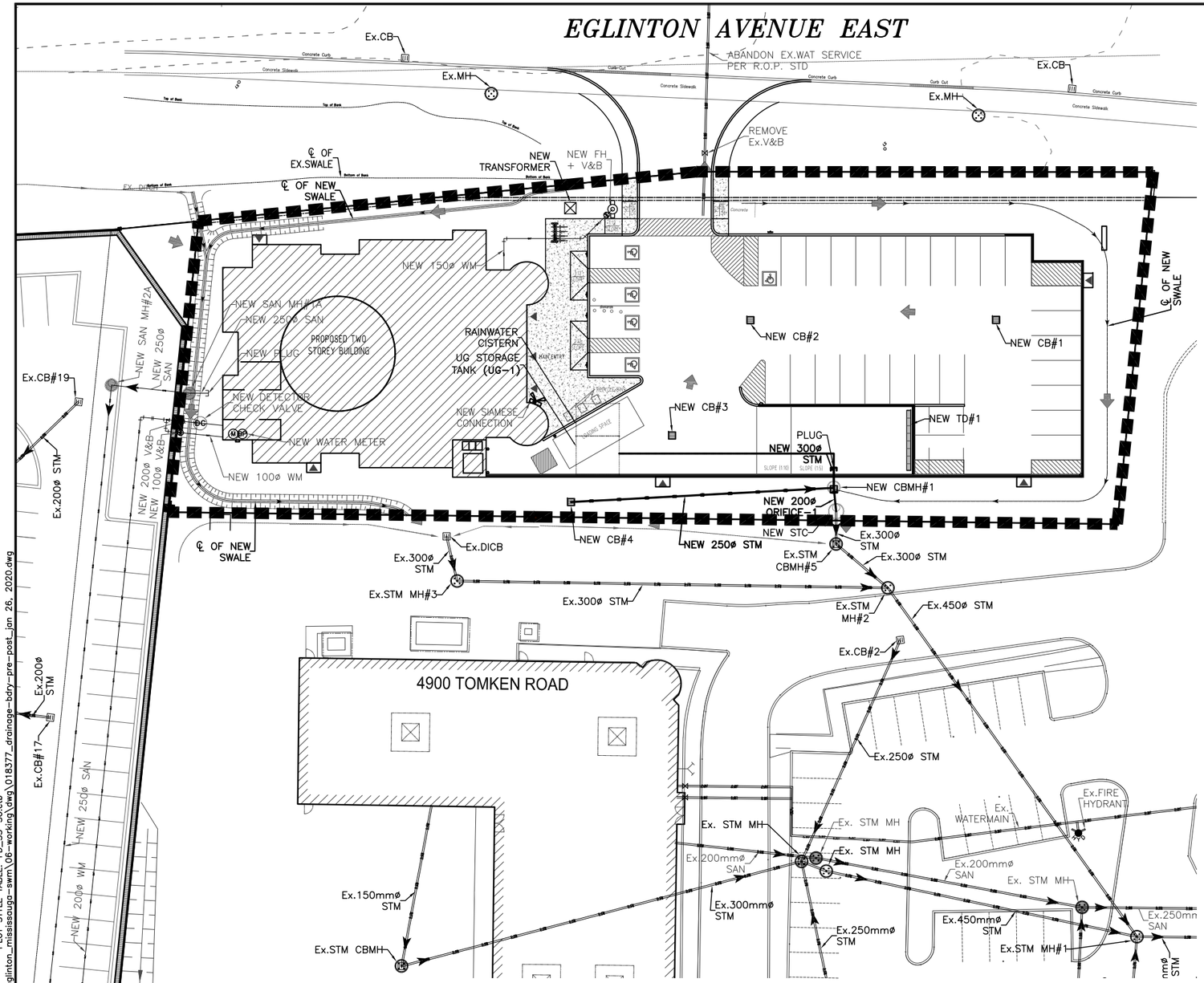
Swale Bottom Width =	0.3	m	
Left Side Slopes (X:1) =	3.0	to 1	
Right Side Slopes (X:1) =	3.0	to 1	
Flow Depth =	**0.200**	m	
Manning's N =	0.03	For	Weedy Surface
Longitudinal Slope (%) =	1.85	%	

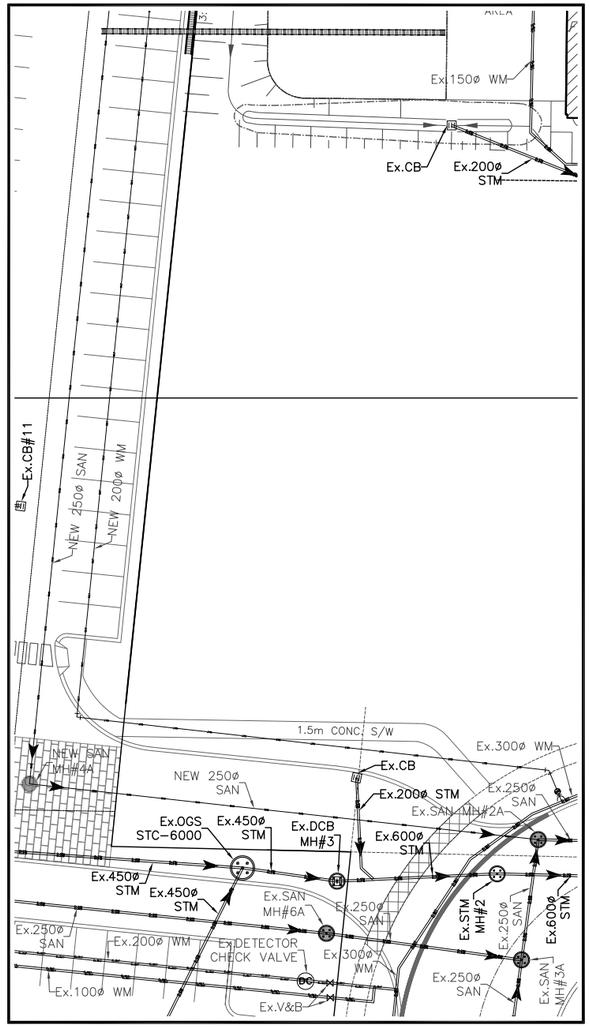
Calculated Results

Top Width of Water =	1.500	m	
Area =	0.180	m^2	
Wetted Perimeter =	1.565	m	

Swale Capacity - Q_{peak} =	**0.193**	m^3/s	(100-Year Storm)
Peak Velocity =	**1.07**	m/s	

Actual Flow - Q_{actual} =	**0.184**	m^3/s	(100-Year Storm)





N
PROJECT NORTH
TRUE NORTH

LEGEND

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- EX. MANHOLE
- NEW CATCH BASIN
- EX. CATCH BASIN
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PROJECT:
PROPOSED PLACE OF WORSHIP
900 EGLINTON AVENUE EAST, MISSISSAUGA, ON

DRAWING TITLE:
PROPOSED STORM SERVICING PLAN

DATE	ISSUED
JAN 2019	.
JOB NUMBER	DRAWN BY
FD-018377	AT
SCALE	CHECKED BY
N.T.S.	CP
SHEET NUMBER	STM-01

(11x17)

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Appendix "C" Sanitary Drainage System

- Population Density Calculations
- Proposed Sanitary Flow Calculations
- Proposed Sanitary Sewer Design Calculations
- Sanitary Drainage Plan – Adjoining Development – 4598 Tomken Road
- Proposed Sanitary Servicing Plan

POPULATION DENSITY CALCULATIONS

Post-development population density

(According to the Sanitary Sewer Design Criteria Manual, Region of Peel, March 2017)

Development Type	Equivalent population density (Persons/ha)	Area of Site (ha)	Population (Persons)
Light Industrial	70	0.35	25

PROPOSED SANITARY FLOW CALCULATIONS

(According to the Sanitary Sewer Design Criteria Manual, Region of Peel, March 2017)

According to Standard Drawing 2-9-2

Domestic Sewage Flow for less than 1000 persons	0.013	m^3/sec
Infiltration Allowance (I) =	0.0002	m^3/ha. Sec
Gross Area of Site (ha) =	0.35	ha

Design Flow

Design Flows (Q) =	Based on Equivalent Population	+	Infiltration Allowance (I)

Design Flows (Q) =	**0.0131**	**m^3/sec**
	13.07	**L/sec**

PROPOSED SANITARY SEWER DESIGN CALCULATIONS

Pipe Capacity Q =	**$1/n * A * R^{2/3} * S^{1/2}$**

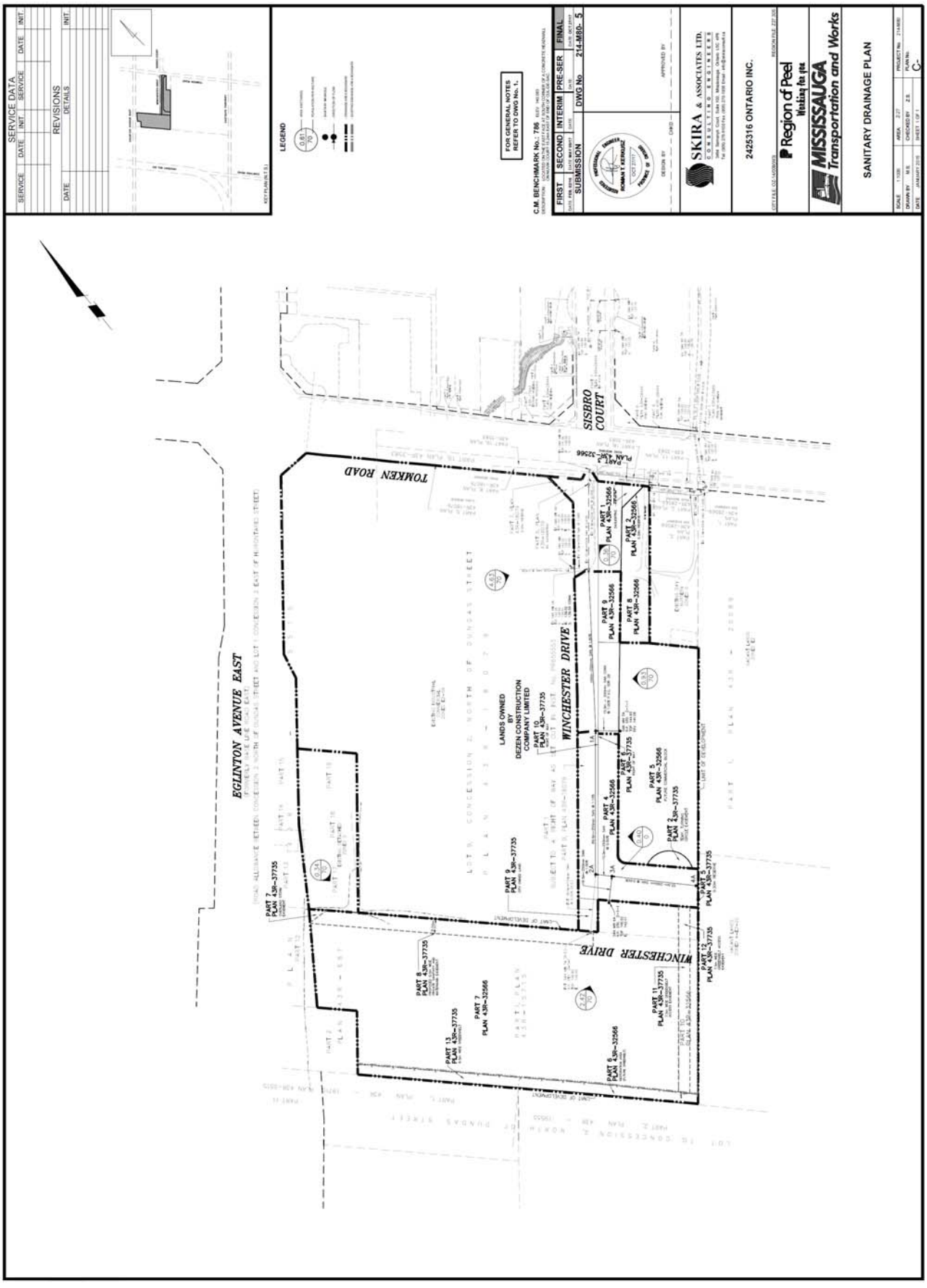
Where:
n = Manning's Roughness Coeff. (For PVC Pipe = 0.013)
R = Hydraulic Radius (m) = Area/Wetted Perimeter
S = Slope (m/m)
A = Cross Sectional Area of Flow (m^2)

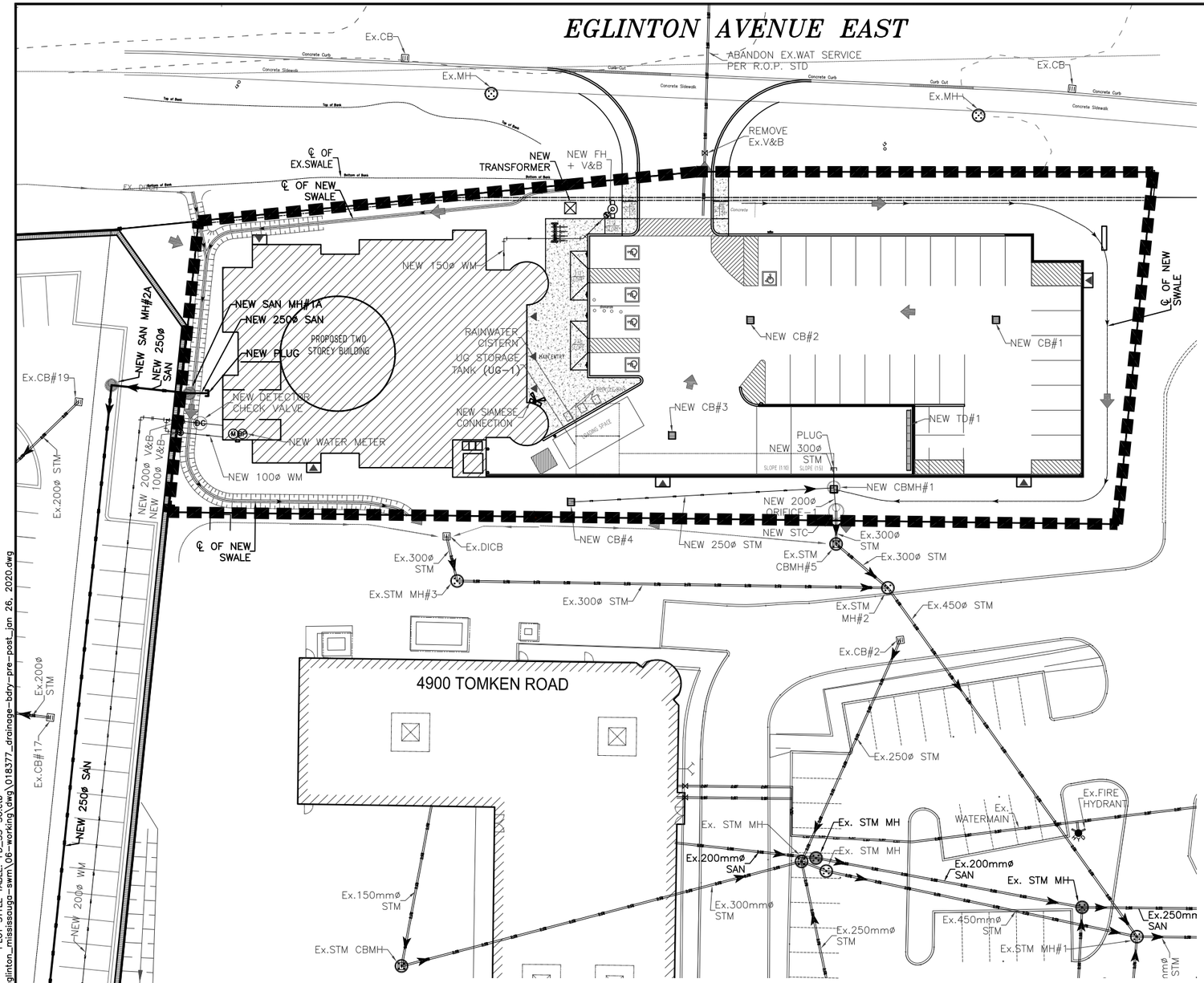
Sanitary Sewer Capacities

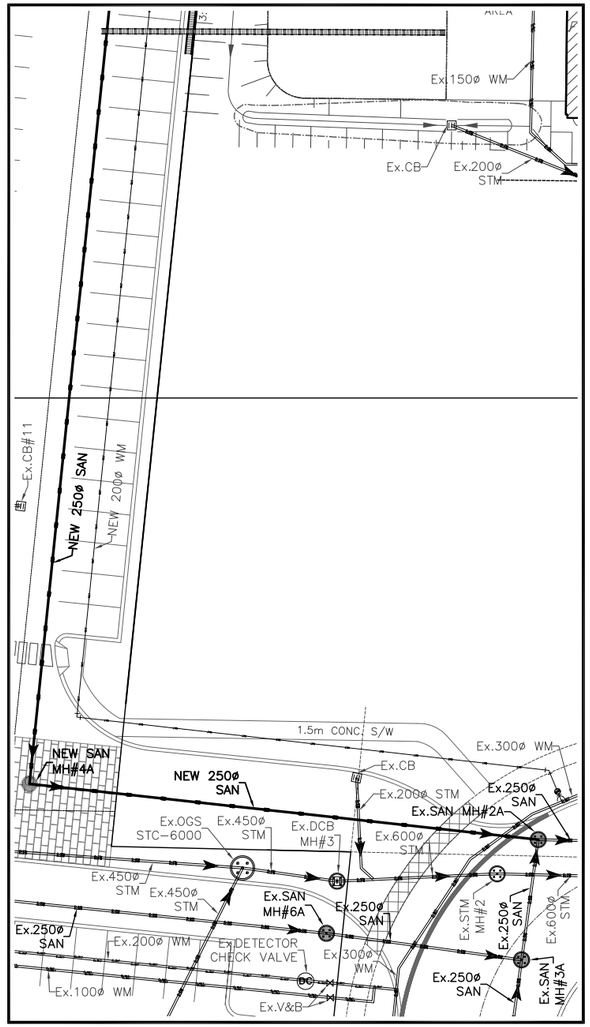
From MH	To MH	Max. Flow Qact (L/s)	Pipe Dia (mm)	Length (m)	Slope (%)	Pipe Capacity Qcap (L/s)	Full Flow Velocity (m/s)	Percent Full Qact/Qcap
Plug	MH-1A	13.07	200	2.00	1.00%	32.75	1.04	39.91%
MH-1A	MH-2A	13.07	250	8.17	1.00%	59.38	1.21	22.01%
MH-2A	MH-3A	13.07	250	67.05	1.00%	59.38	1.21	22.01%
MH-3A	MH-4A	13.07	250	90.00	1.00%	59.38	1.21	22.01%
MH-4A	Ex.MH-2A	13.07	250	42.88	1.00%	59.38	1.21	22.01%

SANITARY DRAINAGE PLAN – ADJOINING DEVELOPMENT – 4598 TOMKEN ROAD (Not to Scale)

(Ref: Excerpts from design documents prepared by Skira)







N
PROJECT NORTH
TRUE NORTH

LEGEND

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- EX. MANHOLE
- NEW CATCH BASIN
- EX. CATCH BASIN
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PROJECT:
PROPOSED PLACE OF WORSHIP
900 EGLINTON AVENUE EAST, MISSISSAUGA, ON

DRAWING TITLE:
PROPOSED SANITARY SERVICING PLAN

DATE	ISSUED
JAN 2019	.
JOB NUMBER	DRAWN BY
FD-018377	AT
SCALE	CHECKED BY
N.T.S.	CP
SHEET NUMBER	SAN-01

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Appendix "D" Water Supply System

- Post-development Water Supply Requirement Calculations
- Post-development Fire Flow Requirement Calculations
- Connection Single Use Demand Table
- Proposed Water Servicing Plan

POST-DEVELOPMENT WATER SUPPLY REQUIREMENT CALCULATIONS

Typical Water Demand Criteria

(According to the Watermain Design Criteria, Region of Peel, June 2010)

Population Type	Unit	Average Consumption Rate	Max Day Factor	Peak Hour Factor
ICI	L / Employee . D	300	1.4	3.0

Post-development Water Supply Requirements

Development Type	Light Industrial
Eq. Population Density	25

No.	Demand Type	Demand	Units
1	Average day flow	0.09	L/Sec
2	Maximum day flow	0.13	L/Sec
3	Peak hour flow	0.27	L/Sec
4	Fire flow	66.67	L/Sec
Analysis			
5	Maximum day plus fire flow	66.79	L/Sec
6	Peak hour flow	0.27	L/Sec
7	**Maximum demand flow**	66.79	L/Sec

POST-DEVELOPMENT FIRE FLOW REQUIREMENT CALCULATIONS

The Fire Underwriters Survey requires that a minimum water supply source "F" be provided at 140 kPa.

1 Estimate of Required Fire Flow

F =	220 * C * (A)^0.5

Where => F = Required Fire Flow (L/min)
C = Coefficient related to construction
A = Total Area (m^2)

Determining "C"

C =	0.8	For non-combustible construction

Determining "A"

A =	Total floor area of all story in the building	For non-combustible construction

Largest Floor Area =	555.80	m^2	Ground Floor
1st adjoining Floor Area =	500.30	m^2	2nd Floor
2nd adjoining Floor Area =	64.80	m^2	Mezzanine Floor
A =	1120.90	m^2	

So that, **F = 6,000.00 L/min.** (Rounded per FUS Guide Page # 20)

2 Addition / Reduction for occupancy type

Reduced by	-25%	For the occupancies having low contents of fire hazard

So that, **F = 4,500.00 L/min.**

3 Reduction for sprinkler system

Reduced by	-30%	Adequately designed sprinkler system per NFPA

4 Addition for structures exposed within distance of fire area

Side	Distance (m)	% Addition
North	None	0%
South	19.1	15%
East	71.0	0%
West	67.0	0%
Total		**15%**

Shall not exceed 75%

Net Reduction / Addition for step 3 & 4

Reduced by	-15%

So that, **F = 4000.00 L/min.** (Rounded per FUS Guide Page # 20)

N.B. - As per FUS requirements fire flow shall not exceed **45000 L/min** nor be less than **2000 L/min**.

Therefore, the fire flow required is =	**4000.00**	L/min.
	66.67	L/sec
	1056.69	USGPM
	880.57	Imp. GPM

CONNECTION SINGLE USE DEMAND TABLE

Project : Proposed Place of Worship Development
Project Address: 900 Eglinton Avenue East, Mississauga, ON

WATER CONNECTION

Connection Point :	Existing 300mm dia watermain located within the road allowance of Winchester Drive		
Pressure zone of connection point			
Total equivalent population to be serviced [1)]		25	
Total lands to be serviced		0.35 ha	
Hydrant Flow Test :	To be completed before Site Plan Application		
Hydrant flow test location	Hydrant #		
Hydrant residual test location	Hydrant #		
	Pressure (kPa)	Flow (L/Sec)	Time
Minimum water pressure			
Maximum water pressure			

WATER DEMANDS

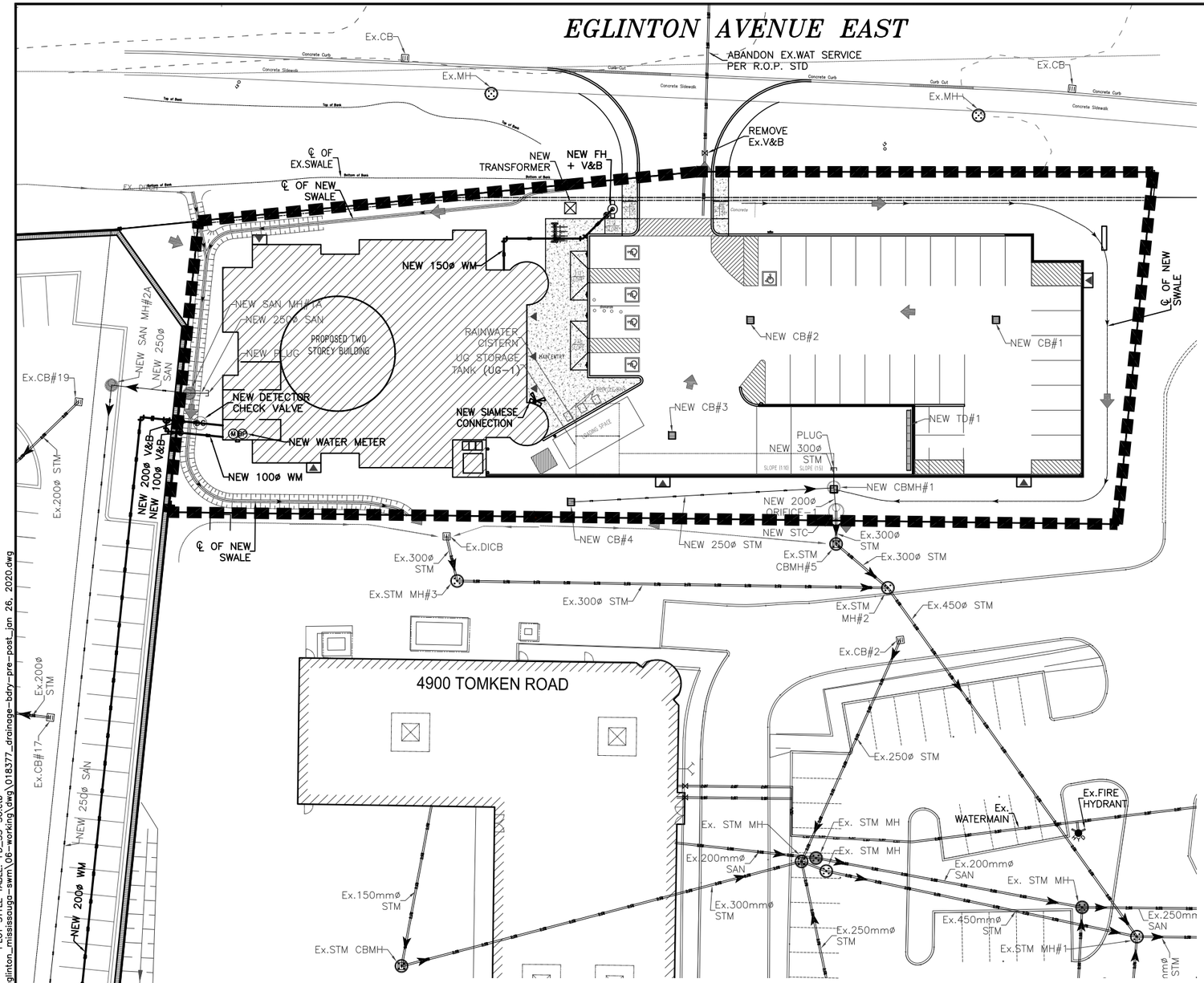
No.	Demand Type	Demand	Units
1	Average day flow	0.09	L/Sec
2	Maximum day flow	0.13	L/Sec
3	Peak hour flow	0.27	L/Sec
4	Fire flow [2)]	66.67	L/Sec
Analysis			
5	Maximum day plus fire flow	66.79	L/Sec

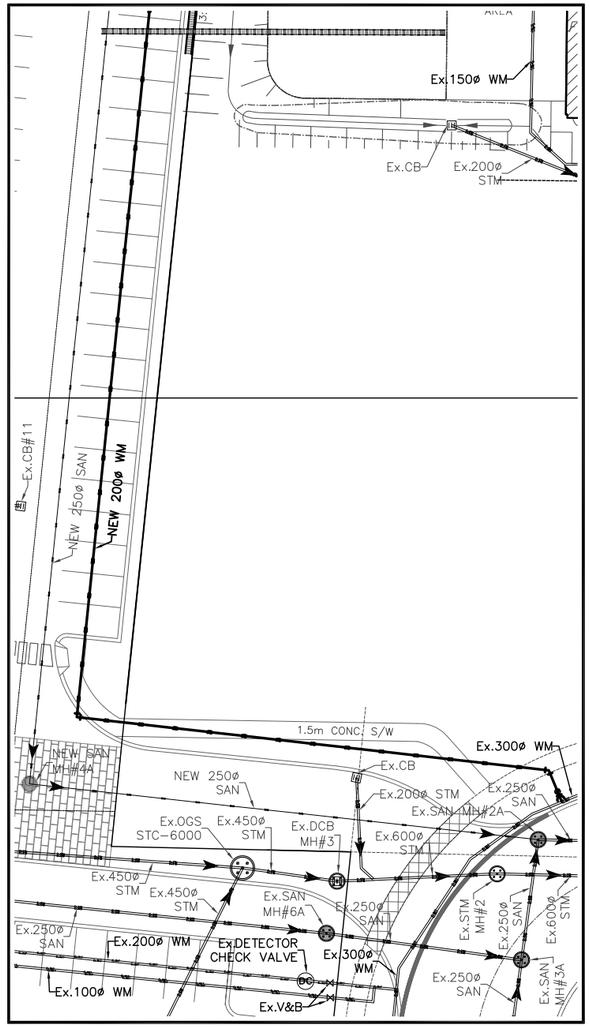
WASTEWATER CONNECTION

Connection Point [3)]**:**	Existing Sanitary Manhole MH1A located within the road allowance of Winchester Drive		
Total equivalent population to be serviced [1)]			25
Total lands to be serviced			0.35 ha
6	Wastewater sewer effluent	13.07	L/Sec

1) The calculations should be based on the development estimated population (employment or residential).
2) Please reference the Fire Underwriters Survey Document
3) Please specify the connection point ID
4) Please specify the connection point (wastewater line or manhole ID)
Also, the "total equivalent population to be serviced" and the "total lands to be serviced" should reference the connection point (The FSR should contain one copy of Site Servicing Plan)

EGLINTON AVENUE EAST





N

PROJECT NORTH

TRUE NORTH

LEGEND

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PROJECT:
PROPOSED PLACE OF WORSHIP

900 EGLINTON AVENUE EAST, MISSISSAUGA, ON

DRAWING TITLE:
PROPOSED WATER SERVICING PLAN

DATE	ISSUED
JAN 2019	.
JOB NUMBER	DRAWN BY
FD-018377	AT
SCALE	CHECKED BY
N.T.S.	CP
SHEET NUMBER	WAT-01

(11x17)

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MODIFIED: Jan 26, 2020
PLOT STYLE TABLE: FD_SS-SG.ctb

Appendix "E" Statement of Limiting Conditions and Assumptions

Statement of Limiting Conditions and Assumptions

1. This Report/Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner, and its affiliates (the "Intended Users"). No one other then the intended users have the right to use and rely on the work without first obtaining the written authorization of FLORA DESIGNS and its Owners.
2. The comments, recommendations and material in this report reflect Flora Designs best judgement in light of the information available to it at the time of preparation of this report. It is not qualified to and is not providing legal or planning advice in this work.
3. Flora Designs expressly excludes liability to any third party except the Intended Users for any use of, and/or reliance upon, the work.
4. Flora Designs notes that the following assumptions were made in completing the work
   a) The land use description(s) supplied to Flora Designs are correct
   b) The surveys and other data supplied to Flora Designs by the Owner are accurate
   c) Market timing, approval delivery and secondary information is within the control of parties other then Flora Designs
   d) There are no encroachments, leases, covenants, binding agreements, restrictions, pledges, charges, liens or special assessments outstanding, or encumbrances, which would significantly affect the use or servicing

   Investigations have not carried out to verify these assumptions. Flora Designs deems the sources of data and statistical information contained herein to be reliable, but we extend no guarantee of accuracy in these respects.
5. All the plans, photographs, and sketches prepared and presented in this report/study are included solely to aid the visualizing the location of the property, the boundaries of the site, and the relative position of the improvements on the said lands are based on information provided by Owner
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