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Proposed Office Building
2707 Solandt Road

Site Servicing &
Stormwater Management Report

Engineering excellence. Planning precision. Inspired landscapes.

Proposed Office Building
2707 Solandt Road

Site Servicing and
Stormwater Management Report

Prepared For:

KRP Properties Inc.

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario
K2M 1P6

October 9, 2019
Revised: January 15, 2020
Revised: February 28, 2020

Novatech File: 119110
Ref: R-2019-157

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Engineers, Planners & Landscape Architects

February 28, 2020

City of Ottawa
Planning, Infrastructure and Economic Development Department
Planning and Infrastructure Approvals
110 Laurier Avenue West
Ottawa, ON K1P 1J1

Attention: **Santhosh Kuruvilla, P.Eng.**
Project Manager, Development Approvals

Dear Santhosh:

Reference: **Site Servicing and Stormwater Management Report**
2707 Solandt Road
Our File No.: 119110

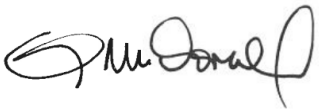
Enclosed is the revised 'Site Servicing and Stormwater Management Report' prepared for the proposed office building located at 2707 Solandt Road in the City of Ottawa.

This report is submitted in support of a Site Plan Control application.

Please contact the undersigned, should you have any questions or require additional information.

Yours truly,

NOVATECH



Greg MacDonald, P.Eng.
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1.0 INTRODUCTION

A new office building is being proposed by KRP Properties Inc. at 2707 Solandt Road, in the City of Ottawa. Novatech has been retained to complete a Site Servicing and Stormwater Management report for the proposed development.

This report addresses the approach to site servicing and stormwater management for the proposed development and is being submitted in support of a site plan control application.

1.1 Location and Existing Site Description

The subject site is located at 2707 Solandt Road in the City of Ottawa, as shown in **Figure 1 (Aerial Plan)**, and is approximately 2.00 hectares (ha) in area. The site is bordered by an existing parking lot (2505 Solandt Road) to the east, the Marshes golf course to the north, an undeveloped parcel and Shirley's Brook to the west and Solandt Road to the south.

The subject site is currently undeveloped and is mostly forested - vegetation has re-generated on it since it was last cleared in the early 1990s. Along the eastern edge of the site, there is an existing municipal sanitary trunk sewer and an existing storm drainage ditch.

The legal description of the site is Part of Block 29 Plan 4M-280 City of Ottawa Part 2 on Plan 4R-26736.

Figure 1 – **Aerial Plan** provides an aerial view of the site.

Image Source: geoOttawa 2017 Aerial map

1.2 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on July 11, 2019, at which time the client was advised of the general submission requirements. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

1.3 Reference Material

The following material has been consulted to develop the servicing and grading design.

1 "Shirley's Brook and Watts Creek Subwatershed Study", prepared by Dillon Consulting, dated June, 1999.

2 "Kanata Research Park, City of Kanata – Stormwater Management Plan", prepared by Novatech, dated April 2000.

3 Shirley's Brook Floodplain Mapping, MVCA website, accessed September 2019.

4 "Geotechnical Investigation Proposed Commercial, 2707 Solandt Road, Ottawa, Ontario" report (18111016), prepared by Golder Associates Ltd, dated January 2019.

5 "Stormwater Site Management Plan, Dell Parking Lot, 2505 Solandt Drive", (R-2006-069) prepared by Novatech, dated March 31, 2006.

1.4 Regulatory Approvals

The following regulatory approvals are understood to be required to facilitate this proposed development:

- City of Ottawa - Site Plan Control
- Mississippi Valley Conservation Authority (MVCA) Permit for 'Development, Interference with Wetlands and Alterations to Shorelines and Watercourses'
- Ministry of the Environment, Conservation and Parks (MOECP) Environmental Compliance Approval (ECA) for stormwater management

1.0 PROPOSED DEVELOPMENT

The proposed development is intended to be an eight (8) storey office building with total gross floor area (GFA) of approximately 18,450 m^2. A surface parking lot around the proposed building, with access via two new entries from Solandt Road, and a vehicle and pedestrian connection to the existing parking lot at 2505 Solandt Road are proposed. A separate Transportation Impact Assessment (TIA) has been prepared and submitted with this application.

Refer to **Appendix B** for a copy of the latest Site Plan (by Figurr) showing the general layout of the proposed development.

2.0 SITE SERVICING

The objective of the site servicing design is to conform to the requirements of the City of Ottawa, to provide suitable sewage outlets and to ensure that a domestic water supply and appropriate fire protection are provided for the proposed development.

Servicing criteria, expected sewage flows and water demands for the proposed development have been established using the City of Ottawa design guidelines for sewer systems and water distribution.

2.1 Existing Municipal Services and Drainage Ditch

An existing 750mm dia. municipal sanitary trunk sewer runs along the eastern edge of the site. There is no municipal local sanitary sewer system in Solandt Road.

There are existing municipal watermain and storm sewer systems located in Solandt Road. At the eastern corner of the site, the storm sewer system discharges to the existing storm drainage ditch that runs along the eastern side of the subject site. This drainage ditch runs to the northern corner of the site before outletting to Shirley's Brook via an existing culvert located under the golf course.

2.2 Proposed Servicing Overview

In general, the proposed development will be serviced for water and sanitary by extending new private water and sanitary services to the existing municipal watermain in Solandt Road and the existing municipal sanitary trunk sewer along the eastern edge of the site. The proposed development will be serviced for stormwater by constructing a new private storm sewer system which outlets to the existing storm drainage ditch on the site.

Refer to the subsequent sections of the report and to the attached drawing **119110-GP** for further details.

3.0 SANITARY SERVICING

The proposed development will be serviced by extending a new private 200mm dia. sanitary system from the proposed building to the existing 750mm dia. municipal sanitary trunk sewer on the eastern edge of the site. A monitoring manhole will be installed before the service connection to the trunk sewer.

The theoretical sanitary flows for the proposed development are summarized below in **Table 3.1.** Refer to **Appendix C** for detailed calculations and design criteria.

Table 3.1: Sanitary Design Flows for the Proposed Development

Proposed Commercial Gross Floor Area (GFA)	Site Area	Average Flow [1] (L/s)	Peak Flow [2] (L/s)
18,450 m2	2.00 ha	0.70	1.56

[1] Average Dry Weather Flow includes a dry weather infiltration allowance of 0.05 L/s/gross ha
[2] Peak Wet Weather Flow includes a total infiltration allowance of 0.33 L/s/gross ha and a commercial peaking factor of 1.5

Based on Manning's Equation, a 200mm dia. sanitary gravity sewer at a minimum slope of 1.0% has a full flow conveyance capacity of approximately 34 L/s, which is sufficient to convey the theoretical sanitary design flows calculated above.

Based on sewer invert information available from GeoOttawa, the estimated capacity of the main segment of the trunk sewer which runs through the site is given in **Table 3.2.**

Table 3.2: Existing Sanitary Trunk Sewer Capacity

Sanitary Sewer Size	Approximate Sewer Slope (%)	Approximate Sewer Capacity [1] (L/s)
750mm dia.	0.13%	401 L/s

[1] Capacity calculated using Manning's Formula with n=0.013

Based on calculations above, the theoretical peak flow from the proposed development represents approximately 0.4% of the total estimated capacity of the existing 750mm dia. sanitary trunk sewer. It is anticipated that the existing sanitary trunk sewer can adequately service the proposed development.

4.0 WATER SERVICING

There is an existing 305mm dia. municipal watermain located adjacent to the site in Solandt Road. The site is located in the City of Ottawa 'Energy Mines & Resources' (EMR) water distribution pressure zone. The proposed development will be serviced by extending a new 150mm dia. water service from the proposed building to the existing municipal watermain.

4.1 Water Demands

The theoretical domestic water demands for the proposed development are given in **Table 4.1.** Refer to **Appendix D** for the design criteria used, taken from Section 4 of the Ottawa Design Guidelines – Water Distribution.

Table 4.1: Theoretical Water Demands for Proposed Development

Average Water Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
0.65	0.98	1.76

4.2 Water Supply for Fire-Fighting

The Fire Underwriters Survey (FUS) was used to estimate fire flow requirements for the proposed development. The following building construction details were confirmed with the architect:

- Fire-resistive construction (2-hour rating)
- Protected vertical openings between floors
- Fully sprinklered

There are three (3) existing municipal fire hydrants within 150m of the site. Refer to attached drawing **119110-GP** for their locations. The proposed building will be fully sprinklered and supplied with a fire department Siamese connection(s), located within 45m of the closest existing municipal fire hydrant on Solandt Road.

The fire flow requirements include both sprinkler system and hose allowances in accordance with the OBC and NFPA 13. The sprinkler system will be designed by the fire protection (sprinkler) contractor at the detailed design stage as this process involves detailed hydraulic calculations based on building layout, pipe runs, head losses, fire pump requirements, etc. Booster pumps may be required to provide adequate service pressure on the upper floors.

It should be noted that fire flow requirements calculated using the FUS method tend to generate higher values when compared to flows being calculated using the Ontario Building Code (OBC).

Table 4.2 summarizes the Fire Flow Requirements for the proposed development based on FUS calculations.

Table 4.2: Fire Flow Requirements for the Proposed Development

Building Usage	Fire Flow Demand
Office	117 L/s (7,000 L/min)

Refer to **Appendix D** for a copy of the FUS fire flow calculations.

4.3 Municipal Boundary Conditions and Summary of Watermain Analysis Results

The water demands and fire flow calculations presented above were provided to the City of Ottawa. These values were used to generate the municipal watermain network boundary conditions.

Table 4.3-A summarizes the boundary conditions provided by the City of Ottawa for the existing municipal watermain network. Refer to **Appendix D** for a copy of the correspondence from the City of Ottawa.

Table 4.3-A: Hydraulic Boundary Conditions Provided by the City

Municipal Watermain Boundary Condition	Solandt Rd Watermain	
	Head (m)	Pressure[1] (psi)
Minimum HGL	126.2 m	68.7 psi
Maximum HGL	131.0 m	75.4 psi
Maximum Day + Fire Flow	125.5 m	67.7 psi

[1] – Ground elevation = 77.9 m.

Table 4.3-B summarizes the theoretical water demands for the proposed development under the various operating conditions and compares the anticipated operating pressures at the existing water service connection to the acceptable operating pressures outlined in the City of Ottawa Design Guidelines. It is assumed that hydraulic losses in the proposed 150mm dia. water service are negligible.

Table 4.3-B: Water Analysis Results Summary

Condition	Total Water Demand (L/s)	Approximate Design Operating Pressures (psi) / Relative Head (m) [1]	Acceptable Municipal Operating Pressures (psi)
Average Demand	0.65	76 psi (53.3 m)	40-80 psi
Peak Hour Demand	1.76	69 psi (48.5 m)	40-80 psi
Max Day + Fire Flow Demand	117.98	68 psi (47.8 m)	20 psi (Min.)

1 – The finished floor elevation of the proposed building is 77.70 m.

Table 4.3-C summarizes the existing fire hydrants within 150m of the proposed building and the combined available fire flow for the site. The combined fire flow was calculated using the individual fire flow contribution rates given in Technical Bulletin ISTB-2018-02.

Table 4.3-C: Summary of Existing Fire Hydrants Within 150m of the Proposed Building and Combined Available Fire Flow

Building	Fire Flow Demand (L/min)	Fire Hydrants Within 0-75m	Fire Hydrants Within 75- 150m	Combined Available Fire Flow (L/min)
Proposed commercial building	7,000	1 X AA-rated hydrant	2 x AA-rated hydrants	13,300

The total combined available flow from the three existing fire hydrants exceeds the required fire flow. Based on the above analysis, the existing municipal watermain system can provide adequate water supply (domestic and fire) to the proposed development.

5.0 STORMWATER

5.1 Stormwater Management Criteria and Objectives

The site is located within Catchment Area 'SB-4' of the 'Shirley's Brook and Watts Creek Subwatershed Study Report' [1], so the relevant environmental protection targets from this report were consulted. The site is located outside of the overall catchment area considered in the 'Kanata Research Park, City of Kanata - Stormwater Management Plan' [2], so the stormwater management criteria in this report are not applicable.

Based on the 'Shirley's Brook and Watts Creek Subwatershed Study Report' [1] and the current City of Ottawa Sewer Guidelines, the stormwater management criteria and objectives for the site are as follows:

- Provide a dual drainage system (i.e. minor and major system flows).

[1] "Shirley's Brook and Watts Creek Subwatershed Study", prepared by Dillon Consulting, dated June, 1999.
[2] "Kanata Research Park, City of Kanata – Stormwater Management Plan", prepared by Novatech, dated April 2000.

- Control post-development flows from the site to an allowable release rate. Post-development peak flows will be controlled for storms up to and including the 100-year design event, prior to being released into the existing storm drainage ditch on the eastern side of the site.
- Provide on-site stormwater storage to control flows to the allowable release rate using a combination of rooftop storage, underground storage and surface ponding in the proposed parking lot areas. Limit rooftop ponding to 150mm depth and surface ponding to 300mm depth.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

5.2 Pre-Development Conditions

Under existing conditions, the 2.00 ha site is undeveloped with trees and other vegetation. Stormwater flows from the site currently drain either to the existing storm drainage ditch along the eastern side of the site or to Shirley's Brook to the west of the site.

The existing municipal storm sewer system in Solandt Road outlets to the existing storm drainage ditch at the southeast corner of the site. The storm drainage ditch drains to Shirley's Brook via a 900mm dia. culvert under the golf course to the north of the subject site.

The uncontrolled pre-development site peak flows for the 5-year and the 100-year design events, assuming a time of concentration of 20 minutes and a runoff coefficient of 0.25, were calculated using the Rational Method and are summarized in **Table 5.2.**

Table 5.2: Pre-Development Site Peak Flows

Design Event	Pre-Development Peak Flow
5-year	97.7 L/s
100-year	208.4 L/s

Refer to **Appendix E** for detailed calculations and design criteria.

5.3 Allowable Release Rate

The quantity control environmental protection target listed in the 'Shirley's Brook and Watts Creek Subwatershed Study Report' [1] for the subject site's catchment area is to control post-development peak flows to existing (pre-development) peak flows for all storm events up to the 100-year design event (i.e. control the 100-year post-development peak flow to the 100-year pre-development peak flow, etc.). Refer to **Appendix E** for relevant excerpts from this report.

However, as there is an existing 900mm dia. culvert at the downstream end of the existing storm drainage ditch on the site, the allowable release rate has been conservatively set as the 5-year pre-development peak flow for all design events up to the 100-year storm.

As many areas around the exterior of the site will not be developed and left as existing, the allowable release rate was calculated based on the total area of the site to be developed (1.59 ha). Refer to attached plan **119110-SWM** for details.

The allowable release rate was calculated using the Rational Method with the following variables: a runoff coefficient (C) of 0.25, a 5-year rainfall intensity of 70.3 mm/hr, based on City of Ottawa IDF Curves using a time of concentration of 20 minutes.

The allowable release rate was calculated to be 77.6 L/s. Refer to **Appendix E** for detailed calculations.

5.4 Post-Development Conditions

Under post-development conditions, stormwater from the site will be collected by a private storm sewer network and discharged to the existing storm drainage ditch on the eastern side of the site via two (2) new outlet structures.

The proposed development will consist of three (3) main drainage sub-catchment areas. A brief description of these areas is as follows:

- D-1, D-2 and D-3: Direct Runoff Areas - Runoff from grassed areas around the exterior of the proposed parking lot which are to be re-graded will drain uncontrolled towards Shirley's Brook or the storm drainage ditch on the site as per existing drainage patterns.
- R-1: Controlled Roof Runoff Area - Runoff from the proposed building roof will be controlled by controlled roof drains before discharging to the proposed building storm service. This storm service will drain directly to the existing storm drainage ditch on the site, without any downstream inlet control devices.
- S-1: Controlled Runoff Area - Runoff from the parking lot and proposed landscaped areas around the building will be controlled and stored in an underground storage pipe and on the surface of the parking lot and landscaped areas.

The foundation drain system for the building will be connected to the storm service from the building for the roof runoff. A cleanout/inspection port will be provided inside the building.

The post-development flows for the site were calculated using the Rational Method and are detailed in the subsequent sections of the report. Refer to **Appendix E** for detailed SWM calculations. The Stormwater Management Plan **119110-SWM** is attached to this report.

5.4.1 Areas D-1, D-2 and D-3 – Uncontrolled Direct Runoff

The uncontrolled post-development flows from direct runoff sub-catchment areas D-1 (0.061 ha), D-2 (0.012 ha) and D-3 (0.086 ha) are shown in **Table 5.4-A.**

Table 5.4-A: Areas D-1, D-2 and D-3 - Post-Development Uncontrolled Peak Flows

Design Event	Uncontrolled Peak Flow			
	Area D-1	Area D-2	Area D-3	Total
5-year	3.6 L/s	0.7 L/s	5.0 L/s	9.2 L/s *
100-year	7.6 L/s	1.5 L/s	10.7 L/s	19.8 L/s

* Total peak flow doesn't equal the addition of all 3 individual area peak flows due to rounding.

5.4.2 Area R-1– Controlled Flows from Building Roof

Runoff from the roof area of the proposed building will be controlled through the use of control flow roof drains. At the time of writing, only a preliminary roof drain design is available from the architect. Based on this preliminary design, the proposed building will have a total of approximately six (6) controlled roof drains. At this stage in the building design process, it has been conservatively estimated that each controlled roof drain will discharge a maximum of 3.0 L/s during the 100-year design event and approximately 2.5 L/s during the 5-year design event. Watts Adjustable Flow Control Roof Drains set on the fully exposed weir opening setting (or equivalent) would limit the controlled flow per roof drain to less than the flows specified above. Detailed flow and storage calculations will be completed during detailed design.

The controlled flows will be conveyed internally to the building storm service. Scuppers will be included in the building design at a height of 0.15m above the roof drains to provide an overflow for excess runoff in the case of a storm event greater than the 100-year design storm. The maximum controlled release rates, approximate ponding depths, required and maximum storage volumes for both the 5-year and 100-year design events are summarized in the **Table 5.4-B** below.

Table 5.4-B: Area R-1 Controlled Flow Building Roof Drains

Area ID	Maximum Controlled Flow (L/s)		Approximate Ponding Depth (cm)		Approximate Storage Volume Required (m^3)	
	5-year	100-year	5-year	100-year	5-year	100-year
R-1	15.0	18.0	5 -10	10 -15	35	83

Refer to **Appendix E** for Modified Rational Method calculations.

5.4.3 Area S-1 – Controlled Flows from Parking Lot and Landscaped Areas

Stormwater runoff from the parking lot and landscaped areas will be directed to proposed catchbasins located in the parking lot. The post-development flows from this sub-catchment will be attenuated by the use of an ICD installed within proposed manhole CBMH1. Stormwater runoff from this drainage area will be temporarily stored within an underground 750mm dia. storage pipe system, and also on the surface of the parking lot in larger design events prior to being discharged to the existing storm drainage ditch. There will be no ponding during the 2-year design event.

The allowable design flow for this sub-catchment area were determined by subtracting the uncontrolled flows from Areas D-1, D-2 and D-3 and the controlled flows from Area R-1 from the allowable release rate for both the 5-year and 100-year design storms. The allowable 100-year design flow for sub-catchment area S-1 is 39.9 L/s.

The Modified Rational Method was used to determine the required storage volumes for the 2- year, 5-year and 100-year design events. As required by the City of Ottawa due to the presence of underground storage, the storage volume calculations were completed for all design events using an assumed average release rate equal to 50% of the peak allowable flow. It is noted that this approach is considered overly conservative and is likely to overestimate the required storage volume and maximum ponding elevation. The approximate ponding depths for the 100-year and 5-year design storms were estimated based on the required storage volumes. For comparison,

storage volume calculations were also completed for all design events using the peak design flows. Refer to **Appendix E** for Modified Rational Method calculations.

The stage-storage curve for the proposed storage pipe, catchbasins, manholes and parking lot ponding was determined from the proposed grading and servicing design. Refer to attached drawing **119110-GR** for details of the proposed grading. The required circular orifice size for a plug type ICD was calculated for the 100-year ponding elevation and maximum allowable 100-year design flow.

Table 5.4-C summarizes the controlled flows, the required ICD orifice size, required storage volumes and approximate ponding depths for the 2-year, 5-year and 100-year design events and the total storage volume available.

Table 5.4-C: Area S-1 – Post-Development Controlled Flows

Design Event	ICD Type	Controlled Peak Flow	Storage Volume Required [1]	Approximate Ponding Depth (Elevation)	Maximum Storage Volume Available [2]
2-year	114mm dia. Circular Orifice Plug	27.9 L/s	158 m^3	N/A (Underground storage provided)	Approximately 718 m^3
5-year		38.2 L/s	235 m^3	12 cm (77.07m)	
100-year		39.7 L/s	541 m^3	26 cm (77.21m)	

1 – Required storage volumes were calculated assuming an average release rate of 20.0 L/s, equal to 50% of the peak allowable rate of 39.9 L/s
2 – At the emergency spill elevation of 77.25m

Refer to **Appendix E** for detailed calculations. A total of 187 m^3 is provided underground, so there will not be any surface ponding during the 2-year design event.

Based on Manning's Equation, a 300mm dia. gravity storm sewer at a minimum slope of 0.5% has a full flow conveyance capacity of approximately 71 L/s, which is sufficient to convey the stormwater design flows calculated above.

5.4.4 Summary of Post-Development Flows

Table 5.4-D compares the total post-development flows from the site to the allowable release rate and to the total pre-development flows for the 5-year and the 100-year design events.

Table 5.4-D: Stormwater Flow Comparison Table

Design Event	Allowable Release Rate (L/s)	Post-Development			
		D-1, D-2 and D-3 Uncontrolled Flow (L/s)	R-1 Controlled Roof Flow (L/s)	S-1 Controlled Surface Flow (L/s)	Total Flow (L/s)
5-Year	77.6	9.2	15.0	38.2	62.4
100-Year		19.8	18.0	39.7	77.4

The post-development flows will meet the allowable release rate for both the 5-year and 100-year design storm events.

5.5 Stormwater Quality Control

The subject site is located within the jurisdiction of the Mississippi Valley Conservation Authority (MVCA) and is in the Shirley's Brook tributary area. As per the 'Shirley's Brook and Watts Creek Subwatershed Study' [1], "Level 2 water quality enhancement", which corresponds to a long-term average removal of 70% of total suspended solids (TSS) is required. During pre-consultation MVCA recommended that quality protection be increased to enhanced level (80% TSS removal) as the site is in close proximity to the Kanata North Urban Expansion Area, which requires enhanced treatment for Shirley's Brook. It is understood that rooftop areas are considered "clean" and runoff from the proposed building roof is not required to be treated.

A CDS hydrodynamic separator unit will be installed downstream of CBMH1 on the proposed 300mm diameter stormwater sewer outlet pipe. Stormwater runoff collected by the main storm sewer network (sub-catchment Area S-1, which includes all proposed trafficked areas) will be directed through this treatment unit.

Echelon Environmental have modelled and analyzed the tributary area to provide a CDS unit capable of meeting the TSS removal requirements. It was determined that a CDS Model PMSU 20_15_5m will exceed the target removal rate, providing a net annual 84% TSS removal. This CDS unit has a treatment capacity of 20 L/s, a sediment storage capacity of 0.838 m3 and an oil storage capacity of 232 L. The unit should be inspected annually and cleaned out when the unit's sediment storage sump is approximately 85% full. Details of the proposed CDS treatment unit are included in **Appendix E.**

6.0 SITE GRADING

Most of existing site is generally flat at elevations between approximately ±77.0 and ±77.5. The existing storm drainage ditch along the eastern side of the site is at an elevation of approximately 74.5m. There is an existing depression on the west side of the site which drains to Shirley's Brook. Refer to plan **119110-GR** for details.

The proposed stormwater outlets have been set at an invert level of 75.00m. This is based on the existing storm drainage ditch outlet being at an elevation of 74.40m, with some freeboard provided. The MVCA Shirley's Brook Floodplain Mapping (5) shows the predicted regulatory flood elevation in Shirley's Brook near the outlet of the existing 900mm diameter culvert under the golf

course to the north of the site to be 76.0m. Refer to **Appendix E** for relevant floodplain maps. The finished floor elevation (FFE) of the proposed building is approximately 1.7m above this regulatory flood elevation.

The MVCA regulatory floodplain and MVCA regulatory limits from the floodplain mapping [3] are shown on the attached plans. No works are proposed within the regulatory floodplain limit.

6.1 Major System Overflow Route

In the case of a major rainfall event exceeding the design storms provided for, stormwater from the proposed development will overflow towards the existing strom drainage ditch. The finished floor elevation (FFE) of the proposed building has been set to be a minimum of 0.3m above the major system overflow points. The major system spill point is shown on plan **119110-GR**.

7.0 GEOTECHNICAL INVESTIGATIONS

A Geotechnical Investigation Report [4] has been prepared by Golder. Refer to the Geotechnical Report for sub-surface conditions, construction recommendations and geotechnical inspection requirements.

8.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the municipal drainage system, temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks will be placed under the grates of nearby catchbasins and manholes and will remain in place until construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits, where applicable.
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.

The temporary erosion and sediment control measures will be implemented prior to construction and will remain in place during all phases of construction. Regular inspection and maintenance of the erosion control measures will be undertaken.

9.0 CONCLUSIONS

This report has been prepared in support of a site plan control application for the proposed commercial development at 2707 Solandt Road.

[3] Shirley's Brook Floodplain Mapping, MVCA website, accessed September 2019.
[4] "Geotechnical Investigation Proposed Commercial, 2707 Solandt Road, Ottawa, Ontario" report (18111016), prepared by Golder Associates Ltd, dated January 2019.

The conclusions are as follows:

- The proposed development is intended to be an eight (8) storey office building with total gross floor area (GFA) of approximately 18,500 m^2.
- The proposed development will be serviced for water by extending a new water service from the proposed building to the existing municipal watermain in Solandt Road.
- The proposed development will be sprinklered and supplied with a fire department Siamese connection. The Siamese connection will be located within 45m of an existing municipal fire hydrant on Solandt Rd. The proposed development is located within 150m of two (2) additional existing municipal fire hydrants along Solandt Road.
- Based on hydraulic boundary conditions provided by the City of Ottawa, the existing municipal watermain network within the vicinity of the site is adequate to service the proposed development.
- The proposed development will be serviced for sanitary by extending a new private sanitary sewer system from the proposed building to the existing municipal sanitary trunk sewer which runs down the eastern side of the site.
- Based on an analysis of the total capacity of the trunk sewer, the theoretical peak flow from the proposed development represents approximately 0.4% of the total estimated capacity of the municipal truck sewer. It is anticipated that the existing trunk sewer has adequate surplus capacity to accommodate the proposed development.
- On-site stormwater quantity control will be provided by using controlled roof drains on the proposed building and a combination of underground and surface storage with a controlled outlet in the proposed parking lot. A 114mm dia. circular orifice inlet control device (ICD) is required.
- The total post-development flows from the area of the site to be developed will be approximately 62.5 L/s during the 5-year design event and 77.4 L/s during the 100-year design event, both less than or equal to the allowable release rate of 77.6 L/s.
- On-site stormwater quality control will be provided using a CDS stormwater treatment unit.
- Temporary erosion and sediment controls will be provided during construction.

NOVATECH

Prepared by:

Lydia Bolam, P. Eng.
Project Engineer

Reviewed by:

Jazmine Gauthier, B.A.Sc.
Project Manager | Land Development Engineering

Approved by:

Greg MacDonald, P. Eng.
Director | Land Development and
Public Sector Infrastructure

APPENDIX A

Pre-Consultation Correspondence

Lydia Bolam

From: McCreight, Laurel <Laurel.McCreight@ottawa.ca>
Sent: Thursday, July 18, 2019 11:05 AM
To: James Ireland
Cc: Greg Winters
Subject: Pre-Consultation Follow-Up: 2505 & 2707 Solandt Road
Attachments: Applicant's Study and Plan Identification List.pdf

Hi James,

Please refer to the below regarding the Pre-Application Consultation Meeting held on Thursday July 11, 2019 for the property at 2505 & 2707 Solandt Road for a Site Plan Control Application for an office building. I have also attached the required Plans & Study List for application submission.

Below are staff's preliminary comments based on the information available at the time of pre-consultation meeting:

Planning / Urban Design

- Setback to the parking at front should be a least 13.0 metres to be consistent with neighbouring properties and will help to preserve as many mature trees as possible along the street edge.
- Will there be any other way for employees to exit/enter the building?
    - If so, the pedestrian circulation on site should reflect that; especially how to get to the recreation area.
- There is an existing drainage ditch in between the site and the existing parking lot.
    - This ditch should be properly landscaped on both sides to prevent pedestrians trying to cross it (to and from the parking lot) other than the provided access.
- The pedestrian route from the parking along the southwest edge of the site to the building needs to be considered.
- The building elevations look good.
    - The vertical expression using the stairwell is a nice feature and different materials used on the front and back of the building to create interest is positive.

Engineering

- The Servicing Study Guidelines for Development Applications are available at the following link: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans
- Record drawings and utility plans are available for purchase from the City's Information Centre. Contact the City's Information Centre by email at informationcentre@ottawa.ca or by phone at (613) 580-2424 x44455
- Stormwater quantity control criteria – needs to be consistent with the Stormwater Management Plan, Kanata Research Park, City of Kanata and the previously approved report Stormwater Site Management Plan, Dell Parking Lot, 2505 Solandt Drive.
- Stormwater quality control – Consult with the Conservation Authority (MVCA) for their requirements. Include the correspondence with MVCA in the stormater/site servicing report.
- MECP ECA is required.
- Sanitary & storm sewers and water main are available within Solandt Road for lateral service connections.
- Clearly show all the easements on the property on all plans.
- When calculating the composite runoff coefficient (C) for the site (post development), please provide a drawing showing the individual drainage area and its runoff coefficient.
- When using the modified rational method to calculate the storage requirements for the site, the underground storage should not be included in the overall available storage. The modified rational method assumes that the restricted flow rate is constant throughout the storm which, in this case, underestimates the storage

requirement prior to the 1:100 year head elevation being reached. Alternately, if you wish to include the underground storage, you may use an assumed average release rate equal to 50% of the peak allowable rate. Otherwise, disregard the underground storage as available storage or provide modeling to support the design.

- Engineering plans are to be submitted on standard A1 size (594mm x 841mm) sheets.
- Phase 1 ESA and Phase 2 ESA must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.
- Provide the following information for water main boundary conditions:
    1. Location map with water service connection location
    2. Average daily demand (l/s)
    3. Maximum daily demand (l/s)
    4. Maximum hourly demand (l/s)
    5. Fire flow demand (provide fire detailed flow calculations based on the fire underwriters survey method)
    6. If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.

Please contact Infrastructure Project Manager, Santhosh Kuruvilla for follow-up questions.

Environmental

- An EIS is required
    - Blanding's Turtle, Species at Risk, watercourse setback
- Crossing of the creek is within MVCA's jurisdiction
- Approval from MOECPP is required
    - It is recommended to contact them as soon as possible
- There will be a 15 metre no touch zone to Shirley's Brook
- Approval from MNRF may be required for the bridge if the watercourse is considered under the Public Lands Act
- Discuss pathways with MNRF

Please contact Environmental Planner, Matthew Hayley for follow-up questions.

Forestry

- A permit is not required because the land is federally owned
- A Tree Conservation Report (TCR) must be supplied for review along with the various other plans/reports required by the City; an approved TCR is a requirement for Site Plan approval
- The removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
- In this case, the TCR may be combined with the EIS
- The TCR must list all trees on site by species, diameter and health condition; similar groupings (stands) of trees can combined using averages by species, diameter class
- The TCR must address all trees with a critical root zone that extends into the developable area – all trees that could be impacted by the construction that are outside the developable area need to be addressed.
- Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees

- If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained – please provide a plan showing retained and removed treed areas
- All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca
- Please ensure newly planted trees have an adequate soil volume for their size at maturity.
- The following is a table of recommended minimum soil volumes:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

- The City requests that all efforts are made to retain trees – trees should be healthy, and of a size and species that can grow into the site and contribute to Ottawa's urban forest canopy

Please contact Planning Forester, Mark Richardson for follow-up questions.

Transportation

- Follow Traffic Impact Assessment Guidelines
  - Submit TIA Step 2 (Scoping).
  - A full TIA will be required.
  - The intersection of Terry Fox Drive at Legget Drive and March Road at Carling Avenue should be included to the proposed study area.
  - Please note that the application will not be deemed complete until it meets the necessary TIA components (Draft Steps 1-4 of the TIA).
- If roadway modifications are required, draft RMA package will have to be submitted with Step 4 of the TIA.
- Noise Impact Studies required for the following:
  - Road
  - Solandt Road is classified as a collector road. Noise Impact Study may be exempted in the case that the applicant can indicate the volume on Solandt Road is significantly low for any noise impacts.

- On site plan:
  - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
  - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
  - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and ensure these measurements are identified on the site plan.
  - Show lane/aisle widths.
  - Grey out any area that will not be impacted by this application.

Please contact Transportation Project Manager, Neeti Paudel for follow-up questions.

Other

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-consultation comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to contact me if you have any questions.

Regards,
Laurel

Laurel McCreight MCIP, RPP
Planner
Development Review West
Urbaniste
Examen des demandes d'aménagement ouest

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 16587
ottawa.ca/planning / ottawa.ca/urbanisme

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APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer here:

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	5	1. Site Servicing Plan	2. Site Servicing Study	S	3
S	5	3. Grade Control and Drainage Plan	4. Geotechnical Study	S	3
	2	5. Composite Utility Plan	6. Groundwater Impact Study		3
	3	7. Servicing Options Report	8. Wellhead Protection Study		3
S	3	9. Transportation Impact Study (if required)	10.Erosion and Sediment Control Plan	S	3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		3
	3	13.Hydraulic Water main Analysis	14.Noise	S	3
	PDF only	15.Roadway Modification Functional Design	16.Confederation Line Proximity Study		3

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	15	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		2
	5	19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	5	21.Site Plan	22.Minimum Distance Separation (MDS)		3
	15	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		3
	3	25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		3
S	5	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		3
S	2	29.Survey Plan	30.Shadow Analysis		3
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)		Available online
	3	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		3
	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		3
	3	38.Record of Site Condition	39.Mineral Resource Impact Assessment		3
S	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species	S	3
	3	42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)		3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
S	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45.		

Meeting Date: June 5, 2019 Application Type: *Site Plan Control*

File Lead (Assigned Planner): Laurel McCreight Infrastructure Approvals Project Manager: Santhosh Kuruvilla

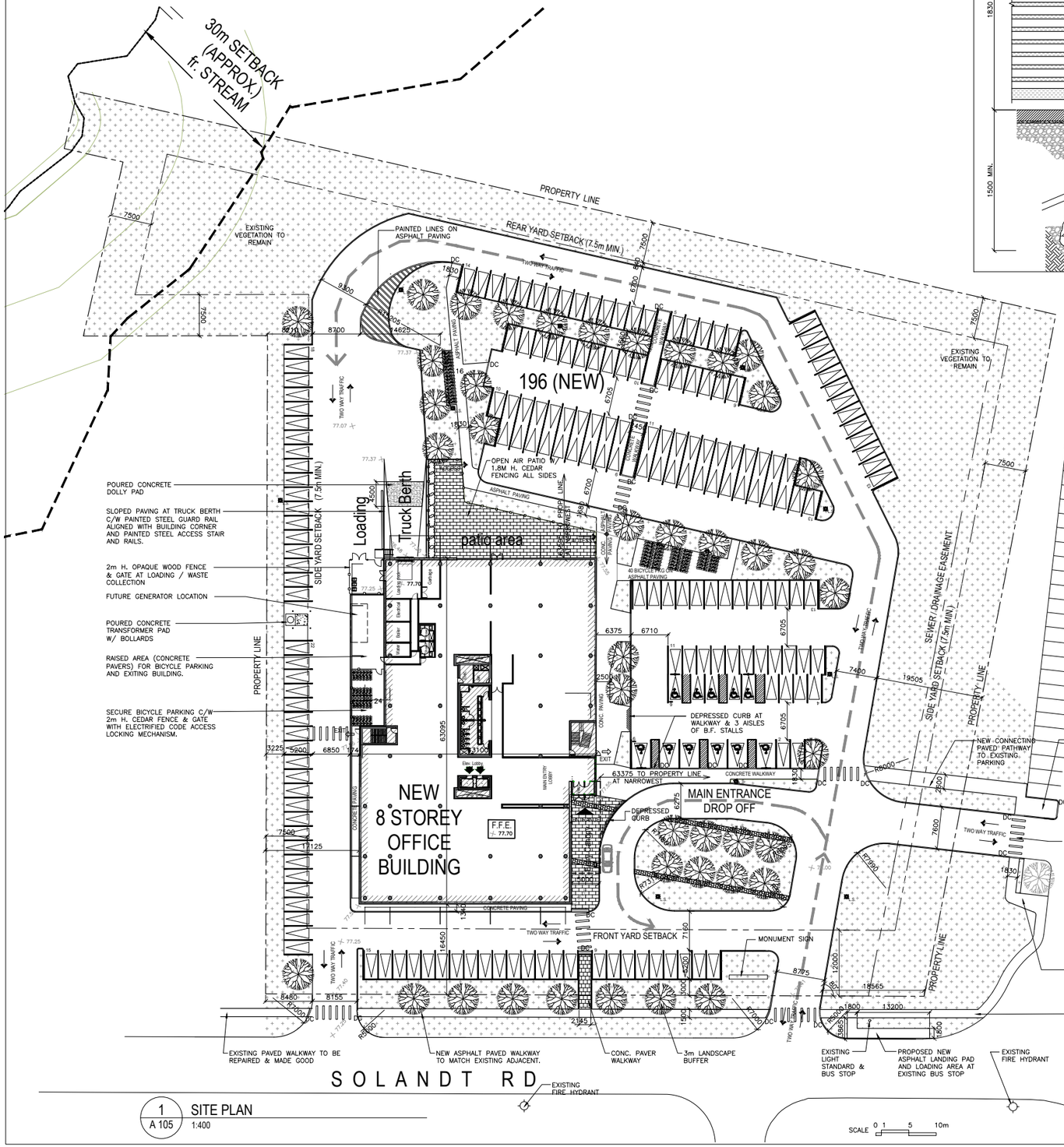
Site Address (Municipal Address): 8700 Campeau *Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

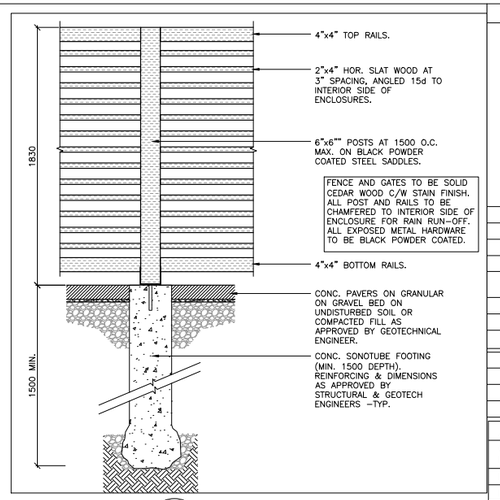
It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the* Planning, Infrastructure and Economic Development Department *will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning, Infrastructure and Economic Development Department.

APPENDIX B

Site Plan



1 / A 105 SITE PLAN 1:400



2 / A 105 TYP. FENCE ENCLOSURE DETAIL 1:20

KEY PLAN

PROPERTY DESCRIPTION

EIGHT STOREY OFFICE BUILDING	
CITY OF OTTAWA PIN NUMBER	04517 - 0838
MUNICIPAL ADDRESS	2707 SOLANDT RD, KANATA, ON

SITE INFORMATION

Site information is derived from part of Block 29 on 4M-280, which is otherwise legally described as Part 1 on 4R-13632, save and except Part 1 on 4R-26736.

LOT AREA:	19,986 m²
LOT FRONTAGE:	120.07 m
LOT DEPTH:	126.66 m /

BUILDING INFORMATION

BUILDING AREA:	2,306.45m² (2,495m2 w/ vertical cores)
BUILDING FLOOR AREA (GFA):	18,451.6m²
PROPOSED USE:	OFFICE BUILDING, MID-RISE

ZONING TABLE	IP6	
CITY OF OTTAWA ZONING BY-LAW No. 2008-250	REQUIRED	PROPOSED
MINIMUM LOT AREA	4,000m²	19,986 m²
MINIMUM LOT WIDTH	45m	120.07 m
FRONT YARD SETBACK	12m	12 m
MINIMUM INTERIOR SIDE YARD SETBACK	7.5m	7.5m
MINIMUM REAR YARD SETBACK	7.5m	7.5m
MAXIMUM BUILDING HEIGHT	22m	32.09m
MAXIMUM FLOOR SPACE INDEX	N/A	
PARKING AREA	N/A	11,099 m²
LANDSCAPED AREA (8,380 m2 OF LOT AREA)	15% of parking area (Section 110) –% of Lot	1,943 m2 of parking area 17.5 % of parking area 41.9 % of Lot area
VEHICLE PARKING REQUIREMENTS (AREA C, SCHEDULE 1A)	2.4 per 100m2 of GFA 443 spaces required	390 existing + 196 new SPACES
VISITOR PARKING REQUIREMENTS	N/A	TBD with Owner requirements
BARRIER-FREE PARKING REQTS City of Ottawa Part C - Section 111 O.Reg 191/11	Part C -Section 111: 5 per 400-499 O.Reg 191/11: 2 + 2% per 201-1000	11 SPACES per O.Reg 191/11: (6 type 'A' + 5 type 'B')
BICYCLE PARKING SPACES Part C-Section 111, Table 111A	1 per 250m2 GFA 74 Spaces required (25% to be indoors/secure)	80 SPACES total including 24 secured
LOADING SPACE REQUIREMENTS Part C - Section 113, Table 113A	2 per 15,000-24,999m2 GFA 50% to be oversized	2 SPACES (1 regular + 1 oversized)
DRIVE ACCESS CURBS RADII	Per WB-20 Truck Turning Template for a 53' transport trailer as shown on plan.	

LEGEND:

- GRASS / SOFT-SCAPE (SEE LANDSCAPE PLANS)
- UNIT PAVERS (CONCRETE, STONE, ETC)
- ASPHALT PAVING
- HEAVY DUTY ASPHALT PAVING
- CONCRETE
- FIRE ROUTE
- EXISTING FENCE
- PROPERTY / LOT LINE
- SETBACK LINE
- LINE OF ARCHITECTURAL CEDAR SCREEN, SEE DETAIL 2/A105
- LINE OF TURTLE FENCE
- DESIGNATED BUILDING ENTRANCE / EXIT
- DEPRESSED CURB
- PAINTED CROSSWALK LINES
- STANDARD PARKING SPACE (2600 x 5200)
- TYPE 'A' BARRIER-FREE PARKING SPACE c/w AISLE, PAINTED MARKINGS & SIGN WHERE SHOWN (1500 / 3660 / 5200)
- TYPE 'B' STANDARD PARKING SPACE c/w AISLE, PAINTED MARKINGS & SIGN WHERE SHOWN (1500 / 2600 / 5200)
- SIGNAGE FOR BARRIER-FREE PARKING
- BICYCLE PARKING (HORIZONTAL) (1500 / 1800 / 600) N.T.S.
- FIRE HYDRANT. REFER TO CIVIL
- CATCH BASIN
- MANHOLE
- FLOOR DRAIN
- UTILITY POLE
- OVERHEAD UTILITY WIRES
- L.S. LIGHT STANDARD
- NEW TREE (REFER TO LANDSCAPE DRAWINGS)
- NEW SHRUB (REFER TO LANDSCAPE DRAWINGS)
- NEW BENCH (REFER TO LANDSCAPE DRAWINGS)
- 00.00 EXISTING GROUND ELEVATION (TO DETERMINE EXISTING AVERAGE GRADE)
- 00.00 NEW GROUND ELEVATION REFER TO CIVIL
- NEW RIPARIAN ZONE PLANTING (REFER TO LANDSCAPE DRAWINGS)

NOTES:
- REFER TO CIVIL DRAWINGS FOR GRADING, STORM WATER MANAGEMENT, UTILITIES & SITE SERVICES, ROADWAY DESIGN, RETAINING WALLS, ETC.
- REFER TO LANDSCAPE DRAWINGS FOR TREES, PLANTINGS, LANDSCAPE SURFACE TREATMENTS AND COVERINGS, ETC.
- DOUBLE TRAFFIC LANES (AND AISLES) TO BE A MINIMUM OF 6.7 METERS WIDE.

No.	Date	Émis pour / Object
1	2019-10-04	SITE PLAN CONTROL
2	2020-01-08	CLIENT REVIEW
3	2020-01-10	CLIENT REVIEW
4	2020-01-14	CLIENT TREVIEW
5	2020-01-15	SP – CITY COMMENTS
6	2020-01-17	SP – CITY COMMENTS
7	2020-02-20	SP – CITY COMMENTS

Ingénieur / Engineer (Mécanique & Électricité / Mechanical & Electrical)
Goodkey Weedmark Consulting Engineers

Ingénieur / Engineer (Structure / Structure)

Architecte/ Architect (paysagiste / Landscape)

Ingénieur / Engineer (Civil / Civil)
NOVATECH ENGINEERING CONSULTANTS LTD

Client / Client
KRP Properties

Architecte / Architect — Collectif d'architectes / Architects Collective
fig. 1 3550, Saint-Antoine O. Montréal QC H4C 1A9 T. 514 861-5122
fig. 2 150 Somerset St W #206 Ottawa ON K2P 0J4 T. 613 695-6122
figurr — Formerly Rubin & Rotman Architects — www.figurr.ca

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Sceau / Seal

Note:
L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement l'architecte de toutes erreurs ou omissions.
Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Projet / Project
EIGHT STOREY OFFICE BUILDING
2707 SOLANDT ROAD, KANATA, ON

Titre / Title
SITE PLAN

Dessiné par / Drawn by: GB	No. projet / Project number: 1930
Vérifié par / Verified by: RC	No. dessin / Drawing number: A105-a
Échelle / Scale: 1:400	Révision / Revision: #
Date de création du dessin / Drawing creation date: 2019/08/13	

Zoning File: D02-02-19-0125

City SP file: D07-12-19-0172 (Appl. #18039)

APPENDIX C

Sanitary Flow Calculations

PROJECT #: 119110
PROJECT NAME: 2707 SOLANDT RD

SANITARY SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			RESIDENTIAL FLOW						COMMERCIAL FLOW					EXTRANEOUS FLOW		TOTAL FLOWS	PIPE					
Area ID	Use	Total Area	Number of Units	Design Population	Avg Flow	Peak Factor	Res. Peak Flow	**Accum. Res. Flow**	Approximate gross comm. floor area (GFA)	Avg Flow	Peak Factor	Comm. Peak Flow	**Accum. Comm. Flow**	Infiltration Allowance: Total I/I	Infiltration Allowance: **Accum. Infil. Flow**	**Peak Design Flow**	Size	Slope	Length	Capacity	Full Flow Velocity	Q/Qfull
		(ha)	-	(persons)	(l/s)	-	(l/s)	**(l/s)**	(m2)	(l/s)	-	(l/s)	**(l/s)**	(l/s)	**(l/s)**	**(l/s)**	(mm)	(%)	(m)	(l/s)	(m/s)	(%)
2707 Solandt	Commercial (office)	2.00	0	0	0	N/A	0.00	**0.00**	18,450	0.60	1.5	0.90	**0.90**	0.66	**0.66**	**1.56**	200	1.50	47.00	40.13	1.28	3.88%
Total		2.00	0	0	0.00		0.00	**0.00**	18,450	0.60	1.5	0.90	**0.90**	0.66	**0.66**	**1.56**	750	0.13	127.0	401.2	0.91	0.4%

Design Parameters:

Average Sanitary Flows

Commercial - General office	28,000	L/gross ha/d

Peaking Factors

Commercial	1.0	if commercial contribution <20%
	1.5	if commercial contribution >20%

Peak Extraneous Flows

Infiltration Allowance (Dry Weather)	0.05	L/s/effective gross
Infiltration Allowance (Wet Weather)	0.28	L/s/effective gross
Infiltration Allowance (Total I/I)	0.33	L/s/effective gross

Designed: LGB
Checked: JAG

Note: Existing sanitary sewer information from GeoOttawa

Date: 8-Jan-2020

APPENDIX D

Water Demand and FUS Calculations

and Correspondence

WATER DEMAND CALCULATION SHEET

FILE NO.: 119110

DATE: Sept 23, 2019

NOVATECH
Engineers, Planners & Landscape Architects

WATER DEMAND

TO STREET	DOMESTIC			COMMERCIAL				MAX. DAILY DEMAND (l/s)			PEAK HOURLY DEMAND (l/s)			TOTAL MAX DAILY + MAX. FIRE DEMAND (l/s)
	NUMBER OF UNITS		POP'N	SITE AREA	AVERAGE DAILY DEMAND (l/s)									
	BACHELOR / 1-BEDROOM	2-BEDROOM	(pers)	(ha)	RES.	NON-RES.	TOTAL	RES.	NON-RES.	TOTAL	RES.	NON-RES.	TOTAL	TOTAL
SOLANDT RD	-	-	-	2.00	-	0.65	0.65	-	0.98	0.98	-	1.76	1.76	117.98
TOTAL	-	-	-	2.00	-	0.65	0.65	-	0.98	0.98	-	1.76	1.76	-

ASSUMPTIONS:

AVER. DAILY DEMAND:
- Commercial 28000 L / ha. / day

MAX. DAILY DEMAND:
- Commercial 1.5 * aver. day

PEAK HOURLY DEMAND:
- Commercial 1.8 * max. day

FIRE FLOW:
- Total 7,000 l/min. = **117 l/s**

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 119110
Project Name: 2707 Solandt Rd
Date: 24/9/2019
Input By: LGB
Reviewed By: JAG

Legend: Input by User; No Information or Input Required

Building Description: 8-storey office building
Fire Resistive Construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Wood frame		1.5	0.6	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)	Yes	0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	2495			
		Number of Floors/Storeys	8			
		Protected Openings (1 hr)	Yes			
		Area of structure considered (m^2)			**3,743**	
	F	**Base fire flow without reductions**				**8,000**
		$F = 220\ C\ (A)^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**8,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,200**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	No	-10%		
				Cumulative Total	**-40%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**2,400**
		East Side	> 45.1m		0%	
		South Side	> 45.1m		0%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**30%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**7,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**117**
				or	USGPM	1,849
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	2
		Required Volume of Fire Flow (m^3)			m^3	840

Lydia Bolam

From: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Sent: Thursday, October 3, 2019 10:47 AM
To: Lydia Bolam
Cc: Greg MacDonald
Subject: RE: Watermain boundary conditions request - 2707 Solandt Road
Attachments: 2707 Solandt Road _Boundary Conditions_30Sept2019.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Lydia,

Please find attached the boundary conditions.

Thanks,

Santhosh

From: Lydia Bolam <l.bolam@novatech-eng.com>
Sent: September 26, 2019 11:26 AM
To: Kuruvilla, Santhosh <Santhosh.Kuruvilla@ottawa.ca>
Cc: Greg MacDonald <g.Macdonald@novatech-eng.com>
Subject: Watermain boundary conditions request - 2707 Solandt Road

Hi Santhosh,

We would like to request municipal watermain boundary conditions for the proposed commercial development at 2707 Solandt Road. It is proposed to construct an 8-storey office building with a building footprint of approximately 2,500 m2.

The location of the proposed 150mm dia. water service connection to the existing 305mm municipal watermain in Solandt Road and the three (3) existing fire hydrants within the vicinity of the site are shown on the attached sketch. Ideally, the City could provide the boundary conditions and the maximum available fire flow for this development.

Based on preliminary calculations, using the City of Ottawa Guidelines for Drinking Water Systems, the water demands for the proposed development are as follows:

- Average Day Demand = 0.65 L/s (2.00 ha x 28,000 L/ha/d)
- Max. Day Demand = 0.98 L/s (1.5 x Avg. Demand)
- Peak Hour Demand = 1.76 L/s (1.8 x Max. Day Demand)

Based on the Fire Underwriters Survey (FUS) Guidelines, the fire flow for the proposed sprinklered building is approximately 117 L/s (see attached FUS calculations sheet for details).

Please let me know if you have any questions or require any additional information.

Regards,

Lydia Bolam, P.Eng., Project Engineer
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 Ext:276 | Fax: 613.254.5867

'

'

Boundary Conditions for 2707 Solandt Road

Date Provided October-19

Scenario	Demand	
	L/min	L/s
Average Daily Demand	39	0.65
Maximum Daily Demand	59	0.98
Peak Hour	106	1.76
Fire Flow Demand #1	7020	117

# of connections 1

Location:

Results:

Connection 1 - 2707 Solandt Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.0	75.4
Peak Hour	126.2	68.7
Max Day plus Fire 1	125.5	67.7

[1] Ground Elevation = 77.9 m

Notes:

Not Applicable

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

2707 SOLANDT ROAD - PROPOSED WATER SERVICE CONNECTION AND EXISTING FIRE HYDRANTS

(NOVATECH 26/9/2019)

September 26, 2019

- Property Parcels

Water Labels / Étiquettes

Valves / Vannes

- Valve / Vanne
- TVS, A, D

Water Fittings / Raccords de conduite d'eau

- Cap / bouchon
- Reducer / réducteur
- Hydrants / Bornes-fontaines
- Hydrant Laterals / Branchements de borne-fontaine

Water Mains / Conduites d'eau principales

- Private / Branchement privé
- Public / Branchement public

PROPOSED WATER SERVICE

EXISTING FIRE HYDRANT WITHIN 0-75m
OF PROPOSED SIAMESE CONNECTION

EXISTING FIRE HYDRANT WITHIN 75-150m
OF PROPOSED SIAMESE CONNECTION

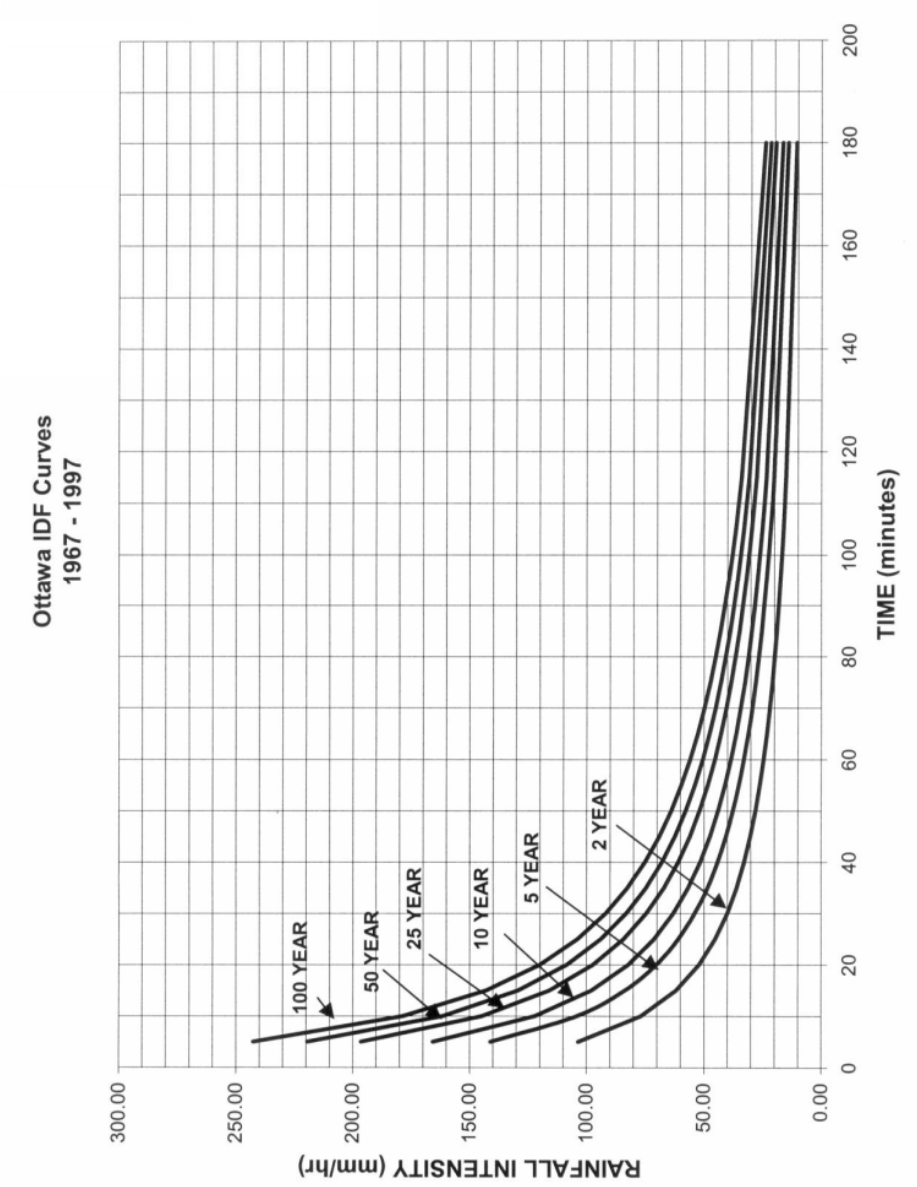
0 .05 .10 km

City of Ottawa

APPENDIX E

Stormwater Management Calculations, CDS Treatment Unit Details, MVCA Floodplain Mapping and Relevant Report Excerpts

APPENDIX 5-A OTTAWA INTENSITY DURATION FREQUENCY (IDF) CURVE



NOVATECH
Engineers, Planners & Landscape Architects

Stormwater Management Design
Proposed Development
2707 Solandt Rd

Project No: 119110

Pre - Development: Overall Flows									
Description	***A (ha)***	***A imp (ha) C=0.9***	***A grav (ha) C=0.60***	***A perv (ha) C= 0.25***	**C_5**	**C_{100} (25% increase)**	**Q-pre (L/s) 2 year**	**5 year**	**100 year**
Site area to be developed	1.588	0.000	0.000	1.588	0.25	0.31	57.4	77.6	165.4
Undeveloped site area (to remain as existing)	0.413	0.000	0.000	0.413	0.25	0.31	14.9	20.2	43.0
Total =	2.000	0.000	0.000	2.000	0.25	0.31	**72.3**	**97.7**	**208.4**
							t_c =20mins	*t_c =20mins*	*t_c =20mins*
						i =	*52.03*	*70.3*	*119.95*

Allowable Site Flows									
Description	***A (ha)***	***A imp (ha) C=0.9***	***A grav (ha) C=0.6***	***A perv (ha) C= 0.25***	**C_5**	**C_{100} (25% increase)**	**Q-allow (L/s) 2 year**	**5 year**	**100 year**
Site area to be developed	1.588	0.000	0	1.588	0.25	0.31	77.6	77.6	77.6
								t_c =20mins	
						i =		*70.3*	

Post - Development: Total Flows for Uncontrolled Sub Catchments											
Area	**Description**	***A (m2)***	***A (ha)***	***A imp (ha) C=0.9***	***A grav (ha) C=0.6***	***A perv (ha) C=0.20***	**C_5**	**C_{100} (25% increase)**	**Q-post uncontrolled (L/s) 2 year**	**5 year**	**100 year**
D-1	Direct Runoff	614	0.061	0.000	0.000	0.061	0.20	0.25	2.6	3.6	7.6
D-2	Direct Runoff	117	0.012	0.000	0.000	0.012	0.20	0.25	0.5	0.7	1.5
D-3	Direct Runoff	863	0.086	0.000	0.000	0.086	0.20	0.25	3.7	5.0	10.7
S-1	Controlled parking lot and landscaped areas	11790	1.179	0.993	0.000	0.186	0.79	0.88	198.8	269.7	516.2
R-1	Controlled Roof	2500	0.250	0.250	0.000	0.000	0.90	1.00	48.0	65.2	124.1
					0.000						
	Total =		1.588	1.243	0.00	0.35	0.75	0.84	**253.6**	**344.1**	**660.11**
									t_c =10mins	*t_c =10mins*	*t_c =10mins*
		0.250						*i =*	*76.81*	*104.20*	*178.60*

Post - Development : Total Flows for Controlled Site								
Area	**Description**	**Q-post controlled (L/s) 2 year**	**5 year**	**100 year**	**Storage Required (m^3) 2 year**	**5 year**	**100 year**	**Provided (m^3)**
D-1, D-2 & D-3	Direct Runoff (Uncontrolled)	6.8	9.2	19.8	N/A	N/A	N/A	N/A
S-1	Controlled Parking Lot/Landscaped Area	27.9	38.2	39.7	158	235	541	718
R-1	Controlled Roof (RD1 - RD6)	< 10	15.0	18.0	< 34	35	83	>83
Total =		**44.7**	**62.4**	**77.4**	**192**	**270**	**623**	**801**
	Meet Allowable Site Flow							
Over-Controlled by:		32.9	15.2	0.2				

* Required storage volumes for S-1 were calculated using 50% of the peak allowable rate of 39.9 L/s

2707 Solandt Rd — **STORAGE CALCULATIONS USING AVERAGE**
Project No: 119110 — **RELEASE RATE EQUAL TO 50% ALLOWABLE**
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA S-1 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE — Qpeak = 38.2 L/s
Area = 1.179 ha — Qaverage = 20.0 L/s
C = 0.79 — Vol(max) = 235 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	365.36	345.36	103.61
10	104.19	269.64	249.64	149.78
15	83.56	216.24	196.24	176.61
20	70.25	181.80	161.80	194.16
25	60.90	157.59	137.59	206.39
30	53.93	139.56	119.56	215.21
35	48.52	125.56	105.56	221.67
40	44.18	114.35	94.35	226.43
45	40.63	105.14	85.14	229.89
50	37.65	97.44	77.44	232.33
55	35.12	90.90	70.90	233.96
60	32.94	85.25	65.25	234.92
65	31.04	80.34	60.34	235.32
70	29.37	76.01	56.01	235.25
75	27.89	72.17	52.17	234.78
90	24.29	62.86	42.86	231.42
105	21.58	55.85	35.85	225.87
120	19.47	50.38	30.38	218.74
135	17.76	45.97	25.97	210.39
150	16.36	42.34	22.34	201.09

2707 Solandt Rd
Project No: 119110
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA S-1 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE — Qpeak = 39.7 L/s
Area = 1.179 ha — Qaverage= 20.0 L/s
C = 0.88 — Vol(max) = 541 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	701.37	681.42	204.43
10	178.56	516.00	496.05	297.63
15	142.89	412.94	392.99	353.69
20	119.95	346.63	326.68	392.02
25	103.85	300.10	280.15	420.22
30	91.87	265.48	245.53	441.96
35	82.58	238.64	218.69	459.24
40	75.15	217.16	197.21	473.29
45	69.05	199.54	179.59	484.90
50	63.95	184.82	164.87	494.60
55	59.62	172.30	152.35	502.76
60	55.89	161.52	141.57	509.67
65	52.65	152.14	132.19	515.53
70	49.79	143.88	123.93	520.52
75	47.26	136.56	116.61	524.74
90	41.11	118.80	98.85	533.81
105	36.50	105.47	85.52	538.78
120	32.89	95.06	75.11	540.79
135	30.00	86.69	66.74	540.56
150	27.61	79.79	59.84	538.56

2707 Solandt Rd
Project No: 119110
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA S-1 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE — Qpeak = 27.9 L/s
Area = 1.179 ha — Qaverage= 20.0 L/s
C = 0.79 — Vol(max) = 158 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	268.03	248.03	74.41
10	76.81	198.76	178.76	107.26
15	61.77	159.85	139.85	125.86
20	52.03	134.65	114.65	137.58
25	45.17	116.89	96.89	145.33
30	40.04	103.63	83.63	150.53
35	36.06	93.32	73.32	153.97
40	32.86	85.05	65.05	156.12
45	30.24	78.26	58.26	157.29
50	28.04	72.57	52.57	157.70
55	26.17	67.73	47.73	157.50
60	24.56	63.55	43.55	156.79
65	23.15	59.91	39.91	155.66
70	21.91	56.71	36.71	154.17
75	20.81	53.86	33.86	152.38
90	18.14	46.95	26.95	145.54
105	16.13	41.75	21.75	137.04
120	14.56	37.68	17.68	127.33
135	13.30	34.41	14.41	116.70
150	12.25	31.71	11.71	105.36

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
STM MH1	1500	1.77	77.01	75.21	75.06
STM MH2	1500	1.77	77.04	75.26	75.25
STMMH 3	1500	1.77	77.20	75.34	75.33
STM MH4	1500	1.77	77.20	75.36	75.35
CB5	600 x 600	0.36	77.07	-	75.80
CB6	600 x 600	0.36	77.21	-	76.00
STM MH 5	1500	1.77	77.21	-	75.46
STM MH6	1500	1.77	76.90	75.26	75.25
CB 3	600 x 600	0.36	76.95	-	75.85
CB4	600 x 600	0.36	77.01	-	75.85
CB1	600 x 600	0.36	76.95	-	75.80
CB2	600 x 600	0.36	77.18	-	75.85
STM MH7	1500	1.77	77.18	75.31	75.30
STM MH8	1500	1.77	77.00	-	75.36

PI = 3.141592654
pipe I.D.= 762 (750 nominal)
U/G Pipe Volume
End Area 0.456 (m^2)
Total Length 350.0 (m)
Pipe Volume 159.6 (m^3)

U/G Pipe Size	750mm
Pipe Segment	Whole length
Centre-Centre Length	362.0
Inside Structure	12.0
U/G Storage Length	350.0

Area S-1: Storage Table

Elevation (m)	System Head (m)	Underground Storage: STM MH1 Volume (m^3)	STM MH2 Volume (m^3)	STMMH 3 Volume (m^3)	STM MH4 Volume (m^3)	CB5 Volume (m^3)	CB6 Volume (m^3)	STM MH 5 Volume (m^3)	STM MH6 Volume (m^3)	CB 3 Volume (m^3)	CB4 Volume (m^3)	CB1 Volume (m^3)	CB2 Volume (m^3)	STM MH7 Volume (m^3)	STM MH8 Volume (m^3)	U/G 750mm dia. Storage Pipe	**Total U/G Volume (m^3)**	Surface Storage: Ponding Volume (m^3)	**Total Surface Volume (m^3)**	**Total Storage Volume (m^3)**
75.06	-0.15																0.00		0.00	**0.00**
75.21	0.00	0.00	0.00	0.00	0.00				0.00					0.00	0.00	0.00	0.00		0.00	**0.00**
75.46	0.25	0.71	0.37	0.23	0.19			0.00	0.37					0.28	0.18	43.00	45.33		0.00	**45.33**
75.71	0.50	1.15	0.81	0.67	0.64	0.0		0.44	0.81	0.0	0.0	0.0	0.0	0.72	0.62	105.00	110.80		0.00	**110.80**
76.00	0.79	1.66	1.33	1.18	1.15	0.1	0.0	0.95	1.33	0.1	0.1	0.1	0.1	1.24	1.13	143.65	153.92		0.00	**153.92**
76.20	0.99	2.01	1.68	1.54	1.50	0.1	0.1	1.31	1.68	0.1	0.1	0.1	0.1	1.59	1.48	159.61	173.14		0.00	**173.14**
76.40	1.19	2.37	2.03	1.89	1.86	0.2	0.1	1.66	2.03	0.2	0.2	0.2	0.2	1.94	1.84	159.61	176.40		0.00	**176.40**
76.60	1.39	2.72	2.39	2.24	2.21	0.3	0.2	2.01	2.39	0.3	0.3	0.3	0.3	2.30	2.19	159.61	179.66		0.00	**179.66**
76.80	1.59	3.07	2.74	2.60	2.56	0.4	0.3	2.37	2.74	0.3	0.3	0.4	0.3	2.65	2.54	159.61	182.92		0.00	**182.92**
76.95	1.74	3.34	3.00	2.86	2.83	0.4	0.3	2.63	2.92	0.4	0.4	0.4	0.4	2.92	2.81	159.61	185.28	0.00	0.00	**185.28**
77.00	1.79	3.43	3.09	2.95	2.92	0.4	0.4	2.72	2.92	0.4	0.4	0.4	0.4	3.00	2.90	159.61	185.97	2.80	2.80	**188.77**
77.10	1.89	3.45	3.16	3.13	3.09	0.5	0.4	2.90	2.92	0.4	0.4	0.4	0.5	3.18	2.90	159.61	186.87	68.40	68.40	**255.27**
77.20	1.99	3.45	3.16	3.30	3.27	0.5	0.4	3.07	2.92	0.4	0.4	0.4	0.5	3.32	2.90	159.61	187.60	322.00	322.00	**509.60**
77.25	2.04	3.45	3.16	3.30	3.27	0.5	0.4	3.09	2.92	0.4	0.4	0.4	0.5	3.32	2.90	159.61	187.62	531.00	531.00	**718.62**

Inlet Control Device - Circular Plug

1:100 Yr
Flow (L/s) = 39.7
Head (m) = 2.00
Elevation (m) = **77.21**
Outlet Pipe Dia.(mm) = 300
Volume (m3) = 540.8

1:5 Yr
Flow (L/s) = 20.0
Head (m) = 1.86
Elevation (m) = **77.07**
Outlet Pipe Dia.(mm) = 300
Volume (m3) = 235.3

Maximum Ponding Depth	**(cm)**
1:100 Yr	**26**
1:5 Yr	**12**

Orifice Size - 1:100 yr Flow Check
Q=0.62xAx(2gh)^0.5

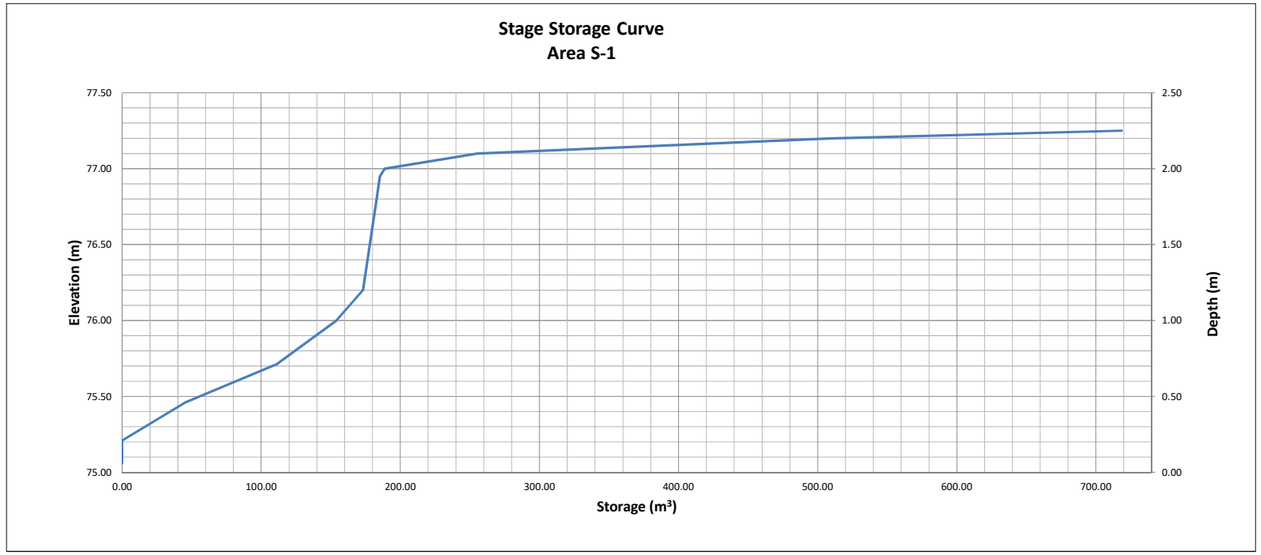
	1:100 yr	Flow Check
Q (m^3/s) =	0.0397	**0.0396**
g (m/s^2) =	9.81	9.81
h (m) =	**2.00**	2.00
A (m^2) =	**0.010221963**	**0.01021**
D (m) =	**0.114083338**	**0.11400**
D (mm) =	**114**	114.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0382
g (m/s^2) =	9.81
h (m) =	**1.86**
A (m^2) =	**0.01021**
D (m) =	**0.114**
D (mm) =	**114**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0279
g (m/s^2) =	9.81
h (m) =	**0.99**
Elev. (m)	76.05
A (m^2) =	**0.01021**
D (m) =	**0.114**
D (mm) =	**114**



2707 Solandt Rd **STORAGE CALCULATIONS USING PEAK**
Project No: 119110 **FLOWS FOR COMPARISON**

REQUIRED STORAGE - 1:5 YEAR EVENT
AREA S-1 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE

Area =	1.179	ha	Qpeak =	38.2	L/s
C =	0.79		Vol(max) =	183.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	365.36	327.16	98.15
10	104.19	269.64	231.44	138.86
15	83.56	216.24	178.04	160.23
20	70.25	181.80	143.60	172.32
25	60.90	157.59	119.39	179.09
30	53.93	139.56	101.36	182.45
35	48.52	125.56	87.36	183.45
40	44.18	114.35	76.15	182.75
45	40.63	105.14	66.94	180.75
50	37.65	97.44	59.24	177.73
55	35.12	90.90	52.70	173.90
60	32.94	85.25	47.05	169.40
65	31.04	80.34	42.14	164.34
70	29.37	76.01	37.81	158.81
75	27.89	72.17	33.97	152.88
90	24.29	62.86	24.66	133.14
105	21.58	55.85	17.65	111.21
120	19.47	50.38	12.18	87.70
135	17.76	45.97	7.77	62.97
150	16.36	42.34	4.14	37.29

2707 Solandt Rd
Project No: 119110
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA S-1 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE

Area =	1.179	ha	Qpeak =	39.7	L/s
C =	0.88		Vol(max) =	438.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	701.37	661.67	198.50
10	178.56	516.00	476.30	285.78
15	142.89	412.94	373.24	335.91
20	119.95	346.63	306.93	368.32
25	103.85	300.10	260.40	390.60
30	91.87	265.48	225.78	406.41
35	82.58	238.64	198.94	417.77
40	75.15	217.16	177.46	425.89
45	69.05	199.54	159.84	431.58
50	63.95	184.82	145.12	435.35
55	59.62	172.30	132.60	437.58
60	55.89	161.52	121.82	438.57
65	52.65	152.14	112.44	438.51
70	49.79	143.88	104.18	437.57
75	47.26	136.56	96.86	435.87
90	41.11	118.80	79.10	427.16
105	36.50	105.47	65.77	414.35
120	32.89	95.06	55.36	398.59
135	30.00	86.69	46.99	380.58
150	27.61	79.79	40.09	360.81

2707 Solandt Rd
Project No: 119110
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA S-1 Controlled Flow-Parking Lot Storage

OTTAWA IDF CURVE

Area =	1.179	ha	Qpeak =	27.9	L/s
C =	0.79		Vol(max) =	137.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	268.03	240.13	72.04
10	76.81	198.76	170.86	102.52
15	61.77	159.85	131.95	118.75
20	52.03	134.65	106.75	128.10
25	45.17	116.89	88.99	133.48
30	40.04	103.63	75.73	136.31
35	36.06	93.32	65.42	137.38
40	32.86	85.05	57.15	137.16
45	30.24	78.26	50.36	135.96
50	28.04	72.57	44.67	134.00
55	26.17	67.73	39.83	131.43
60	24.56	63.55	35.65	128.35
65	23.15	59.91	32.01	124.85
70	21.91	56.71	28.81	120.99
75	20.81	53.86	25.96	116.83
90	18.14	46.95	19.05	102.88
105	16.13	41.75	13.85	87.27
120	14.56	37.68	9.78	70.45
135	13.30	34.41	6.51	52.71
150	12.25	31.71	3.81	34.26

PROJECT #: 113195
PROJECT NAME: 245 Rideau Street
LOCATION: CITY OF OTTAWA

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1- All Controlled Roof Drains

OTTAWA IDF CURVE

Area =	0.250	ha	Qallow =	15.00	L/s
C =	0.90		Vol(max) =	34.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	88.31	73.31	21.99
10	104.19	65.17	50.17	30.10
15	83.56	52.27	37.27	33.54
20	70.25	43.94	28.94	34.73
25	60.90	38.09	23.09	34.64
30	53.93	33.73	18.73	33.72
35	48.52	30.35	15.35	32.23
40	44.18	27.64	12.64	30.33
45	40.63	25.41	10.41	28.12
50	37.65	23.55	8.55	25.66
55	35.12	21.97	6.97	23.00
60	32.94	20.61	5.61	20.18
65	31.04	19.42	4.42	17.23
70	29.37	18.37	3.37	14.16
75	27.89	17.44	2.44	11.00
90	24.29	15.19	0.19	1.04
105	21.58	13.50	-1.50	-9.45
120	19.47	12.18	-2.82	-20.33

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1- All Controlled Roof Drains

OTTAWA IDF CURVE

Area =	0.250	ha	Qallow =	18.00	L/s
C =	1.00		Vol(max) =	82.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	168.68	150.68	45.20
10	178.56	124.10	106.10	63.66
15	142.89	99.31	81.31	73.18
20	119.95	83.37	65.37	78.44
25	103.85	72.17	54.17	81.26
30	91.87	63.85	45.85	82.53
35	82.58	57.39	39.39	82.72
40	75.15	52.23	34.23	82.14
45	69.05	47.99	29.99	80.97
50	63.95	44.45	26.45	79.34
55	59.62	41.44	23.44	77.35
60	55.89	38.85	20.85	75.05
65	52.65	36.59	18.59	72.50
70	49.79	34.60	16.60	69.74
75	47.26	32.84	14.84	66.79
90	41.11	28.57	10.57	57.09
105	36.50	25.37	7.37	46.40
120	32.89	22.86	4.86	35.01

Watts Accutrol Flow Control Roof Drains: TBC at detailed design

Design Event	Number of RDs	Total Flow (L/s)	Approximate Ponding (cm)	Approximate Storage (m^3)	
				Total Required	Provided (APPROX.)
1:5 Year	6	15.0	13	35	TBC (>44)
1:100 Year	6	18.0	15	83	TBC (>99)

PROJECT #: 113195
PROJECT NAME: 245 Rideau Street
LOCATION: CITY OF OTTAWA

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1- RD1 Controlled Roof Drain #1

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	2.50	L/s
C =	0.90		Vol(max) =	5.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	13.92	11.42	3.43
10	104.19	10.27	7.77	4.66
15	83.56	8.24	5.74	5.16
20	70.25	6.93	4.43	5.31
25	60.90	6.00	3.50	5.25
30	53.93	5.32	2.82	5.07
35	48.52	4.78	2.28	4.79
40	44.18	4.36	1.86	4.45
45	40.63	4.01	1.51	4.06
50	37.65	3.71	1.21	3.64
55	35.12	3.46	0.96	3.18
60	32.94	3.25	0.75	2.69
65	31.04	3.06	0.56	2.18
70	29.37	2.90	0.40	1.66
75	27.89	2.75	0.25	1.12
90	24.29	2.39	-0.11	-0.57
105	21.58	2.13	-0.37	-2.35
120	19.47	1.92	-0.58	-4.18

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1- RD1

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	3.00	L/s
C =	1.00		Vol(max) =	12.7	m3

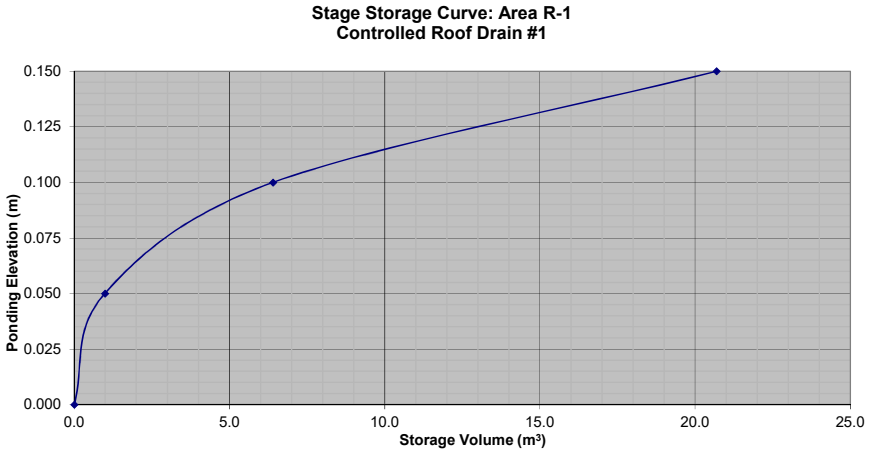
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	26.58	23.58	7.08
10	178.56	19.56	16.56	9.93
15	142.89	15.65	12.65	11.39
20	119.95	13.14	10.14	12.17
25	103.85	11.37	8.37	12.56
30	91.87	10.06	7.06	12.71
35	82.58	9.04	6.04	12.69
40	75.15	8.23	5.23	12.55
45	69.05	7.56	4.56	12.32
50	63.95	7.01	4.01	12.02
55	59.62	6.53	3.53	11.65
60	55.89	6.12	3.12	11.24
65	52.65	5.77	2.77	10.79
70	49.79	5.45	2.45	10.30
75	47.26	5.18	2.18	9.79
90	41.11	4.50	1.50	8.12
105	36.50	4.00	1.00	6.29
120	32.89	3.60	0.60	4.34

Control Roof Drain: TBC at detailed design

Design Event	Flow per roof drain (L/s)	Total Flow (L/s)	Approximate Ponding (cm)	Approximate Storage (m^3) Total Required	Approximate Storage (m^3) Provided (APPROX.)
1:5 Year	2.50	2.5	10	5	6
1:100 Year	3.00	3.0	12	13	13

Roof Drain Storage Table (Approximate)

Elevation	Area RD	Total Volume
m	m^2	m^3
0.00	0	0
0.05	39	1
0.10	177	6
0.15	394	21



PROJECT #: 113195
PROJECT NAME: 245 Rideau Street
LOCATION: CITY OF OTTAWA

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1- RD2 Controlled Roof Drain #2

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	2.50	L/s
C =	0.90		Vol(max) =	5.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	13.85	11.35	3.40
10	104.19	10.22	7.72	4.63
15	83.56	8.20	5.70	5.13
20	70.25	6.89	4.39	5.27
25	60.90	5.97	3.47	5.21
30	53.93	5.29	2.79	5.02
35	48.52	4.76	2.26	4.74
40	44.18	4.33	1.83	4.40
45	40.63	3.98	1.48	4.01
50	37.65	3.69	1.19	3.58
55	35.12	3.44	0.94	3.12
60	32.94	3.23	0.73	2.63
65	31.04	3.04	0.54	2.12
70	29.37	2.88	0.38	1.60
75	27.89	2.74	0.24	1.06
90	24.29	2.38	-0.12	-0.64
105	21.58	2.12	-0.38	-2.41
120	19.47	1.91	-0.59	-4.25

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1- RD2

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	3.00	L/s
C =	1.00		Vol(max) =	12.6	m3

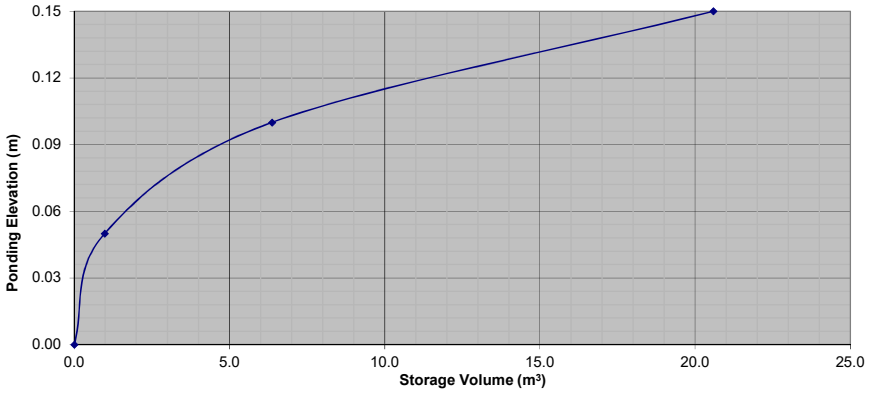
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	26.45	23.45	7.03
10	178.56	19.46	16.46	9.88
15	142.89	15.57	12.57	11.31
20	119.95	13.07	10.07	12.09
25	103.85	11.32	8.32	12.48
30	91.87	10.01	7.01	12.62
35	82.58	9.00	6.00	12.60
40	75.15	8.19	5.19	12.45
45	69.05	7.52	4.52	12.22
50	63.95	6.97	3.97	11.91
55	59.62	6.50	3.50	11.54
60	55.89	6.09	3.09	11.13
65	52.65	5.74	2.74	10.68
70	49.79	5.43	2.43	10.19
75	47.26	5.15	2.15	9.67
90	41.11	4.48	1.48	7.99
105	36.50	3.98	0.98	6.16
120	32.89	3.58	0.58	4.21

Control Roof Drain:		**TBC at detailed design**			
Design Event	**Flow per roof drain (L/s)**	**Total Flow (L/s)**	**Approximate Ponding (cm)**	**Approximate Storage (m^3)**	
				Total Required	**Provided (APPROX.)**
1:5 Year	2.50	2.5	10	5	6
1:100 Year	3.00	3.0	13	13	13

Roof Drain Storage Table (Approximate)

Elevation	Area RD	Total Volume
m	m^2	m^3
0.00	0	0
0.05	39	1
0.10	176	6
0.15	392	21

Stage Storage Curve: Area R-1
Controlled Roof Drain #2



PROJECT #: 113195
PROJECT NAME: 245 Rideau Street
LOCATION: CITY OF OTTAWA

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1- RD3 Controlled Roof Drain #3

OTTAWA IDF CURVE

Area =	0.043	ha	Qallow =	2.50	L/s
C =	0.90		Vol(max) =	6.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	15.26	12.76	3.83
10	104.19	11.26	8.76	5.26
15	83.56	9.03	6.53	5.88
20	70.25	7.59	5.09	6.11
25	60.90	6.58	4.08	6.12
30	53.93	5.83	3.33	5.99
35	48.52	5.24	2.74	5.76
40	44.18	4.78	2.28	5.46
45	40.63	4.39	1.89	5.11
50	37.65	4.07	1.57	4.71
55	35.12	3.80	1.30	4.28
60	32.94	3.56	1.06	3.82
65	31.04	3.36	0.86	3.34
70	29.37	3.17	0.67	2.83
75	27.89	3.01	0.51	2.31
90	24.29	2.63	0.13	0.68
105	21.58	2.33	-0.17	-1.05
120	19.47	2.10	-0.40	-2.85

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1- RD3

OTTAWA IDF CURVE

Area =	0.043	ha	Qallow =	3.00	L/s
C =	1.00		Vol(max) =	14.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	29.15	26.15	7.84
10	178.56	21.44	18.44	11.07
15	142.89	17.16	14.16	12.74
20	119.95	14.41	11.41	13.69
25	103.85	12.47	9.47	14.21
30	91.87	11.03	8.03	14.46
35	82.58	9.92	6.92	14.53
40	75.15	9.02	6.02	14.46
45	69.05	8.29	5.29	14.29
50	63.95	7.68	4.68	14.04
55	59.62	7.16	4.16	13.73
60	55.89	6.71	3.71	13.37
65	52.65	6.32	3.32	12.96
70	49.79	5.98	2.98	12.51
75	47.26	5.68	2.68	12.04
90	41.11	4.94	1.94	10.46
105	36.50	4.38	1.38	8.71
120	32.89	3.95	0.95	6.84

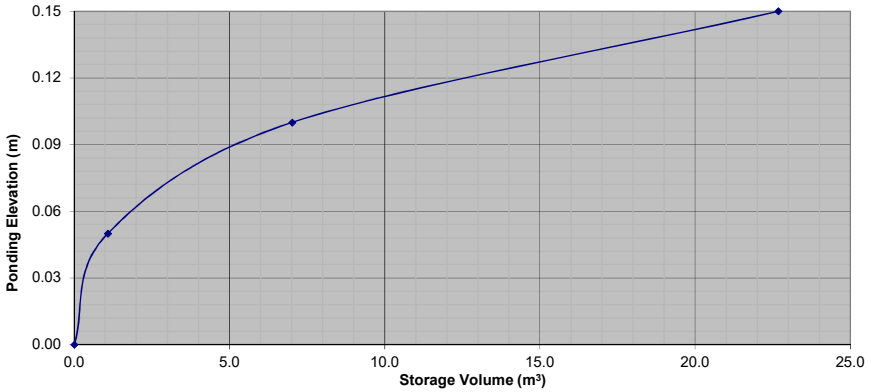
Control Roof Drain: TBC at detailed design

Design Event	Flow per roof drain (L/s)	Total Flow (L/s)	Approximate Ponding (cm)	Approximate Storage (m^3) Total Required	Approximate Storage (m^3) Provided (APPROX.)
1:5 Year	2.50	2.5	10	6	7
1:100 Year	3.00	3.0	12	15	15

Roof Drain Storage Table (Approximate)

Elevation	Area RD	Total Volume
m	m^2	m^3
0.00	0	0
0.05	43	1
0.10	194	7
0.15	432	23

Stage Storage Curve: Area R-1
Controlled Roof Drain #3



PROJECT #: 113195
PROJECT NAME: 245 Rideau Street
LOCATION: CITY OF OTTAWA

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1- RD4 Controlled Roof Drain #4

OTTAWA IDF CURVE

Area =	0.048	ha	Qallow =	2.50	L/s
C =	0.90		Vol(max) =	7.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	16.85	14.35	4.30
10	104.19	12.43	9.93	5.96
15	83.56	9.97	7.47	6.72
20	70.25	8.38	5.88	7.06
25	60.90	7.27	4.77	7.15
30	53.93	6.44	3.94	7.08
35	48.52	5.79	3.29	6.91
40	44.18	5.27	2.77	6.66
45	40.63	4.85	2.35	6.34
50	37.65	4.49	1.99	5.98
55	35.12	4.19	1.69	5.58
60	32.94	3.93	1.43	5.15
65	31.04	3.70	1.20	4.70
70	29.37	3.51	1.01	4.22
75	27.89	3.33	0.83	3.73
90	24.29	2.90	0.40	2.15
105	21.58	2.58	0.08	0.48
120	19.47	2.32	-0.18	-1.27

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1- RD4

OTTAWA IDF CURVE

Area =	0.048	ha	Qallow =	3.00	L/s
C =	1.00		Vol(max) =	16.7	m3

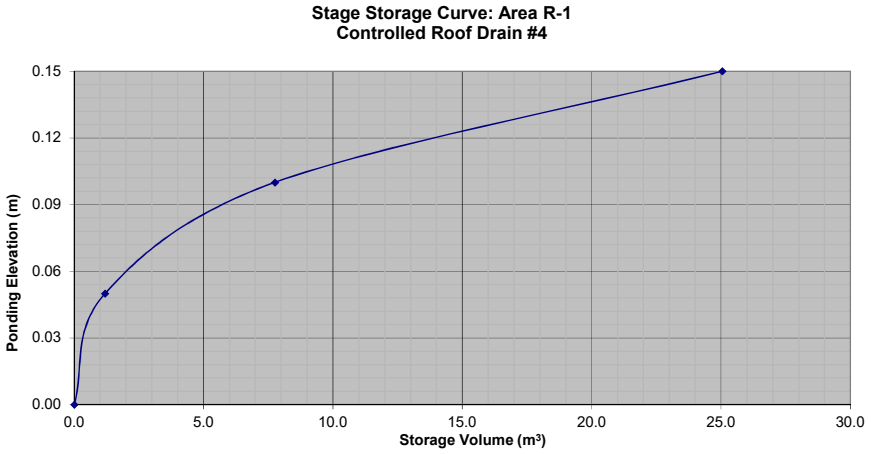
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	32.18	29.18	8.76
10	178.56	23.68	20.68	12.41
15	142.89	18.95	15.95	14.35
20	119.95	15.91	12.91	15.49
25	103.85	13.77	10.77	16.16
30	91.87	12.18	9.18	16.53
35	82.58	10.95	7.95	16.70
40	75.15	9.96	6.96	16.72
45	69.05	9.16	6.16	16.62
50	63.95	8.48	5.48	16.44
55	59.62	7.91	4.91	16.19
60	55.89	7.41	4.41	15.88
65	52.65	6.98	3.98	15.53
70	49.79	6.60	3.60	15.13
75	47.26	6.27	3.27	14.70
90	41.11	5.45	2.45	13.24
105	36.50	4.84	1.84	11.59
120	32.89	4.36	1.36	9.81

Control Roof Drain: TBC at detailed design

Design Event	Flow per roof drain (L/s)	Total Flow (L/s)	Approximate Ponding (cm)	Approximate Storage (m^3) Total Required	Approximate Storage (m^3) Provided (APPROX.)
1:5 Year	2.50	2.5	10	7	8
1:100 Year	3.00	3.0	13	17	17

Roof Drain Storage Table (Approximate)

Elevation	Area RD	Total Volume
m	m^2	m^3
0.00	0	0
0.05	48	1
0.10	215	8
0.15	477	25



PROJECT #: 113195
PROJECT NAME: 245 Rideau Street
LOCATION: CITY OF OTTAWA

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1- RD5 Controlled Roof Drain #5

OTTAWA IDF CURVE

Area =	0.040	ha	Qallow =	2.50	L/s
C =	0.90		Vol(max) =	5.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	14.24	11.74	3.52
10	104.19	10.51	8.01	4.80
15	83.56	8.43	5.93	5.33
20	70.25	7.08	4.58	5.50
25	60.90	6.14	3.64	5.46
30	53.93	5.44	2.94	5.29
35	48.52	4.89	2.39	5.02
40	44.18	4.46	1.96	4.69
45	40.63	4.10	1.60	4.31
50	37.65	3.80	1.30	3.89
55	35.12	3.54	1.04	3.44
60	32.94	3.32	0.82	2.96
65	31.04	3.13	0.63	2.46
70	29.37	2.96	0.46	1.94
75	27.89	2.81	0.31	1.40
90	24.29	2.45	-0.05	-0.28
105	21.58	2.18	-0.32	-2.04
120	19.47	1.96	-0.54	-3.87

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1- RD5

OTTAWA IDF CURVE

Area =	0.040	ha	Qallow =	3.00	L/s
C =	1.00		Vol(max) =	13.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	27.19	24.19	7.26
10	178.56	20.00	17.00	10.20
15	142.89	16.01	13.01	11.71
20	119.95	13.44	10.44	12.53
25	103.85	11.63	8.63	12.95
30	91.87	10.29	7.29	13.13
35	82.58	9.25	6.25	13.13
40	75.15	8.42	5.42	13.01
45	69.05	7.74	4.74	12.79
50	63.95	7.17	4.17	12.50
55	59.62	6.68	3.68	12.14
60	55.89	6.26	3.26	11.74
65	52.65	5.90	2.90	11.30
70	49.79	5.58	2.58	10.83
75	47.26	5.29	2.29	10.32
90	41.11	4.61	1.61	8.67
105	36.50	4.09	1.09	6.86
120	32.89	3.69	0.69	4.93

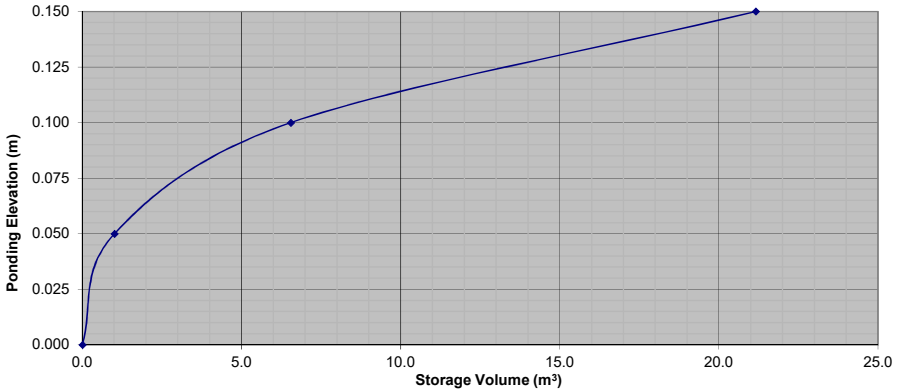
Control Roof Drain: TBC at detailed design

Design Event	Flow per roof drain (L/s)	Total Flow (L/s)	Approximate Ponding (cm)	Approximate Storage (m^3) Total Required	Approximate Storage (m^3) Provided (APPROX.)
1:5 Year	2.50	2.5	10	6	7
1:100 Year	3.00	3.0	13	13	13

Roof Drain Storage Table (Approximate)

Elevation	Area RD	Total Volume
m	m^2	m^3
0.00	0	0
0.05	40	1
0.10	181	7
0.15	403	21

Stage Storage Curve: Area R-1
Controlled Roof Drain #5



PROJECT #: 113195
PROJECT NAME: 245 Rideau Street
LOCATION: CITY OF OTTAWA

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1- RD6 Controlled Roof Drain #6

OTTAWA IDF CURVE

Area =	0.040	ha	Qallow =	2.50	L/s
C =	0.90		Vol(max) =	5.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	14.06	11.56	3.47
10	104.19	10.38	7.88	4.73
15	83.56	8.32	5.82	5.24
20	70.25	7.00	4.50	5.39
25	60.90	6.06	3.56	5.35
30	53.93	5.37	2.87	5.17
35	48.52	4.83	2.33	4.90
40	44.18	4.40	1.90	4.56
45	40.63	4.05	1.55	4.17
50	37.65	3.75	1.25	3.75
55	35.12	3.50	1.00	3.29
60	32.94	3.28	0.78	2.81
65	31.04	3.09	0.59	2.31
70	29.37	2.92	0.42	1.78
75	27.89	2.78	0.28	1.25
90	24.29	2.42	-0.08	-0.44
105	21.58	2.15	-0.35	-2.21
120	19.47	1.94	-0.56	-4.04

2707 Solandt Rd
Project No. 113195
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1- RD6

OTTAWA IDF CURVE

Area =	0.040	ha	Qallow =	3.00	L/s
C =	1.00		Vol(max) =	12.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	26.85	23.85	7.16
10	178.56	19.76	16.76	10.05
15	142.89	15.81	12.81	11.53
20	119.95	13.27	10.27	12.33
25	103.85	11.49	8.49	12.74
30	91.87	10.16	7.16	12.90
35	82.58	9.14	6.14	12.89
40	75.15	8.31	5.31	12.75
45	69.05	7.64	4.64	12.53
50	63.95	7.08	4.08	12.23
55	59.62	6.60	3.60	11.87
60	55.89	6.18	3.18	11.46
65	52.65	5.83	2.83	11.02
70	49.79	5.51	2.51	10.54
75	47.26	5.23	2.23	10.03
90	41.11	4.55	1.55	8.36
105	36.50	4.04	1.04	6.54
120	32.89	3.64	0.64	4.61

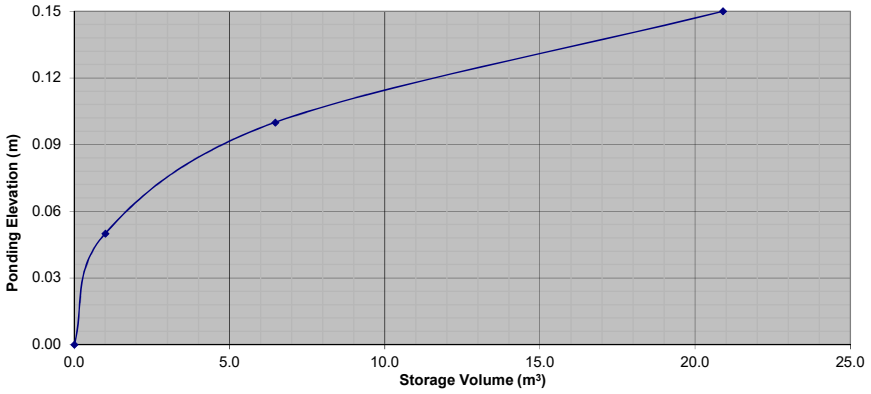
Control Roof Drain: TBC at detailed design

Design Event	Flow per roof drain (L/s)	Total Flow (L/s)	Approximate Ponding (cm)	Approximate Storage (m^3) Total Required	Approximate Storage (m^3) Provided (APPROX.)
1:5 Year	2.50	2.5	10	5	6
1:100 Year	3.00	3.0	13	13	13

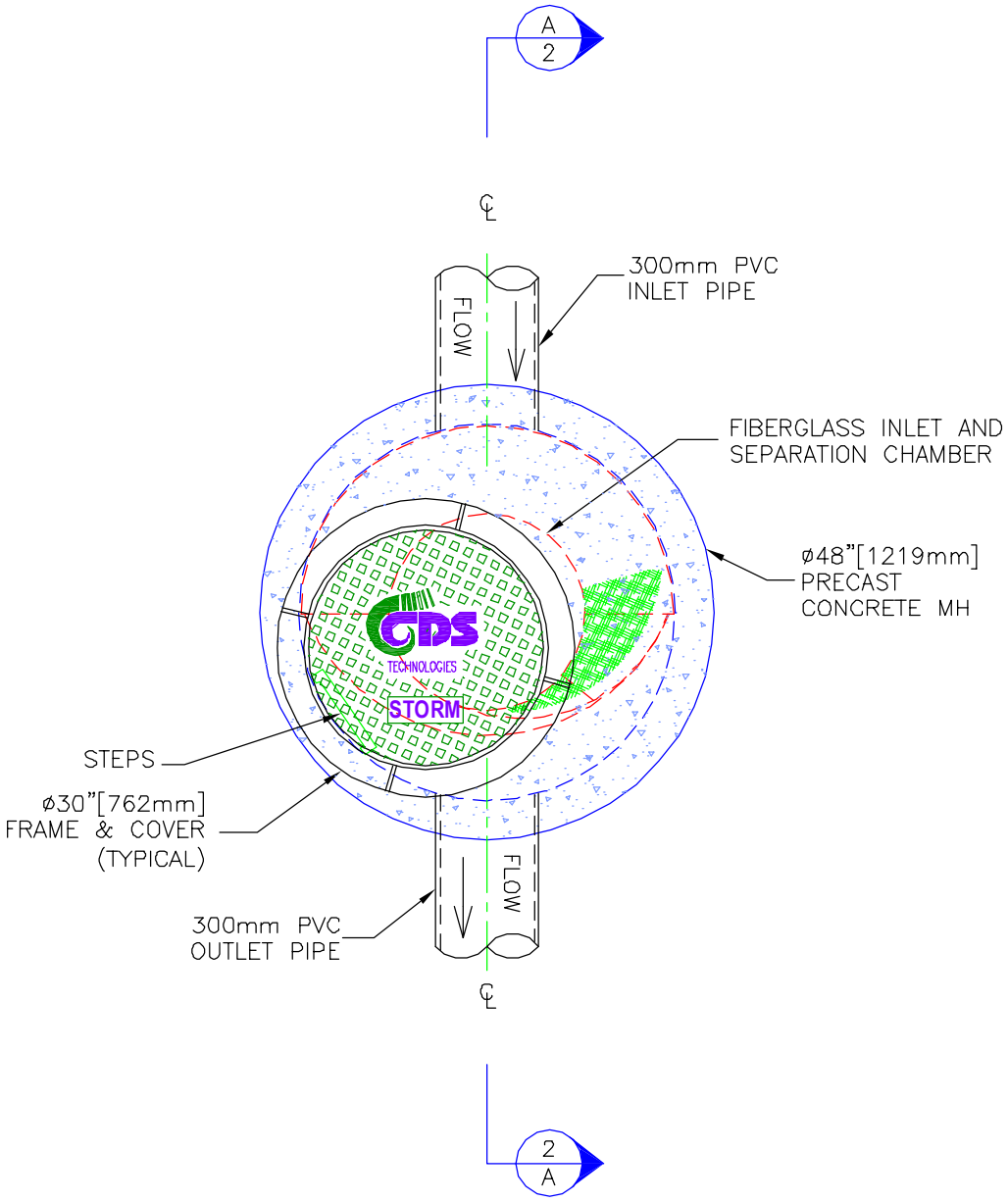
Roof Drain Storage Table (Approximate)

Elevation	Area RD	Total Volume
m	m^2	m^3
0.00	0	0
0.05	40	1
0.10	179	6
0.15	398	21

Stage Storage Curve: Area R-1
Controlled Roof Drain #6



PLAN VIEW

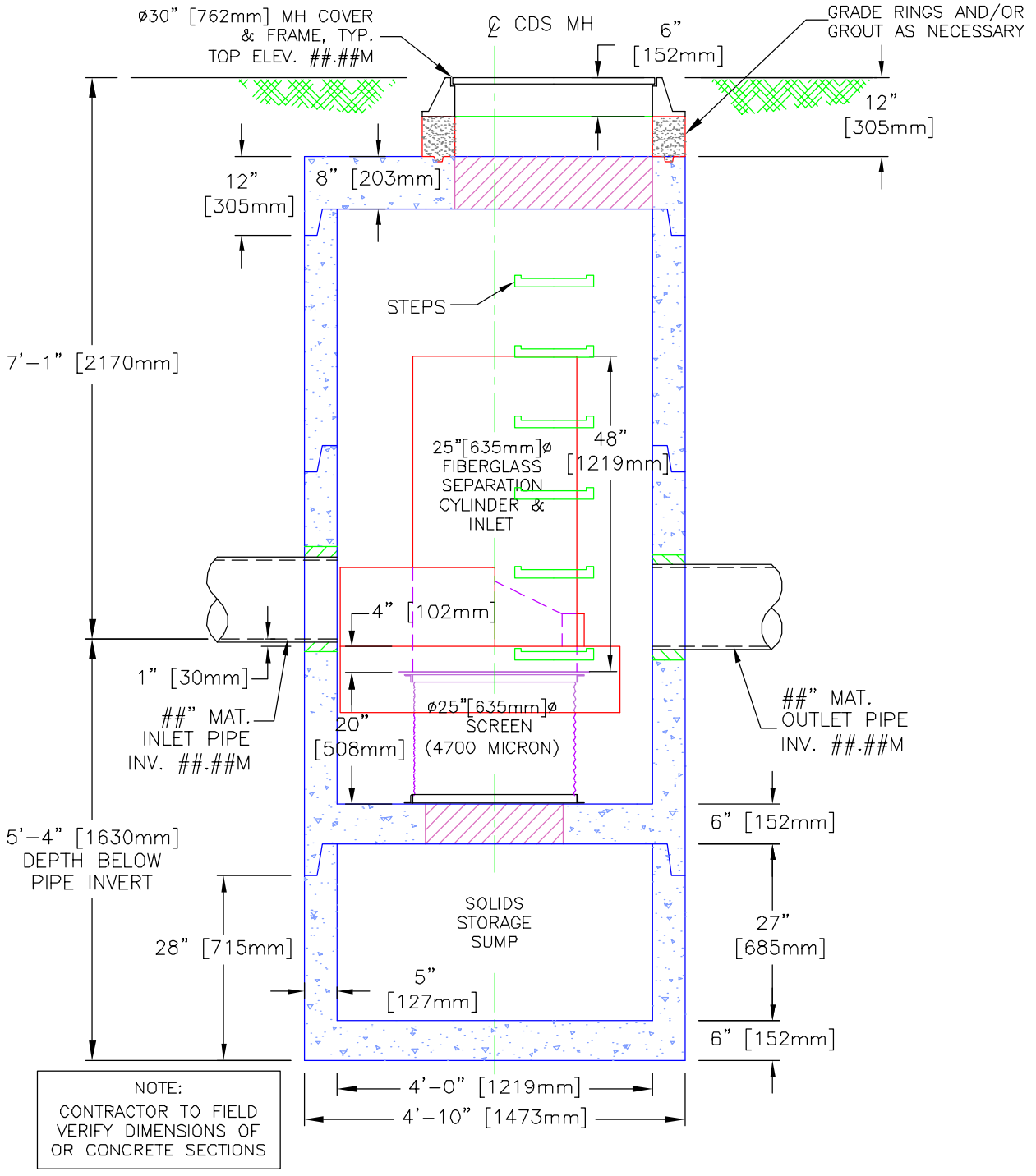


CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX-##-###	SCALE 1" = 2'
		DATE ##/##/##	SHEET 1
		DRAWN INITIALS	
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

SECTION A–A
ELEVATION VIEW



NOTE:
CONTRACTOR TO FIELD VERIFY DIMENSIONS OF OR CONCRETE SECTIONS

CDS MODEL PMSU20_15_4m
STORMWATER TREATMENT UNIT

CONTECH STORMWATER SOLUTIONS	PROJECT NAME CITY, STATE	JOB# XX–##–###	SCALE 1" = 2'
		DATE ##/##/##	SHEET 2
		DRAWN INITIALS	
		APPROV.	

Echelon Environmental 505 Hood Road, Unit 26, Markham, Ontario L3R 5V6 Tel: (905) 948-0000 Fax: (905) 948-0577
CONTECH Stormwater Solutions Inc. 930 Woodcock Road, Suite 101, Orlando, Florida 32803 Tel: (800) 848-9955

CDS Average Annual Efficiency For TSS Removal & Total Annual Volume Treated

Project:	**Solandt Rd 2707**		
Location:	**Ottawa, ON**		
Date:	**10/9/2019**		
By:	**EK**		
PSD:	**FINE**	**Area:**	1.179 ha
CDS Model:	**PMSU20_15_4**	**C-Value**	0.79
CDS Design Flow:	**20 l/s**	**IDF Data:**	Ottawa, ON

Return Period	Peak Flow	TSS Percentage Captured	Treated Flow Volume	Total Flow Volume	Annual Exceedance Probability	System Flow	CDS Flow	By-Pass Flow	Volume Percentage Treated
month / yr	Yr	l/s	%	litres	litres	%	l/s	l/s	l/s	%
1-M	0.08	6.19	93.01	17394	17394	**100.00**	6.19	6.19	0.00	100.00
2-M	0.17	8.85	90.53	24749	24749	**99.75**	8.85	8.85	0.00	100.00
3-M	0.25	9.74	89.69	27249	27249	**98.17**	9.74	9.74	0.00	100.00
4-M	0.33	12.65	86.94	35479	35479	**95.04**	12.65	12.65	0.00	100.00
5-M	0.42	13.78	85.86	38738	38738	**90.91**	13.78	13.78	0.00	100.00
6-M	0.50	14.91	84.78	41997	41997	**86.47**	14.91	14.91	0.00	100.00
7-M	0.58	15.77	83.96	44517	44517	**82.01**	15.77	15.77	0.00	100.00
8-M	0.67	16.63	83.14	47038	47038	**77.67**	16.63	16.63	0.00	100.00
9-M	0.75	17.49	82.31	49558	49558	**73.64**	17.49	17.49	0.00	100.00
10-M	0.83	20.50	78.40	56626	58820	**69.90**	20.50	20.01	0.49	97.16
11-M	0.92	23.51	74.49	63695	68081	**66.40**	23.51	20.01	3.50	94.33
1-Yr	1	26.52	70.58	70764	77343	**63.21**	26.52	20.01	6.51	91.49
2-Yr	2	29.14	67.03	75219	85844	**39.35**	29.14	20.01	9.12	87.62
5-Yr	5	37.84	56.86	87932	115843	**18.13**	37.84	20.01	17.83	75.91
10-Yr	10	38.37	56.31	88621	117749	**9.52**	38.37	20.01	18.35	75.26
25-Yr	25	39.17	55.50	89658	120678	**3.92**	39.17	20.01	19.16	74.30
50-Yr	50	40.36	54.32	91179	125093	**1.98**	40.36	20.01	20.35	72.89
100-Yr	100	43.89	51.02	95476	138568	**1.00**	43.89	20.01	23.88	68.90

Average Annual TSS Removal Efficiency [%]: **83.6** Ave. Ann. T. Volume [%]: **98.01%**

ECHELON ENVIRONMENTAL

CDS TECHNOLOGIES

Date Modified / Date de modification: 12/20/2017

MAP No.
CARTE No. 3

FLOOD RISK MAP
SHIRLEY'S BROOK
CARTE DU RISQUE D'INONDATION

LEGEND / LÉGENDE

- Regulatory Floodplain / La Crue Régulatrice
- Regulatory Limit / Limite Réglementaire
- Contours / Courbes
- Stream / Ruisseau
- Cross Sections / La coupe traversale

Station Number — Numéro de la station
Regulatory Flood Elevation (m) — Niveau de la crue regulatrice (m)

6446
75.7

INDEX CONTOUR INTERVAL 2 METRES
WITH 0.5 METRE INTERMEDIATE CONTOUR
NORTH AMERICAN DATUM 1983

COURBES DE NIVEAU PRINCIPALES DE 2.0 MÈTRE
AVEC COURBES DE NIVEAU INTERMÉDIAIRES DE 0.5 MÈTRES
SYSTÈME DE RÉFÉRENCE GÉODÉSIQUE NORD-AMÉRIQUE 1983

GENERAL INFORMATION

Vertical Datum: CGVD28
Horizontal Datum: North American 1983
Map Projection: Ottawa Transverse Mercator Projection

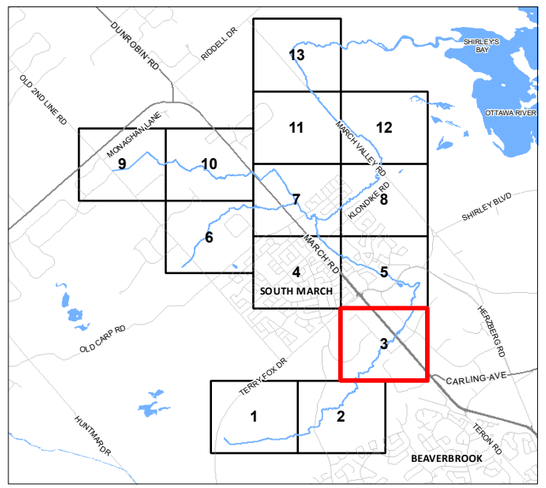
RENSEIGNMENTS GÉNÉRAUX

Niveau de référence vertical: CGVD28
Niveau de référence horizontal: Nord-americain 1983
Projection cartographique: Projection Mercator Transverse d'Ottawa

Mississippi Valley Conservation Authority

Ottawa

SHEET INDEX / TABLEAU D'ASSEMBLAGE



Revision #	Issue
1 - Oct. 25. 2017	Public Review
2 - Dec. 6. 2017	Board approval

LICENSED PROFESSIONAL ENGINEER
J. S. A. PRICE
Nov. 10/17
PROVINCE OF ONTARIO

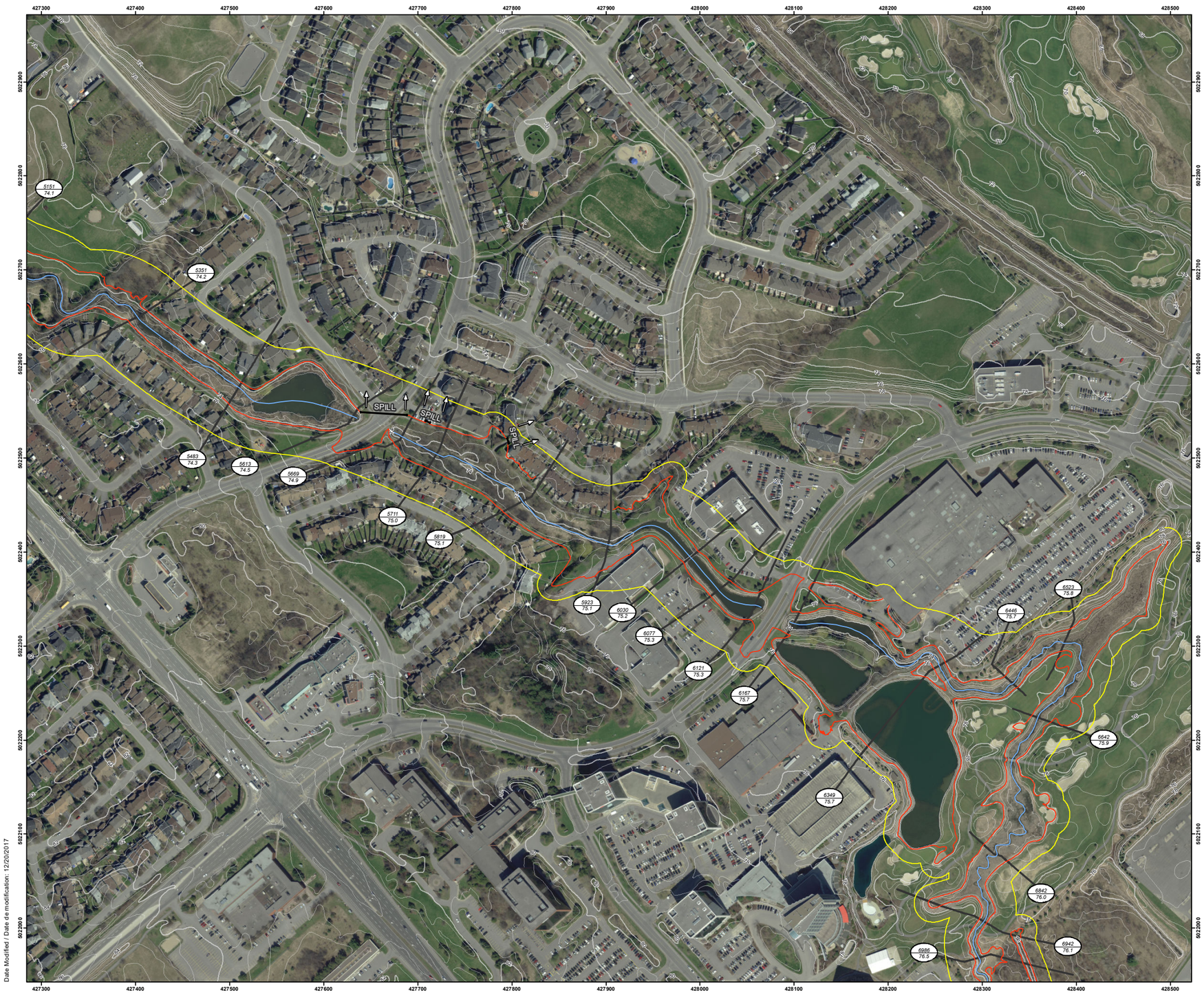
N
W E
S

SCALE 1:2,000 ÉCHELLE

0 25 50 100 150 200
Meters / Mètres

MAP No. 5
CARTE No.

FLOOD RISK MAP
SHIRLEY'S BROOK
CARTE DU RISQUE D'INONDATION



LEGEND / LÉGENDE

- Regulatory Floodplain / La Crue Régulatrice
- Regulatory Limit / Limite Réglementaire
- Contours / Courbes
- Stream / Ruisseau
- Cross Sections / La coupe traversale

Station Number — 6446 / 75.7 — Numéro de la station
Regulatory Flood Elevation (m) — Niveau de la crue regulatrice (m)

INDEX CONTOUR INTERVAL 2 METRES
WITH 0.5 METRE INTERMEDIATE CONTOUR
NORTH AMERICAN DATUM 1983

COURBES DE NIVEAU PRINCIPALES DE 2.0 MÈTRE
AVEC COURBES DE NIVEAU INTERMÉDIAIRES DE 0.5 MÈTRES
SYSTÈME DE RÉFÉRENCE GÉODÉSIQUE NORD-AMÉRIQUE 1983

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Horizontal Datum: North American 1983
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Mississippi Valley Conservation Authority

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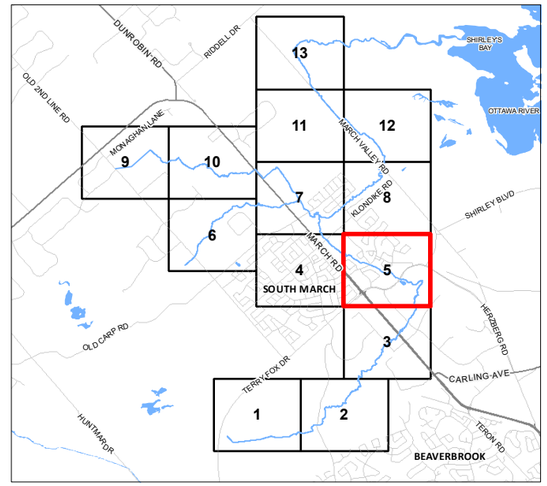
SHEET INDEX / TABLEAU D'ASSEMBLAGE



Date Modified / Date de modification: 12/20/2017

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Digital Elevation Information © City of Ottawa

N
W E
S

SCALE 1:2,000 ÉCHELLE

0 25 50 100 150 200
Meters / Mètres

Cette carte et les renseignements connexes qui sont affichés sont fournis à titre d'exemple général seulement. En dépit de tous les efforts consentis pour en garantir l'exactitude, les représentations ou renseignements que l'on trouvera ici demeurent approximatifs du fait de la nature complexe et de l'étendue des données, et doivent donc être vérifiés par l'utilisateur. L'utilisateur reconnait par la présente que cette carte n'est pas conçue pour une navigation exacte et véridique, accepte et endosse les risques connexes associés à son utilisation.

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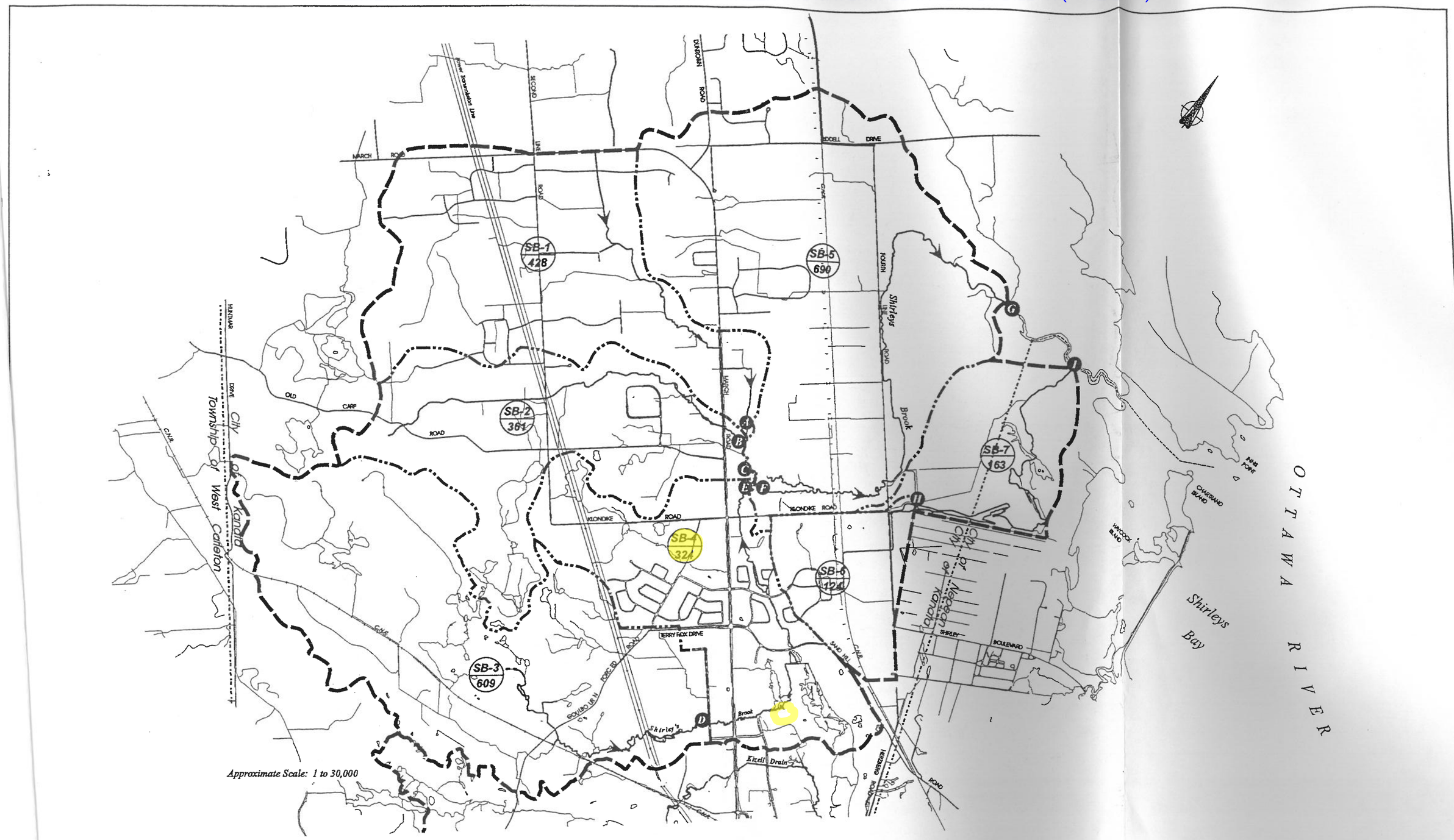
LICENSED PROFESSIONAL ENGINEER
J. S. A. PRICE
Nov. 10/17
PROVINCE OF ONTARIO


SB-1
428
SB-2
361
SB-3
609
SB-4
324
SB-5
690
SB-6
124
SB-7
163
MARCH ROAD
KLONDIKE ROAD
HAZELDEAN ROAD
TERRY FOX DRIVE
SHIRLEY BOULEVARD
CARP ROAD
FOURTH LINE ROAD
Shirleys Brook
Kizell Drain
Shirleys Bay
OTTAWA RIVER
City of Kanata
Township of West Carleton
Approximate Scale: 1 to 30,000
Catchment Area ID
Area (ha)
Subwatershed Boundary
Catchment Area Boundary
Flow Point
Watercourse
DILLON CONSULTING
Shirley's Brook Subwatershed
Existing Drainage Conditions
Figure 2.3a

Catchment Area SB-4

Potential Development Impacts

Future Land Use
- increase in urban residential (118 ha), and industrial/commercial (89 ha)
- area of imperviousness to increase from 16% to 46%

Groundwater Resources
- potential impacts due to road runoff as well as non-specific commercial/industrial point sources (e.g., gas stations)
- potential increased bedrock contamination loading in potential infiltration areas depending upon subsurface profile (i.e., alluvial sands/bedrock connectivity)

Surface Water Resources
- increased runoff peak flows, aggravate existing flooding hazards
- water quality impairment of receiving watercourses
- for 2 year return period event, expected peak flow increase is 303%
- for 100 year return period event, expected peak flow increase is 218%

In stream Water Quality
- increase in TSS
- moderate increase in E. Coli and fecal coliforms
- increased pollutant loading from vehicle traffic

Morphology
- widening of low flow channel: bank toe erosion
- expect more sediment transport and erosion rather than deposition
- meanders will increase in size, causing an increase in the spatial area that the watercourse occupies on the floodplain
- further erosion of existing erosion sites and any other areas in which plantform has been straightened – especially of low order tributary channels and immediately upstream of Klondike Rd.
- increase in fine sediment within channel as a function of particulate matter in urbanized settings
- increase in flushing flows that will remove fines from channel – coarsening of average substrate size
- general erosion process

Aquatic Habitat
- area already significantly impacted
- future development presents an opportunity to restore reach 9
- future impacts from commercial development possible for reach 10
- further increase in erosion and decrease in water quality may degrade habitat to beyond restoration capability

Environmental Protection Targets

Surface Water Quality and Quantity
- provide Level 2 water quality enhancement of urban storm water runoff
- maintain post-development runoff peak flows to existing levels for all storm events up to the 100-year

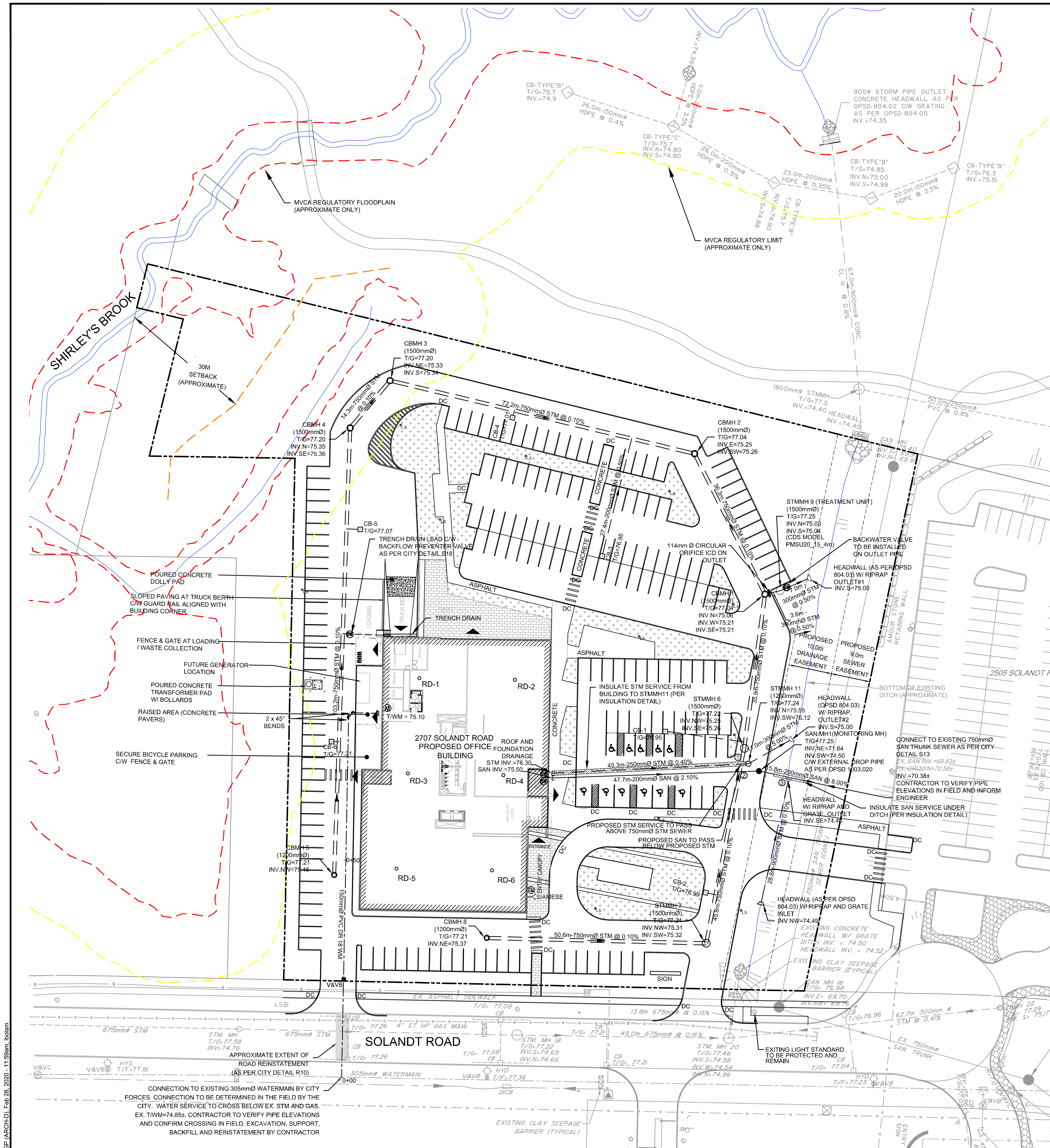
Catchment Area SB-4

Protection Level	Description	[2]SWMP Type	[3]Storage Volume (m^3/ha) for Impervious Level			
			35%	55%	70%	85%
Level 2	Applied in areas of Type 2 fish habitat. Includes: • aquatic habitat identified as ecologically valuable, but is sufficiently abundant or not considered to be a limiting factor for habitat productive capacity • general feeding areas and pool-riffle-run complexes	Infiltration	20	20	25	30
		Wetlands	60	70	80	90
		Wet Ponds	90	110	130	150
		Dry Pond	60	80	95	110

Note:
1 Source, *Stormwater Management Practices Planning and Design Manual*, (MOEE, 1994c)
2 For wetlands and wet ponds, the required storage volume is comprised of 40 m^3/ha extended detention, while the remainder is the permanent pool volume.
3 Storage volumes are based on 24 hour detention.
Storage volumes are based on a 80, 70, 60 and 50% TSS removal for Protection Levels 1, 2, 3 and 4, respectively.

Instream Water Quality

Parameter	Units	Recommended Criteria Level
Dissolved Oxygen	mg/L	> 3.0 mg/L
Temperature	^{0} C	< 2^0 C change (in stormwater discharge)
PH	pH	6.5 - 9.0
Total Suspended Solids (TSS)	mg/L	10
Un-ionized ammonia	mg/L	0.02
Total Phosphorus	mg/L	0.03
Aluminum	mg/L	0.3
Cadmium	mg/L	0.0005
Copper	mg/L	0.005
Lead	mg/L	0.025
Zinc	mg/L	0.03



GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA AND MVCA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT (No. 18111016, DATED SEPTEMBER, 2019), PREPARED BY GOLDER FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO THE 'SITE SERVICING AND STORMWATER MANAGEMENT REPORT' (R-2019-157) PREPARED BY NOVATECH.
11. SAW CUT AND KEYGRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE-IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.

SEWER NOTES:

1. SUPPLY AND CONSTRUCT ALL SEWERS AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
STORM / SANITARY MANHOLE (1200Ø/1500Ø)	701.010	OPSD
CATCHBASIN MANHOLE (1200Ø/1500Ø)	701.011	OPSD
STORM / CBMH FRAME AND COVER	401.010	OPSD
WATERTIGHT SANITARY MH FRAME AND COVER	401.030	OPSD
CATCHBASIN (600x600)	705.010	OPSD
CATCHBASIN FRAME AND COVER	400.020	OPSD
CONCRETE HEADWALL	804.030	OPSD
STORM SEWER (≤ 450mm Ø / 750mm Ø)	PVC DR 35 / CONC. CLASS 65D	
SANITARY SEWER	PVC DR 35	
CATCHBASIN LEAD	PVC DR 35	
SUBDRAIN	HDPE PERF./NON-PERF. PIPE	
SEWER TRENCH	S6 / S7	CITY OF OTTAWA

3. ALL SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
4. ALL STORM AND SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTERS AS PER THE CITY OF OTTAWA STANDARD DETAILS S14 AND S14.1 OR S14.2.
5. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
6. INSULATE ALL SEWER PIPES THAT HAVE LESS THAN 1.5m COVER WITH HI-40 RIGID INSULATION AS PER INSULATION DETAIL. THE PROPOSED STORAGE PIPE DOES NOT REQUIRE INSULATION.
7. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
8. ALL STORM MANHOLES AND CATCHBASIN MANHOLES ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED, AND CATCHBASINS TO HAVE 600mm SUMPS.
9. CATCHBASIN MANHOLE WITH ICD TO BE INSTALLED (CBMH1) IS TO HAVE A 600mm SUMP UNLESS OTHERWISE SPECIFIED.
10. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT TO ENSURE THAT THEY ARE CLEAN AND OPERATIONAL. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES. OBTAIN APPROVAL FROM THE CITY'S SEWER OPERATIONS.
11. THE OWNER SHALL REQUIRE THAT THE SITE SERVICING CONTRACTOR PERFORM FIELD TESTS FOR QUALITY CONTROL OF ALL SANITARY SEWERS. LEAKAGE TESTING SHALL BE COMPLETED IN ACCORDNCE WITH OPSS 410.07.16, 410.07.16.04 AND 407.07.24. DYE TESTING IS TO BE COMPLETED ON ALL SANITARY SERVICES TO CONFIRM PROPER CONNECTION TO THE SANITARY SEWER MAIN. THE FIELD TESTS SHALL BE PERFORMED IN THE PRESENCE OF A CERTIFIED PROFESSIONAL ENGINEER WHO SHALL SUBMIT A CERTIFIED COPY OF THE TEST RESULTS.

WATERMAIN NOTES:

1. SUPPLY AND CONSTRUCT ALL WATERMAIN AND APPURTENANCES IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.
2. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION BY OPEN STRUCTURES	W23	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWERS	W25	CITY OF OTTAWA
WATERMAIN	PVC DR 18	

2. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY CITY OFFICIALS. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION BY THE CONTRACTOR.
3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED. OTHERWISE, THERMAL INSULATION IS REQUIRED AS PER STD DRAWING W22.
4. PROVIDE MINIMUM 0.50m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS WHEN WATERMAIN IS BELOW AND MINIMUM 0.25mm CLEARANCE WHEN WATERMAIN IS ABOVE.
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

150mmØ WATERMAIN TABLE

STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
0+00	77.40±	75.00± *	CONNECTION TO EXISTING 305mmØ WM
0+10.59	77.25±	74.23± **	CROSS UNDER EXISTING STM SEWER
0+13.08	77.25±	74.85±	CROSS UNDER EXISTING GAS
0+22.62	77.54±	75.14±	150mm V&VB @ PROPERTY LINE
0+83.12	77.41±	75.01±	45° HORIZONTAL BEND
0+84.50	77.40±	75.00±	45° HORIZONTAL BEND
0+90.46	77.59±	75.19±	CAP 1.0m FROM BUILDING FACE

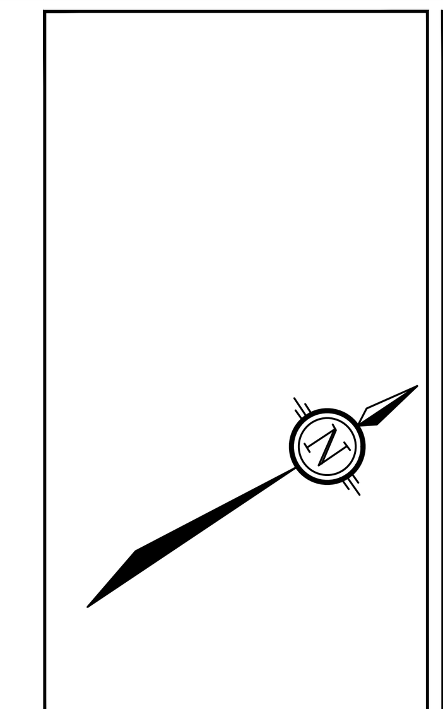
* 150mmØ CONNECTION TO EXISTING 305mmØ WATERMAIN. EXACT ELEVATION TO BE FIELD DETERMINED.

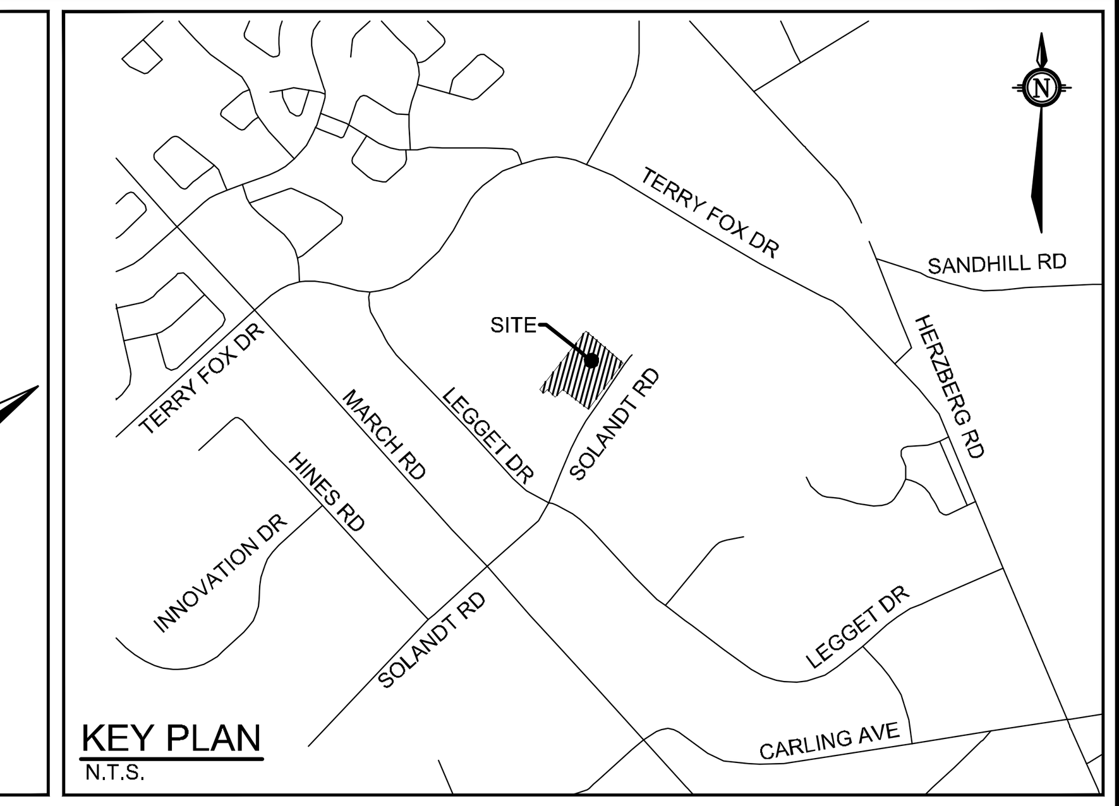
** WATERMIAN CROSSING BELOW EX STM SEWER AS PER CITY OF OTTAWA DETAIL W25.

CRITICAL SEWER PIPE CROSSING TABLE

CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE
①	750mmØ CONC. STM CROWN=76.12	250mm Ø STM INV.=76.12	0.00m *
②	200mm Ø SAN OBV.=74.79	750mm Ø STM INV=75.27	0.48m±
③	200mm Ø SAN OBV.=73.47	900mm Ø STM INV=74.46	0.99m

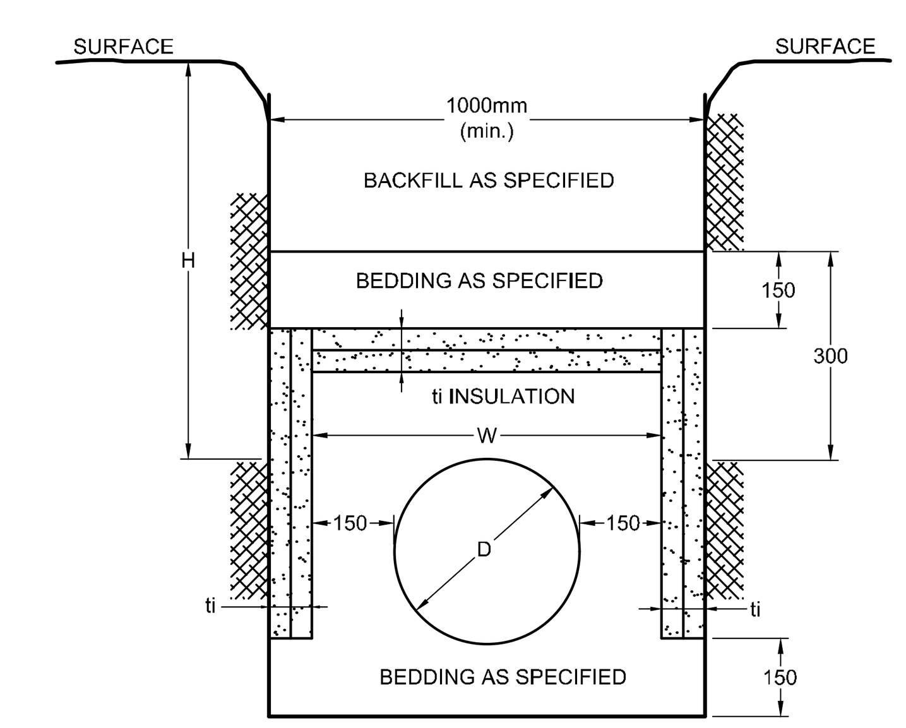
* HIGHER PIPE TO REST ON TOP OF LOWER PIPE.





LEGEND

PROPERTY LINE		EXISTING GAS METER	
PROPOSED CURB		EXISTING CURB	
DC	PROPOSED DEPRESSED CURB	300mmØ WM	EXISTING WATERMAIN
150mmØ	PROPOSED WATERMAIN	V&VB	EXISTING VALVE & VALVE BOX
V&VB	PROPOSED VALVE & VALVE BOX	HYD	EXISTING FIRE HYDRANT
11.25°	PROPOSED BEND & THRUSTBLOCK	SAN MH	EXISTING SANITARY MH & SEWER
M RM	PROPOSED WATER METER / REMOTE METER	STM MH	EXISTING STORM MH & SEWER
	PROPOSED SIAMESE CONNECTION	CB	EXISTING CATCHBASIN C/W CB LEAD
	PROPOSED CAP	CBMH	EXISTING CATCHBASIN MH
SANMH 1	PROPOSED SANITARY MANHOLE & SEWER		EXISTING FENCE
CBMH 2	PROPOSED CATCHBASIN MANHOLE & SEWER	LS	EXISTING LIGHT STANDARD
STMMH 1	PROPOSED STORMWATER MANHOLE		MVCA REGULATORY FLOODPLAN (APPROXIMATE)
CB	PROPOSED CATCHBASIN		MVCA REGULATORY LIMIT (APPROXIMATE)
	PROPOSED BUILDING ENTRANCE		THERMAL INSULATION
ICD	PROPOSED INLET CONTROL DEVICE	L.S.	PROPOSED LIGHT STANDARD
RD	PROPOSED ROOF DRAIN	BW	PROPOSED BACKWATER VALVE
FFE=77.70	PROPOSED FINISHED FLOOR ELEVATION		



ti = THICKNESS OF INSULATION (mm)
h = DEPTH OF COVER
W = D + 300 (1000 min.)
W = WIDTH OF INSULATION (mm)
D = O.D OF PIPE (mm)

INSULATION NOTES:

1. THE THICKNESS OF SEWER INSULATION SHALL BE THE EQUIVALENT OF 25mm FOR EVERY 300mm REDUCTION IN THE REQUIRED DEPTH OF COVER LESS THAN 1500mm (SEE TABLE).

COVER (mm)	INSULATION THICKNESS (mm)
1500-1200	50
1200-900	75
900-600	100
600-500	125

INSULATION DETAIL FOR SHALLOW SEWERS ONLY

NOT TO SCALE

ROOF DRAIN TABLE

ROOF DRAIN NO.	ROOF DRAIN AREA (m^2)	APPROX. 5 YEAR RELEASE RATE	APPROX. 5 YEAR PONDING DEPTH	100 YEAR RELEASE RATE	APPROX. 100 YEAR PONDING DEPTH	APPROX. 5 YEAR STORAGE VOLUME	APPROX. 100 YEAR STORAGE VOLUME
RD1	394	2.5 L/S	5-10 cm	MAX. 3.0 L/S	10 -15 cm	5 m3	13 m3
RD2	392	2.5 L/S	5-10 cm	MAX. 3.0 L/S	10 -15 cm	5 m3	13 m3
RD3	432	2.5 L/S	5-10 cm	MAX. 3.0 L/S	10 -15 cm	6 m3	15 m3
RD4	477	2.5 L/S	5-10 cm	MAX. 3.0 L/S	10 -15 cm	7 m3	17 m3
RD5	403	2.5 L/S	5-10 cm	MAX. 3.0 L/S	10 -15 cm	6 m3	13 m3
RD6	398	2.5 L/S	5-10 cm	MAX. 3.0 L/S	10 -15 cm	5 m3	13 m3
TOTAL	2,496	15.0 L/S	N/A	MAX. 18.0 L/S	N/A	N/A	N/A

* REFER TO THE 'SITE SERVICING AND SWM REPORT' (R-2019-157) PREPARED BY NOVATECH FOR STORMWATER MANAGEMENT DETAILS.

* CONTROLLED ROOF DRAIN ARE TO BE WATTS ADJUSTABLE FLOW CONTROL ROOF DRAINS SET ON THE FULLY EXPOSED WEIR OPENING (OR EQUIVALENT, SO THAT MAXIMUM 100-YEAR RELEASE RATES ABOVE ARE MET.) REVISED STORAGE CALCULATIONS TO BE COMPLETED AT DETAILED DESIGN).

INLET CONTROL DEVICE DATA - CBMH1

DESIGN EVENT	ICD	DIAMETER OF OUTLET PIPE	DESIGN FLOW	DESIGN HEAD	WATER ELEVATION
1:5 YR	114MM Ø PLUG	300mm Ø	38.2 L/s	1.86m	77.07m
1:100 YR			39.7 L/s	2.00m	77.21m

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

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1.	ISSUED FOR SITE PLAN APPROVAL	OCT 09/2019	GJM

SCALE 1:500

DESIGN	LGB/JAG
CHECKED	GJM
DRAWN	LGB
CHECKED	JAG
APPROVED	GJM

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER L. G. BOLAM 100523457 Feb-28-2020 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER G.J. MacDONALD Feb 28, 2020 PROVINCE OF ONTARIO

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LOCATION
CITY OF OTTAWA
2707 SOLANDT ROAD

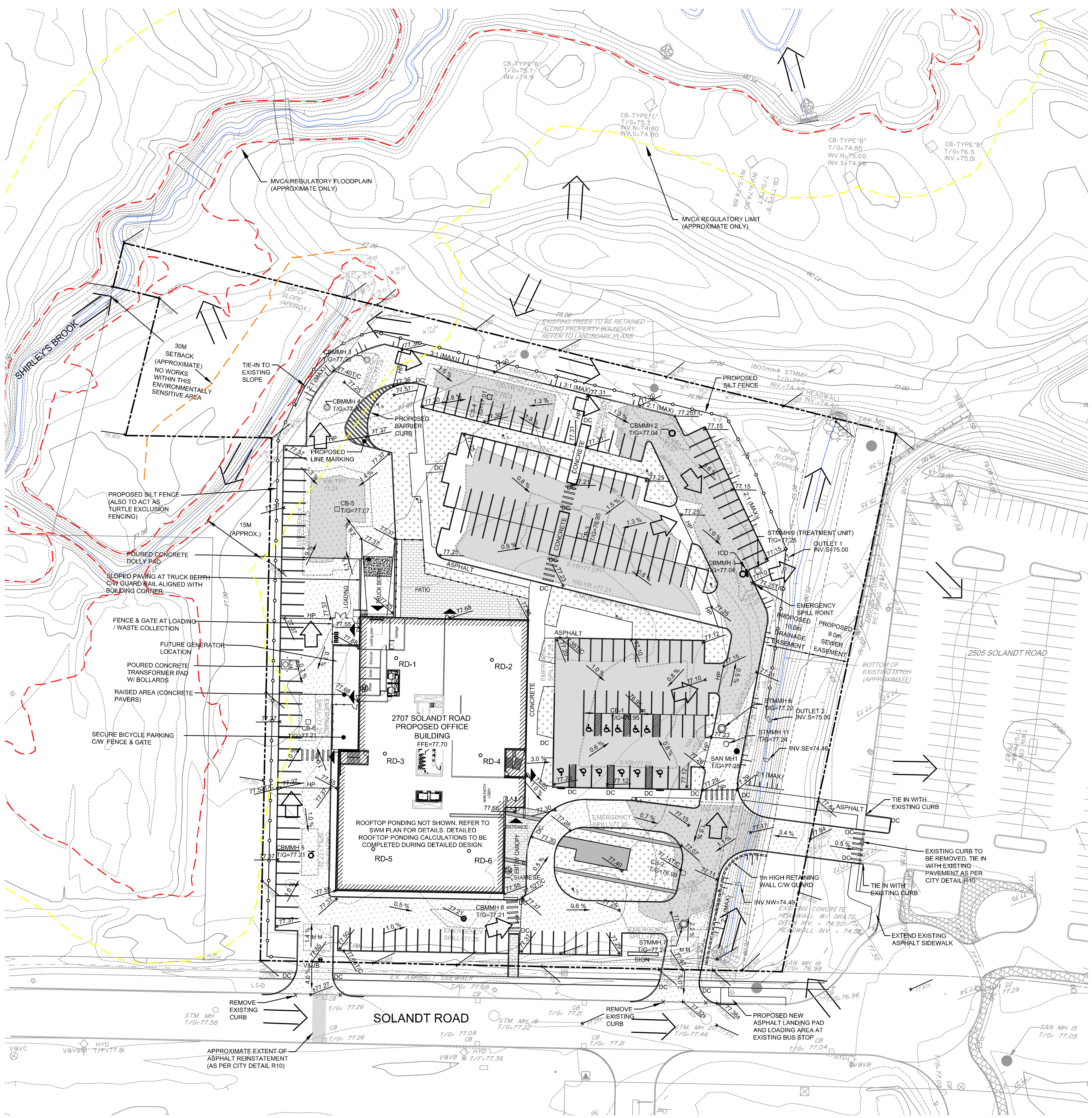
DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 119110-00
REV REV # 3
DRAWING No. 119110-GP

CITY FILE NO. D07-12-19-0172

CITY PLAN NO. 18039

PLAN24x36.DWG - 914.4mmx609.6mm



GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
2. DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME RESPONSIBILITY FOR ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THIS DRAWING.
3. OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF OTTAWA BEFORE COMMENCING CONSTRUCTION.
4. BEFORE COMMENCING CONSTRUCTION OBTAIN AND PROVIDE PROOF OF COMPREHENSIVE, ALL RISK AND OPERATIONAL LIABILITY INSURANCE FOR $2,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. RESTORE ALL DISTURBED AREAS ON-SITE AND OFF-SITE, INCLUDING TRENCHES AND SURFACES ON PUBLIC ROAD ALLOWANCES TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT (No. 18111016, DATED SEPTEMBER, 2019), PREPARED BY GOLDER FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO THE 'SITE SERVICING AND STORMWATER MANAGEMENT REPORT' (R-2019-157) PREPARED BY NOVATECH.
11. SAW CUT AND KEYGRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE-IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING THE AS-BUILT ELEVATION OF EVERY DESIGN GRADE SHOWN ON THIS PLAN.
14. MVCA REGULATORY FLOODPLAIN AND REGULATORY LIMITS SHOWN ARE APPROXIMATE ONLY. INFORMATION IS TAKEN FROM MVCA SHIRLEY'S BROOK FLOOD RISK MAPS DATED DECEMBER 2017.
15. TOPOGRAPHIC MAPPING INFORMATION SHOWN IS FROM CITY OF OTTAWA 1:1000 TOPOGRAPHIC MAPPING.
16. REFER TO LANDSCAPE PLAN FOR REQUIRED TREE PROTECTION FENCING LOCATION AND DETAILS.

GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED BUILDING AND PAVED AREAS.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL CONSULTANT.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS.
4. THE GRANULAR BASE AND SUBBASE SHOULD BE COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE.
5. GRADE AND/OR FILL BEHIND PROPOSED CURB AND BETWEEN BUILDINGS AND CURBS, WHERE REQUIRED TO PROVIDE POSITIVE DRAINAGE.
6. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
7. ALL GRADES BY CURBS ARE EDGE OF PAVEMENT GRADES UNLESS OTHERWISE INDICATED.
8. ALL CURBS SHALL BE BARRIER CURB (150mm) UNLESS OTHERWISE NOTED AND CONSTRUCTED AS PER CITY OF OTTAWA STANDARDS (SC1.1).
9. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
10. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING THE AS-BUILT ELEVATION OF EVERY DESIGN GRADE SHOWN ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES :

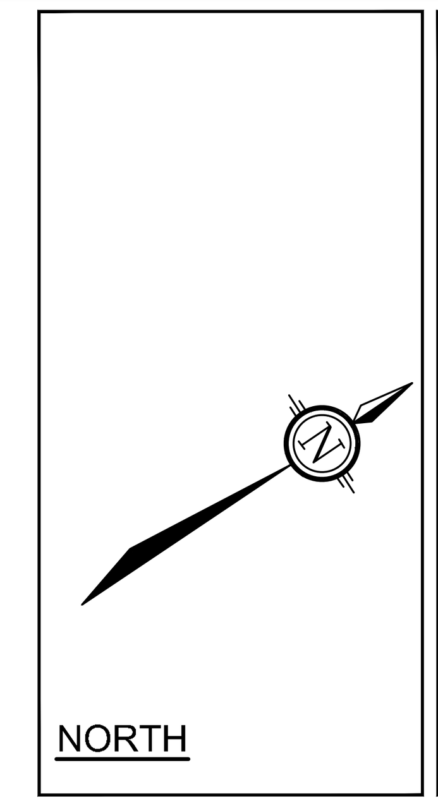
1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS.
2. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA. THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.
3. TO PREVENT SURFACE EROSION FROM ENTERING ANY DITCH OR STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER CLOTH AND/OR CATCH BASIN INSERTS, WILL BE PLACED UNDER GRATES OF CATCH BASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED AROUND THE CONSTRUCTION AREA. THESE CONTROL MEASURES WILL REMAIN IN PLACE UNTIL VEGETATION HAS BEEN ESTABLISHED AND CONSTRUCTION IS COMPLETE.
4. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
5. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGE OF SEDIMENT MATERIAL INTO ANY DITCH OR STORM SEWER SYSTEM. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.
6. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
7. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR MUNICIPALITY.
8. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS.

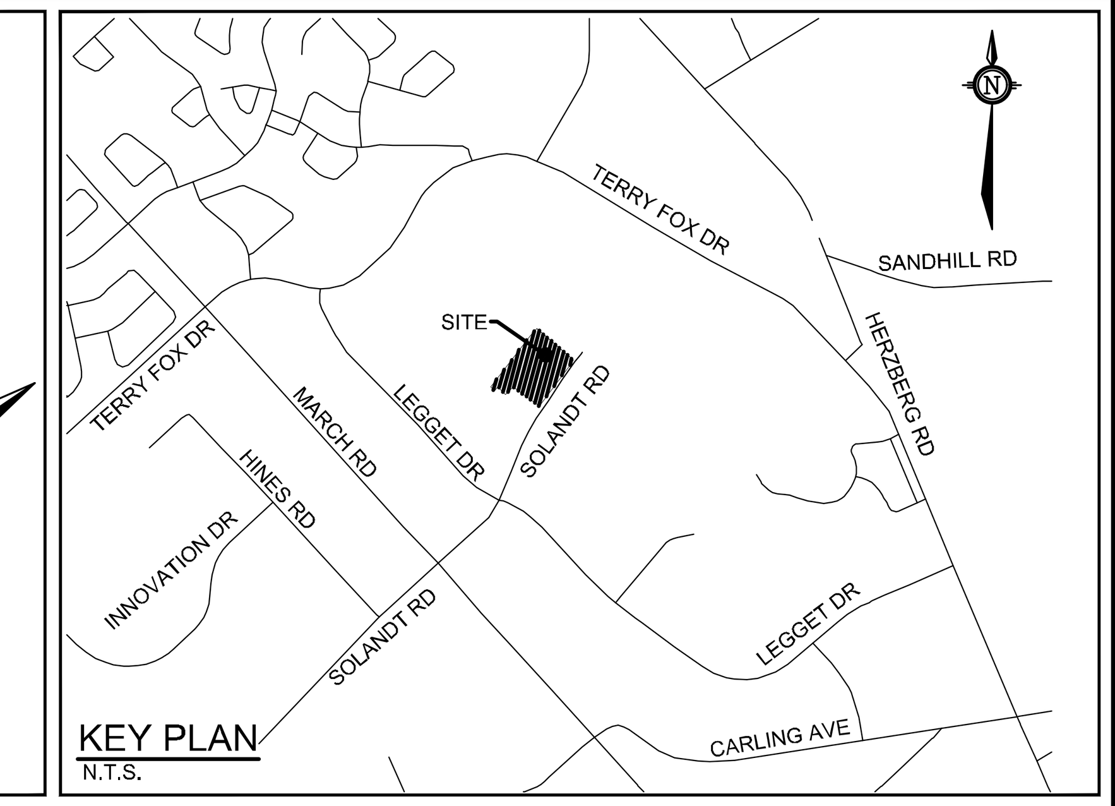
PAVEMENT STRUCTURES:

(AS PER GEOTECHNICAL REPORT)

CAR PARKING AREAS
50mm SUPERPAVE 12.5 SURFACE COURSE
150mm OPSS GRANULAR "A" BASE
300mm OPSS GRANULAR "B" TYPE II SUBBASE

ACCESS & TRUCK TRAFFIC AREAS
40mm SUPERPAVE 12.5 SURFACE COURSE
50mm SUPERPAVE 19.0 BINDER COURSE
150mm OPSS GRANULAR "A" BASE
450mm OPSS GRANULAR "B" TYPE II SUBBASE





KEY PLAN
N.T.S.

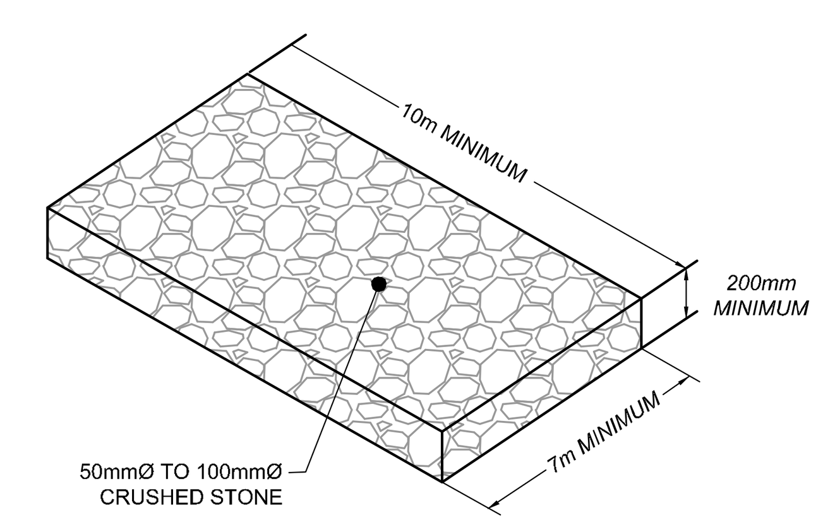
LEGEND

PROPERTY LINE
PROPOSED ELEVATION
EXISTING ELEVATION
EXISTING ELEVATION
PROPOSED TOP OF CURB ELEVATION
GRADE AND DIRECTION
MAXIMUM 3:1 OR 2:1 SIDESLOPE
MAJOR OVERLAND FLOW DIRECTION
SANMH 1 — PROPOSED SANITARY MANHOLE
CBMH 3 — PROPOSED CATCHBASIN MANHOLE
STMMH 1 — PROPOSED STORM MANHOLE
CB — PROPOSED CATCHBASIN
V&VB — PROPOSED VALVE AND VALVE BOX
PROPOSED SIAMESE CONNECTION
PROPOSED SILT FENCE
PROPOSED BARRIER CURB
DC — PROPOSED DEPRESSED CURB
ICD — PROPOSED INLET CONTROL DEVICE
RD — PROPOSED ROOF DRAIN
FFE=77.70 — PROPOSED FINISHED FLOOR ELEVATION
PROPOSED BUILDING ENTRANCE
5-YR=77.07 / 100-YR=77.21 / EMERGENCY SPILL=77.25 — APPROXIMATE PONDING LIMITS AND ELEVATIONS

EXISTING CONCRETE CURB
SANMH — EXISTING SANITARY MANHOLE
CBMH — EXISTING CATCHBASIN MANHOLE
STMMH — EXISTING STORM MANHOLE
CB — EXISTING CATCHBASIN
HYD, V&VB — EXISTING HYDRANT & VALVE
EXISTING FENCE
EXISTING LIGHT STANDARD
77.00 — EXISTING MAJOR CONTOUR (1.0m INTERVAL)
EXISTING MINOR CONTOUR (0.25m INTERVAL) (FROM 1:1000 TOPO MAPPING)
MVCA REGULATORY FLOODPLAN (APPROXIMATE)
MVCA REGULATORY LIMIT (APPROXIMATE)
M M — PROPOSED MUD MAT (REFER TO DETAIL)
EMERGENCY OVERLAND FLOW ROUTE

SURFACE STORAGE TABLE

LOCATION	APPROXIMATE 5 YEAR PONDING DEPTH	APPROXIMATE 100 YEAR PONDING DEPTH	APPROXIMATE 100 YEAR PONDING SURFACE AREA	APPROXIMATE 100 YEAR PONDING VOLUME
CB1	12 cm	26 cm	1185 m2	130 m3
CB2	8 cm	22 cm	445 m2	35 m3
CB3	12 cm	26 cm	1220 m2	110 m3
CBMH1 CBMH2	3 cm	17 cm	800 m2	60 m3
CB4	6 cm	20 cm	225 m2	15 m3
CBMH3	-	1 cm	3 m2	NEGLIGIBLE
CBMH4	-	1 cm	3 m2	NEGLIGIBLE
CB5	-	14 cm	200 m2	10 m3



MUD MAT DETAIL
NOT TO SCALE

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SCALE 1:500

DESIGN LGB/JAG
CHECKED GJM
DRAWN LGB
CHECKED JAG
APPROVED GJM

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LICENSED PROFESSIONAL ENGINEER — L. G. BOLAM 100523457 — Feb-28-2020 — PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER — G.J. MacDONALD — Feb 28, 2020 — PROVINCE OF ONTARIO

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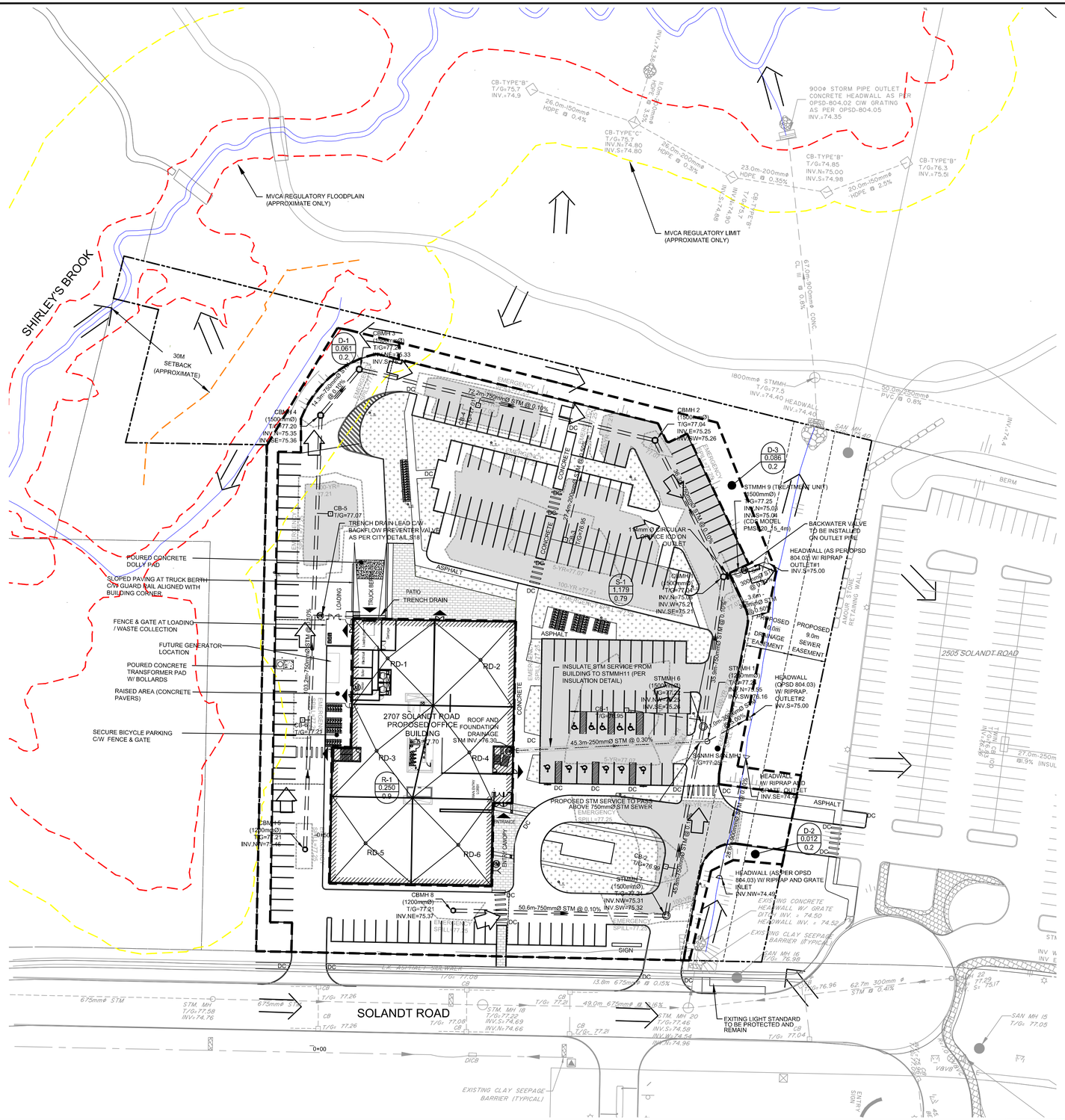
LOCATION
CITY OF OTTAWA
2707 SOLANDT ROAD

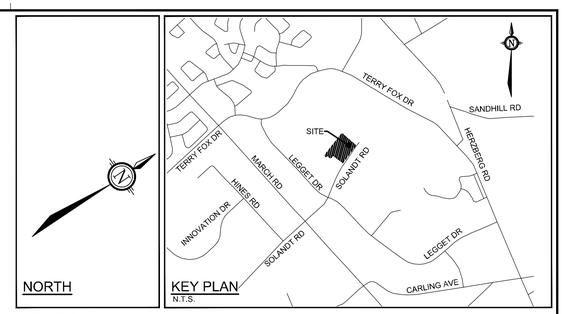
DRAWING NAME
GRADING AND EROSION SEDIMENT CONTROL PLAN

PROJECT No. 119110-00
REV REV # 3
DRAWING No. 119110-GR

CITY FILE NO. D07-12-19-0172

CITY PLAN NO. 18039





LEGEND

- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- DRAINAGE AREA LIMITS
- 5-YEAR=77.07 / 100-YEAR=77.21 / EMERGENCY SPILL = 77.25 — APPROXIMATE PONDING LIMITS
- S-1 / 0.145 / 0.89 — POST-DEVELOPMENT AREA ID
- POST-DEVELOPMENT DRAINAGE AREA (ha)
- 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- STM MH — PROPOSED STORM MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE
- CB — PROPOSED CATCHBASIN
- RD — CONTROLLED FLOW ROOF DRAIN
- PROPOSED STORM SEWER
- ICD — PROPOSED INLET CONTROL DEVICE
- DIRECTION OF MAJOR OVERLAND FLOW
- PROPOSED BUILDING ENTRANCE / EXIT
- STM MH — EXISTING STORM MH & SEWER
- CB — EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- MAXIMUM 3:1 SIDESLOPE
- MVCA REGULATORY FLOODPLAIN (APPROXIMATE)
- MVCA REGULATORY LIMIT (APPROXIMATE)

ROOF DRAIN TABLE

ROOF DRAIN NO.	ROOF DRAIN AREA (m²)	APPROX. 5 YEAR RELEASE RATE	APPROX. 5 YEAR PONDING DEPTH	100 YEAR RELEASE RATE	APPROX. 100 YEAR PONDING DEPTH	APPROX. 5 YEAR STORAGE VOLUME	APPROX. 100 YEAR STORAGE VOLUME
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REFER TO 119110-GP FOR ADDITIONAL NOTES

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SCALE 1:500 (1:500 0 5 10 15 20)

DESIGN LGB
CHECKED JAG
DRAWN RJG
CHECKED LGB
APPROVED GJM

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LICENSED PROFESSIONAL ENGINEER L. G. BOLAM 100523457 Feb-28-2020 PROVINCE OF ONTARIO

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LOCATION
CITY OF OTTAWA
2707 SOLANDT ROAD

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 119110
REV REV # 3
DRAWING No. 119110-SWM

CITY PLAN NO. 18039

CITY FILE NO. D07-12-19-0172

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