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PROPOSED RESIDENTIAL DEVELOPMENT
1765 Montreal Road

Development Servicing and Stormwater Management Report

PROPOSED RESIDENTIAL DEVELOPMENT
1765 MONTREAL ROAD

DEVELOPMENT SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared by:

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

December 20, 2022
Revised March 28, 2025

Ref: R-2022-206
Novatech File No. 121060

April 1, 2025

City of Ottawa
Planning, Infrastructure and Economic Development Department
Development Review – West Branch
110 Laurier Avenue West
Ottawa, Ontario
K1P 1J1

Attention: Mr. Reed Adams

Dear Sir:

Re: Development Servicing and Stormwater Management Report
Proposed Residential Development
1765 Montreal Road, Ottawa, Ontario
Novatech File No: 121060

Enclosed is a copy of the 'Development Servicing and Stormwater Management Report' for the proposed residential development located at 1765 Montreal Road, in the City of Ottawa. This report addresses the approach to site servicing and stormwater management and is submitted in support of a zoning by-law amendment application.

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

Yours truly,

NOVATECH

M Savic

Miroslav Savic, P. Eng.
Senior Project Manager

cc: Hashim Khan (Landric Homes)
Ryan Koolwine (project1studio)

Suite 200, 240 Michael Cowpland Drive, Ottawa ON K2M 1P6 Tel: 613.254.9643 Fax: 613.254.5867 www.novatech-eng.com

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF PLANS

1.0 INTRODUCTION

The new residential development is being proposed by Landric Homes and Novatech has been retained to complete the site servicing and stormwater management design for this project.

This report addresses the approach to site servicing and stormwater management and is being submitted in support of a zoning by-law amendment application.

1.1 Site Description and Location

The subject site is approximately 0.8 hectares in size and currently occupied by two single family homes (1765 Montreal Road and 9 Beckenham Lane). The subject site is located immediately west of the Montfort Renaissance facility. The site is bordered by Montreal Road to the south, Beckenham Lane to the west and Cedar Road to the north. The description of the subject site is designated as Lots 24 and 25, Registered Plan 462, City of Ottawa.

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

1.2 Pre-Consultation Information

A pre-consultation meeting was held with the City of Ottawa on July 26, 2021, at which time the client was advised of the general submission requirements.

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA). Based on feedback from the RVCA, the proposed development will require an 'Enhanced' Level of Protection (i.e. 80% TSS removal) for storm sewer connection to the Montreal Road. Storm sewer outlet to the Cedar Road ditch will not require water quality control. Refer to **Appendix A** for correspondence from the RVCA and City of Ottawa related to the proposed development.

1.3 Proposed Development

The proposed development consists of a 17-storey apartment building fronting on Montreal Road and Beckenham Lane, and a 6-storey apartment building at the rear of the property. The development will include two levels of underground parking and surface parking with access driveways from Montreal Road and Beckenham Lane. Refer to architectural Site Plan included in **Appendix B** for details.

1.4 Reference Material

The following reports and studies were reviewed as part of the design process:

[1] The Geotechnical Investigation report (Report No.: PG5736-1), prepared by Paterson Group Inc. dated April 23, 2021.

2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and the water demands are to conform to the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the subsequent sections of the report for further details.

2.1 Sanitary Sewage

There are no existing municipal sanitary sewers fronting the site. The existing residential properties on site are serviced by private septic systems.

The closest municipal sanitary sewer to the site is a 250mm diameter sewer in Montreal Road that is terminated approximately 30m west of the site. This sanitary sewer will have to be extended to the frontage of the property to service the proposed development. The sewage from the apartment buildings will drain by gravity to the proposed sanitary sewer extension via the proposed 200mm diameter sanitary service. The flows from the u/g parking garage floor drains will have to be pumped to the sanitary service.

The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from Section 4 – 'Sanitary Sewer Systems' and Appendix 4-A - 'Daily Sewage Flow for Various Types of Establishments' of the City of Ottawa Sewer Design Guidelines:

- Residential Units (1-Bedroom): 1.4 persons per unit
- Residential Units (2-Bedroom): 2.1 persons per unit
- Townhouse Units: 2.7 persons per unit

- Average Daily Residential Sewage Flow: 280 L/person/day
- Residential Peaking Factor calculated by the Harmon Equation
- Infiltration Allowance: 0.33 L/s/ha

The peak sanitary flows from the proposed development, including infiltration, are summarized in **Table 2.1** The detailed sanitary flow calculations and sanitary sewer design sheet are provided in **Appendix C.**

Table 2.1: Peak Sanitary Flows

Proposed Development	Peak Flow (L/s)	Infiltration (L/s)	Total Peak Flow (L/s)
Building A & Building B	5.74	0.26	6.00

The proposed 250mm dia. sanitary sewer extension at 0.5% slope has a full flow conveyance capacity of 43.9 L/s and will have enough capacity to convey the theoretical sanitary flows for the proposed development.

The above sanitary flow calculations have been provided to the City of Ottawa for the purpose of downstream analysis of the existing municipal sanitary sewer system. The City asset management has advised that there is no available capacity within the downstream sanitary sewers to accommodate the 6 L/s peak sanitary flows from the proposed development.

The City will allow the developer to proceed with the proposed 6 L/s of sanitary flow provided adequate extraneous flow are removed from the downstream system equivalent to the difference of sanitary flow between the current development proposal and the previous site plan submission in December 2022 (~3 L/s). Refer to **Appendix C** for e-mail correspondence with the City of Ottawa. The developer is working with the City to identify the extraneous flow locations in the existing sanitary sewer to remove the 3 L/s flow from the downstream sewer system.

2.2 Water

The proposed development will be serviced by connecting to the existing 200mm dia. watermain in Beckenham Lane. Two 150mm diameter water services with a new valve on the existing watermain between the two service connections will be provided. This will assure uninterrupted water supply to the proposed development in case of watermain failure at any single point in the municipal watermain system.

The water services have been sized to provide the required domestic water demand and fire flow. Shut-off valves will be provided on the proposed water services at the property line in accordance with the City of Ottawa standards.

2.2.1 Domestic Water Demands and Watermain Analysis

The City of Ottawa design criteria were used to calculate the theoretical water demands for the proposed development. The following design criteria were taken from Section 4 – 'Water Distribution Systems' of the Ottawa Design Guidelines – Water Distribution:

- Residential Units (1 Bedroom): 1.4 persons per unit
- Residential Units (2 Bedroom): 2.1 persons per unit
- Average Daily Residential Water Demand: 2800 L/person/day
- Maximum Day Demand Peaking Factor = 2.5 x Avg. Day Demand
- Peak Hour Demand Peaking Factor = 2.2 x Max. Day Demand

The domestic water demands for the proposed development are summarized in **Table 2.2** The detailed water demand calculations are provided in **Appendix D.**

Table 2.2: Domestic Water Demands

Proposed Development	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand(L/s)
Building A & Building B	1.70	4.25	9.36

The following design criteria were taken from Section 4.2.2 – 'Watermain Pressure and Demand Objectives' of the City of Ottawa Design Guidelines for Water Distribution:

- Maximum system pressure is not to exceed 552 kPa (80 psi)
- Minimum system pressures are to be >276 kPa (40 psi) under Peak Hour demands
- Minimum system pressures are to be >140 kPa (20 psi) under Max Day + Fire Flow demands

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa for the purpose of obtaining the watermain boundary conditions. **Table 2.3** summarizes the watermain boundary conditions and the design pressures at the service connection point.

Table 2.3: Watermain Analysis

Municipal Watermain Boundary Condition	Boundary Condition	Water Demand (L/s)	Min/Max Operating Pressure (psi)	Design Pressure (psi)*
Maximum HGL (Avg Day Demand)	143.0 m	1.70	80 psi (max.)	53.2
Minimum HGL (Peak Hour Demand)	142.5 m	9.36	40 psi (min.)	52.5
Max Day + Fire Flow HGL	139.8 m	67 + 4.25	20 psi (min.)	48.6

* Based on an average ground elevation of 105.6m. Design pressure = (HGL – watermain elevation) x 1.42197 PSI/m

As indicated above, the existing municipal watermains should provide adequate system pressures to the proposed development. It is anticipated that a booster pump will be required to increase pressure to the upper floors of the proposed buildings.

2.2.2 Water Supply for Fire-Fighting

The proposed buildings will be fully sprinklered and supplied with a fire department siamese connection.

Fire Underwriters Survey (FUS) was used to estimate fire flow requirements for the proposed buildings. The fire flow calculations are based on the building information provided by the architect. Refer to **Appendix D** for a copy of the FUS fire flow calculations and correspondence from the architect.

Table 2.4 summarizes the fire flow requirements for the proposed buildings.

Table 2.4: FUS Fire Flow

Proposed Building	Fire Flow Demand
Building A	4,000 L/min (67 L/s)
Building B	4,000 L/min (67 L/s)

There an existing fire hydrant in Beckenham Lane that will provide fire protection to the proposed buildings. The hydrant is located 45m of the fire department siamese connection located near the main entrance of the building. The existing hydrant is Class AA blue bonnet hydrant. Based on Table 1 Maximum flow to be considered from a given hydrant in Appendix I of Technical Bulletin ISTB-2018-02, the hydrant should provide 5,700 L/min exceeding the 4,000 L/min FUS fire flow requirement.

The existing municipal watermain network should therefore have adequate fire water supply for the proposed development.

2.3 Storm Drainage and Stormwater Management

Storm drainage from the site will be directed in two directions following existing drainage patterns. The storm drainage from the proposed building roofs will outlet to the existing 300mm dia. storm sewer in Montreal Road. The storm drainage from the remainder of the site will outlet to the Cedar Road ditch.

2.3.1 Stormwater Management Criteria and Objectives

The stormwater management criteria and objectives for the site are as follows:

- Provide quantity control storage to control post-development flows to the target release rates specified by the City of Ottawa:
    - Montreal Road storm sewer: Control post-development flows up to and including the 100-year design event to the 2-year pre-development release rate.
    - Cedar Road ditch: Control post-development flows to the pre-development release rates (i.e. 5-year post = 5-year pre, 100-year post = 100-year pre). The 2-year post-development flow should also match the 2-year pre-development release rate.
- Maximize the use of available storage on the building roofs and the parking lot surface. Any additional storage required will be provided using an underground storage pipe.
- Provide stormwater quality control as per RVCA requirements as follows.
    - An 'Enhanced' Level of Protection, equivalent to a long-term average removal of 80% of total suspended solids (TSS) is required for the storm outlet to Montreal Road storm sewer.
    - The storm outlet to the Cedar Road ditch does not require water quality control.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

2.3.2 Pre-Development Conditions and Allowable Release Rate

The entire site is approximately 0.8 ha in size and is comprised of two existing residential dwellings. The existing properties primarily sheet drain uncontrolled to the Cedar Road roadside ditch (identified as area EX-1 on the Pre-development Drainage Area Plan in **Appendix E**). The front portion the existing property facing Montreal Road sheet drain uncontrolled to the existing catchbasins in Montreal Road (identified as EX-2). There is currently no stormwater quantity or quality control measures on-site.

The pre-development flows from the 0.634 ha portion of the site draining towards Cedar Road ditch were calculated using the Rational Method to be 42.2 L/s during the 1:2-year design event, 57.2 L/s during the 1:5-year design event and 113.6 L/s during the 1:100-year design event.'
The pre-development flows from the 0.165 ha portion of the site draining towards Montreal Road catchbasins were calculated using the Rational Method to be19.5 L/s during the 1:2-year design event, 26.5 L/s during the 1:5-year design event and 51.5 L/s during the 1:100-year design event. Refer to **Appendix E** for detailed calculations.

The allowable release rates from the site for outlets to Montreal Road storm sewer and Cedar Road ditch were calculated using the Rational Method and are summarised in **Table 2.5**. Detailed calculations are included in **Appendix E**.

Table 2.5: Allowable Release Rates

Outlet Location	Allowable Release Rate		
	2 Year (L/s)	5 Year (L/s)	100 Year (L/s)
Outlet to Montreal Road Storm Sewer	19.5	19.5	19.5
Outlet to Cedar Road Ditch	42.2	57.2	116.3

2.3.3 Post-Development Conditions

In post-development conditions, the storm drainage from the proposed building roofs will outlet to the existing 300mm dia. storm sewer in Montreal Road. The building roofs will be equipped with flow-control roof drains.

The storm drainage from landscaped areas fronting Montreal Road and Beckenham Lane with sheet drain towards the streets. The storm drainage from the public park and landscaped area adjacent to Cedar Road will drain towards the Cedar Road ditch.

The storm drainage from the reminder of the site will be collected by an on-site storm system and will outlet to the Cedar Road ditch via a 375mm storm pipe. A 975mm diameter super-pipe will be used to store and control the post-development flows from this portion of the site prior to outletting to Cedar Road ditch.

2.3.4 SWM Modeling (Post-Development)

Post-development stormwater modeling was completed using the following methodologies:

- SWM calculations for the landscaped areas (Catchments A-1, A-2, A-3) were completed using the Rational Method.
- SWM calculations for the building rooftops (Catchments R-1, R-2) were completed using the Modified Rational Method.
- SWM calculations for the surface parking area (Catchment A-4) were completed using PCSWMM, as this area will be controlled using a combination of surface and underground storage.

2.3.4.1 Rational Method Calculations (Uncontrolled Landscaped Areas)

Area A-1: Direct Runoff to Montreal Road

Stormwater runoff from Area A-1 will sheet drain to Montreal Road. The post-development flow from this area was calculated using the Rational Method to be approximately 2.3 L/s during the 2-year design event, 3.1 L/s during the 5-year design event and 6.3 L/s during the 100-year design event. Refer to **Appendix E** for detailed calculations.

Area A-2: Direct Runoff to Beckenham Lane

Stormwater runoff from Area A-2 will sheet drain to Beckenham Lane. The post-development flow from this area was calculated using the Rational Method to be approximately 2.2 L/s during the 2-year design event, 3.0 L/s during the 5-year design event and 6.1 L/s during the 100-year design event. Refer to **Appendix E** for detailed calculations.

Area A-3: Direct Runoff to Cedar Road

Stormwater runoff from Area A-3 will sheet drain to the Cedar Road ditch. The post-development flow from this area was calculated using the Rational Method to be approximately 5.9 L/s during the 2-year design event, 8.0 L/s during the 5-year design event and 16.8 L/s during the 100-year design event. Refer to **Appendix E** for detailed calculations.

2.3.4.2 Modified Rational Method Calculations (Controlled Roof Areas)

Area R-1: Building 'A' Controlled Roof Flow

The post-development flow from Area R-1 will be attenuated by seventeen (17) individual Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the proposed storm service.

Table 2.5 summarizes the post-development design flows from Area R-1 as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required, and storage volumes provided for both the 5-year and the 100-year design events.

Table 2.5: Design Flow and Roof Drain Table (Area R-1)

Roof Drain ID	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approx. Ponding Depth Above Drain (cm)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
		5-Yr	100-Yr	5-Yr	100-Yr	5-Yr	100-Yr	
RD 1	RD-100-A-ADJ (Closed)	0.32	0.32	10	13	1.1	2.8	3.7
RD 2	RD-100-A-ADJ (Closed)	0.32	0.32	9	13	0.5	1.3	2.0
RD 3	RD-100-A-ADJ (Closed)	0.32	0.32	9	13	0.5	1.3	2.0
RD 4	RD-100-A-ADJ (Closed)	0.32	0.32	9	13	0.5	1.3	2.0
RD 5	RD-100-A-ADJ (Closed)	0.32	0.32	10	13	1.1	2.8	3.7
RD 6	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.4	3.3	3.9
RD 7	RD-100-A-ADJ (Closed)	0.32	0.32	9	13	0.5	1.3	2.0

RD 8	RD-100-A-ADJ (Closed)	0.32	0.32	9	13	0.5	1.3	2.0
RD 9	RD-100-A-ADJ (Closed)	0.32	0.32	9	13	0.5	1.3	2.0
RD 10	RD-100-A-ADJ (Closed)	0.32	0.32	11	14	1.4	3.3	3.9
RD 11	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	0.9	2.2	2.7
RD 12	RD-100-A-ADJ (1/4 Exposed)	0.71	0.87	9	13	0.4	1.0	1.5
RD 13	RD-100-A-ADJ (Closed)	0.32	0.32	11	14	1.4	3.3	3.8
RD 14	RD-100-A-ADJ (1/4 Exposed)	0.79	0.87	9	13	1.6	4.0	6.2
RD 15	RD-100-A-ADJ (1/4 Exposed)	0.79	0.87	9	13	1.6	4.0	6.2
RD 16	RD-100-A-ADJ (1/4 Exposed)	0.71	0.87	9	12	1.3	3.0	5.1
RD 17	RD-100-A-ADJ (1/4 Exposed)	0.71	0.87	9	12	1.3	3.0	5.1
Total Roof	**-**	**7.5**	**8.2**	**-**	**-**	**16.5**	**41.23**	**57.0**

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for roof drain information. As indicated in the table above, the Building A will provide sufficient storage for both the 5-year and 100-year design events.

Area R-2: Building 'B' Controlled Roof Flow

The post-development flow from Area R-2 will be attenuated by fifteen (15) individual Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ) prior to being directed to the proposed storm service.

Table 2.6 summarizes the post-development design flows from Area R-2 as well as the type of roof drains, the maximum anticipated ponding depths, storage volumes required, and storage volumes provided for both the 5-year and the 100-year design events.

Table 2.6: Design Flow and Roof Drain Table (Area R-2)

Roof Drain ID	Watts Roof Drain Model ID (Weir Opening)	Controlled Flow per Drain (L/s)		Approx. Ponding Depth Above Drain (cm)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
		5-Yr	100-Yr	5-Yr	100-Yr	5-Yr	100-Yr	
RD 1	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.6	3.9	4.6
RD 2	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	0.9	2.2	2.7

RD 3	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.4	3.3	4.0
RD 4	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.6	3.9	4.8
RD 5	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.6	3.9	4.8
RD 6	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.6	3.9	4.8
RD 7	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.6	3.9	4.8
RD 8	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.4	3.3	4.0
RD 9	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	0.9	2.2	2.7
RD 10	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	1.6	3.9	4.6
RD 11	RD-100-A-ADJ (Closed)	0.32	0.32	10	14	0.9	2.2	2.7
RD 12	RD-100-A-ADJ (1/4 Exposed)	0.71	0.87	9	13	0.4	1.0	1.6
RD 13	RD-100-A-ADJ (Closed)	0.32	0.32	10	13	0.9	2.2	3.1
RD 14	RD-100-A-ADJ (Closed)	0.32	0.32	10	13	0.9	2.2	3.1
RD 15	RD-100-A-ADJ (Closed)	0.32	0.32	10	13	0.9	2.2	3.1
RD 16	RD-100-A-ADJ (Closed)	0.32	0.32	10	13	0.9	2.2	3.1
Total Roof	**-**	**5.5**	**5.7**	**-**	**-**	**19.1**	**46.7**	**58.2**

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for roof drain information. As indicated in the table above, the Building B roof will provide sufficient storage for both the 5-year and 100-year design events.

2.3.4.3 PCSWMM Modeling (Area A-4)

Stormwater runoff from catchment area A-4 will be collected by the proposed storm sewer system and controlled to the allowable release rate using an ICD installed in the outlet from STMMH 201. Quantity control storage will be provided using a combination of underground and surface storage, and the performance of the system has been evaluated using PCSWMM.

The modelled release rates and storage requirements for Area A-4 are summarized in the following sections. Refer to **Appendix E** for detailed SWM calculations.

Drainage Area & Imperviousness

Catchment A-4 has a contributing drainage area of 0.374ha. For modeling purposes, this area has been assumed to be 100% impervious. While there are some landscaped areas within A-4, the catchment is above the parking garage roof so there will be effectively no infiltration into the underlying soil. Storm runoff from the landscaped areas in Catchment A-4 will either be retained and evapotranspirated, or collected by the drainage system for the parking garage roof which outlets into the underground storage pipes.

Allowable Release Rates (Area A-4)

The allowable release rates for Area A-4 have been calculated based on the overall pre-development peak flow to Cedar Creek, minus the uncontrolled post-development flows from the two landscaped areas draining towards Cedar Road (A-3) and Beckenham Lane (A-2). The allowable release rates for Area A-4 are listed in **Table 2.7**.

Table 2.7: Allowable Release Rates (Area A-4)

Allowable Release Rate to Cedar Creek (L/s)		Return Period		
		2yr	5yr	100yr
Pre-Development	Peak Flow to Cedar Creek	42.2	57.2	116.3
Post-Development	Uncontrolled Flows (A-2, A-3)	8.1	11	22.8
	Allowable Release Rate (A-4)	**34.1**	**46.2**	**93.5**

Quantity Control Storage

The proposed design will provide sufficient storage to control post-development storm runoff from catchment A-4 to the allowable release rates for storms up to and including the 100-year design event. The provided storage is summarized below.

- Underground Storage: 53.7m^3 (975mm storage pipe and 1800mm MHs)
- Surface Storage: 6.3m^3 above CB2 (0.2 m ponding depth)
- Total storage Volume: 61.0m^3

Model Results (ICD Sizing and Storage requirements)

Flows from Area A-4 will be controlled using a 142mm circular orifice plug installed in the outlet pipe from STMMH 201. The peak flows, storage used, and design head on the ICD are summarized in **Table 2.8**.

Table 2.8: ICD Sizing and Storage Requirements (Area A-4)

ICD Size / Type		Circular Plug 142mm dia.				
Outlet Structure		STMMH 201 (1800mm dia.)				
Outlet Pipe		375mm PVC				
ICD Invert		99.63m				
Design Event	**Allowable Release Rate (L/s)**	**ICD Flow (L/s)**	**Design Head[(1)] (m)**	**HGL Elevation (m)**	**Storage Volume**	
					Required (m^3)	**Available (m^3)**
2-year	34.1	35.5	0.60	100.30	27.5	61.0
5-year	46.2	42.6	0.87	100.57	38.5	
100-year	93.5	64.4	2.00	101.70	61.0	
Stress Test	N/A	67.4	2.19	101.89	61.0	

[(1)] Design Head is calculated from the centreline of the ICD orifice.

The proposed design will provide sufficient storage to control post-development flows to the allowable release rates for all storms up to and including the 100-year event. There is a slight exceedance (1.4 L/s) during the 2-year event, but the flows for the 5-year and 100-year events are controlled to less than pre-development levels.

Surface Ponding

There will be no surface ponding during the 2-year and 5-year events. During the 100-year event there will be 0.20m of ponding above CB2.

Stress-Test

The available storage will be exceeded during the stress-test event. STMMH 202 has been designed with a perforated CBMH cover to allow excess flows to spill out the top of this structure, where they will flow overland into Area A-3, then into the Cedar Road ditch.

2.3.5 Stormwater Flow Summary

Table 2.8 and **Table 2.9** provide a summary of the total post-development flows from the site and compares them to the allowable release rates specified by the City for outlets to Montreal Road storm sewer and Cedar Road ditch.

Table 2.8: Stormwater Flow Summary – Outlet to Montreal Road Storm Sewer

Design Event	Post-Development Conditions				
	A-1 Flow (L/s)	R-1 Flow (L/s)	R-2 Flow (L/s)	Total Flow (L/s)	Allowable Release Rate[(1)] (L/s)
5-Year	3.1	7.6	5.5	**16.2**	**19.5**
100-Year	6.3	8.2	5.7	**20.2**	**19.5**

(1) Allowable Release Rate to Montreal Road is 2-year pre-development flow

The total post-development flow will be released to the Montreal Road sewer at a maximum rate of 20.2 L/s during the 1:100-year design event and 16.2 L/s during the 1:5-year design event. The 1:100-year post development flow will slightly exceed the 1:2-year target release rate and the 1:5 year post development flow will be overcontrolled.

Table 2.9: Stormwater Flow Summary – Outlet to Cedar Road Ditch.

Design Event	Post-Development Conditions				
	A-2 Flow (L/s)	A-3 Flow (L/s)	A-4 Flow (L/s)	Total Flow (L/s)	Allowable Release Rate[(1)] (L/s)
2-Year	2.2	5.9	35.5	**43.6**	**42.2**
5-Year	3.0	8.0	42.6	**53.6**	**57.2**
100-Year	6.1	16.8	64.4	**87.2**	**116.3**

(1) Allowable Release Rate based on controlling to pre-development peak flow for 2,5, and 100yr event.

The total post-development flow will be released to the Cedar Road ditch at a maximum rate of 87.2 L/s during the 1:100-year design event, 53.6 L/s during the 1:5-year design event, and 43.6 L/s during the 1:2-year design event. The 1:2-year post development flow will slightly exceed the 1:2 year pre-development flow, while the 1:5 year and 1:100-year post development flows will be overcontrolled.

As indicated in the table above, the total post-development flows represent a significant reduction in flows when compared to pre-development conditions.

2.4 Stormwater Quality Control

The subject site is located within the jurisdiction of the Rideau Valley Conservation Authority (RVCA) and is in the Rideau River tributary area. An 'Enhanced' Level of Protection, equivalent to a long-term average removal of 80% of total suspended solids (TSS) is required for the storm outlet to Montreal Road storm sewer. The storm outlet to the Cedar Road ditch does not require water quality control. Refer to email correspondence with the RVCA included in **Appendix A**.

Only clean roof flows from the site are connected to the 300mm diameter storm sewer in Montreal Road. The reminder of the site will outlet to the Cedar Road ditch. Therefore, the proposed development does not require water quality control.

3.0 SITE GRADING

The intent of the grading design was to propose the building finished floor elevations to best tie into the elevations along the existing adjacent roadways and surrounding property lines, and to provide mayor overland flow route towards Montreal Road and Backhenhem Lane right-of ways. The proposed grading design provides positive drainage away from the buildings and towards the on-site stormwater drainage structures. Due to substantial grade difference between front and back of the property, a large retaining wall is between along the east property line.

3.1 Emergency Overland Flow Route

In the case of a major rainfall event exceeding the design storms provided for, the stormwater located within the subject site will overflow towards Montreal Road and Beckenham Lane. The floor elevation of the proposed buildings will be a minimum of 0.30m above the major system overflow points. No surface ponding will be able to reach the building envelope or any of the proposed building openings. The emergency overland flow route is shown on the enclosed Grading and Erosion & Sediment Control Plan.

4.0 GEOTECHNICAL INVESTIGATIONS

A Geotechnical Investigation report has been prepared by Paterson Group for the proposed project. Refer to the Geotechnical Report[1] for subsurface conditions, construction recommendations and geotechnical inspection requirements.

5.0 EROSION AND SEDIMENT CONTROL

To mitigate erosion and to prevent sediment from entering the storm sewer 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 bags will be placed under the grates of nearby catchbasins, manholes and will remain in place until vegetation has been established, and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits.
- A mud mat will be installed at the construction entrance for the site.

- 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.

6.0 CONCLUSION

This report has been prepared in support of a zoning by-law amendment and site plan control application for the proposed residential development located at 1765 Montreal Road in the City of Ottawa. The conclusions are as follows:

Watermain

- The proposed 150m diameter watermains can adequately service the proposed development.
- There are adequate flows and pressure in the municipal watermain system to meet the required domestic water demand for the development.
- The existing municipal fire hydrants can provide adequate fire water supply for the development.

Sanitary Servicing

- The existing 250mm diameter sanitary sewer in Montreal Road will be extended to service the proposed development
- There is adequate capacity within the proposed sanitary sewer extension to service the proposed development.
- There is no capacity within the existing municipal sanitary sewer system to accommodate the 6 L/s peak flows from proposed development. The City will allow the development to proceed provided that adequate extraneous flows are removed from the downstream system equivalent to approximately 3 L/s.
- The developer is working with the City to identify the extraneous flow locations in the existing sanitary sewer to remove the 3 L/s flow from the downstream sewer system.

Stormwater Management

- For outlet the Montreal Road storm sewer, the proposed development will control the post development peak flows to the 2-year pre-development level. The 100-year post development flow will slightly exceed the 1:2 year pre-development flow, while the 5-year flow will be overcontrolled.
- For outlet to Cedar Road ditch, the proposed development will control the post-development peak flows to the pre-development levels. The 2-year post development flow will slightly exceed the pre-development flow, while the 5-year and the 100-year post-development flows will be overcontrolled.
- On-site stormwater quality control is not required.
- Temporary erosion and sediment control measures will be provided during construction.

It is recommended that the proposed site servicing and stormwater management design be approved for implementation.

NOVATECH

Prepared by:

Miroslav Savic, P. Eng
Senior Project Manager
Land Development

Michael Petepiece, P. Eng.
Senior Project Manager
Water Resources

Reviewed by:

J. Lee Sheets, C.E.T.
Director
Land Development & Public Sector Infrastructure

APPENDIX A

Correspondence

Site Plan Pre- Application Consultation Notes

Date: Monday, July 26, 2021
Site Location: 176 Montreal Road
Type of Development: ☒ Residential (☒ townhomes, ☐ stacked, ☐ singles, ☒ apartments), ☐ Office Space, ☐ Commercial, ☐ Retail, ☐ Institutional, ☐ Industrial, Other: N/A

Infrastructure

Water

Existing public services:

- Montreal – 305mm DI
- Beckham – 203mm DI
- Cedar – 203mm DI

Watermain Frontage Fees to be paid ($190.00 per metre) Cedar Road and Beckham Lane☒ **Yes** ☐ **No**

Boundary conditions:
Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
  - Location of service(s)
  - Type of development and the amount of fire flow required (as per FUS, 1999)
  - Average daily demand: ___ L/s
  - Maximum daily demand: ___ L/s
  - Maximum hourly daily demand: ___ L/s
- Fire protection (Fire demand, Hydrant Locations)
- Please submit sanitary demands with the water boundary conditions to identify any capacity constraints at the local pumping station

General comments

- Service areas with a basic demand greater than 50 m^3/day shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.
- A District Metering Area Chamber (DMA) is required for services 150mm or greater in diameter.

- The existing water services must be blanked at the main.

Sanitary Sewer

Existing public services:

- Montreal Rd – 200mm Conc.

Private servicing:

- A private sanitary sewer runs through 1777, 1795 Montreal, 41 Cedar onto Rothwell Dr. The applicant may considered discussing with the neighbouring property to extended the private sewer.

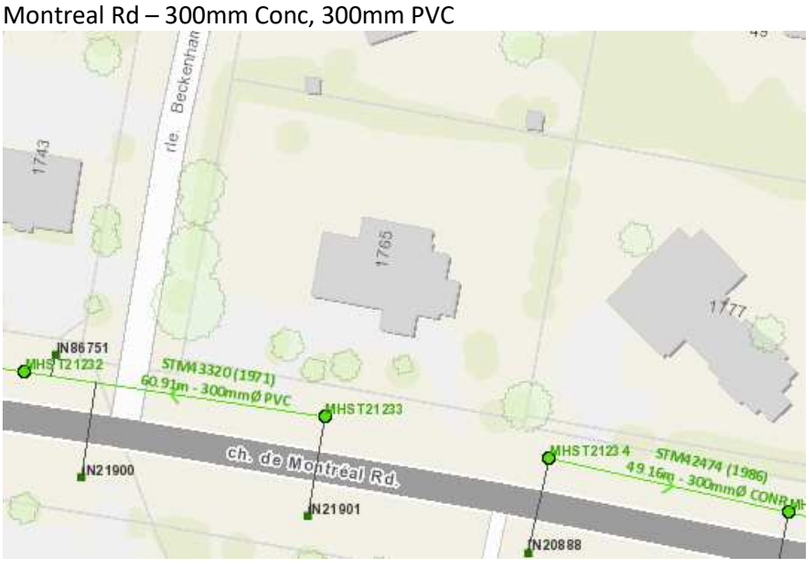
General comments

- The existing sanitary sewer must be extended to the frontage of the property.
- It is anticipated that the proposed high-rise will drain by gravity to the sanitary sewer.
- The proposed townhomes may be pumped. A back-up pump and generator will be requested. All servicing portions within the ROW must drain by gravity. Private force mains within the ROW are strongly discouraged.
- A Transfer of Review ECA will be required for the proposed sanitary sewer extension and private sanitary sewer under Section 53 of OWRA.
- For concrete sewer pipe, maintenance holes shall be installed when the service is greater than 50% of the diameter of the mainline concrete pipe.

Storm Sewer

Existing public services:

- Montreal Rd – 300mm Conc, 300mm PVC



General comments

- Ensure that the proposed drive ramp entrance to the underground parking garage is protected from the major overland flow route.
    - A minimum freeboard elevation of 350mm from highpoint of the ramp to the street spill elevation.
    - A minimum freeboard elevation of 300mm from the invert of the ramp drain to the 100 year HGL of the storm sewer.
    - In general conformity of City of Ottawa Standard S17.

- In order to minimize number of storm sewer connections the foundation drain and the drive ramp drain may connect to site sewer under free-flow conditions. The system must be designed to ensure that drainage does not back-up into the building drain or drive ramp.

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Site is located within Cyrville Drain Subwatershed Study Area
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable run-off coefficient C = 0.5
- Allowable flowrate: Allowable flowrate: Control the 100-year storm events to the 2-year storm event.

Ministry of Environment, Conservation and Parks (MECEP)

All development applications should be considered for an Environmental Compliance Approval, under MECP regulations.

a. Consultants are required to determines if an approval for sewage works under Section 53 of OWRA is required. The City's opinion is that a direct submission ECA will be required.
b. ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval

NOTE: Site Plan Approval, or Draft Approval, is required before any Ministry of the Environment and Climate Change (MOECC) application is sent

General Service Design Comments

- Existing sewer or watermains that are not reused must be decommissioned as per City Standards. Please show all road cuts on the plans.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.

Other

Capital Works Projects within proximity to application? ☐ **Yes** ☒ **No**

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:
  InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>
  (613) 580-2424 ext. 44455
- geoOttawa
  http://maps.ottawa.ca/geoOttawa/

PLANS & STUDIES LIST

For information on preparing required studies and plans refer to:
http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

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

S – Required for Site Plan Control
Z – Required for Zoning By-Law Amendment

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, City Planning 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 City.

Notes:

4. Geotechnical Study / Slope Stability Study – required as per Official Plan section 4.8.3. All site plan applications need to demonstrate the soils are suitable for development. A Slope Stability Study may be required with unique circumstances (Schedule K or topography may define slope stability concerns).

10. Erosion and Sediment Control Plan – required with all site plan applications as per Official Plan section 4.7.3.

11. Stormwater Management Report/Brief - required with all site plan applications as per Official Plan section 4.7.6.

Miro Savic

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Tuesday, October 12, 2021 9:33 AM
To: Miro Savic
Cc: Steve Matthews
Subject: RE: PC2021-0233 Pre-application Consultation - 1765 Montreal Road

Miro,

This sewer can be controlled 100-year to the 5-year storm events.

Rubina

Rubina Rasool, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review – East Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1 rubina.rasool@ottawa.ca

---

From: Miro Savic <m.savic@novatech-eng.com>
Sent: September 30, 2021 2:47 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Steve Matthews <S.Matthews@novatech-eng.com>
Subject: FW: PC2021-0233 Pre-application Consultation - 1765 Montreal Road

I'd like to get some clarification on the allowable release rate for the 1765 Montreal Road project. Why we need to control the 100-year storm event to the 2-year storm event? Typically for site developments we would control the 100-year storm to the 5-year year storm unless connection is made to a combined sewer. On our recent project two lots down the road (1795 Montreal Road) we were required to control the 100 year storm to the 5-year storm.

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Site is located within Cyrville Drain Subwatershed Study Area
- Time of concentration (Tc): Tc = pre-development; maximum Tc = 10 min
- Allowable run-off coefficient C = 0.5
- Allowable flowrate: Allowable flowrate: Control the 100-year storm events to the 2-year storm event.

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

From: Katsouleas, Jonathan <jonathan.katsouleas@ottawa.ca>
Sent: Friday, July 30, 2021 3:51 PM
To: Matthew Firestone <matthew.firestone@landrichomes.com>; Murray Chown <m.Chown@novatech-eng.com>; Ryan Poulton <r.poulton@novatech-eng.com>
Cc: Boughton, Michael <Michael.Boughton@ottawa.ca>; Richardson, Mark <Mark.Richardson@ottawa.ca>; Wood, Mary Ellen <MaryEllen.Wood@ottawa.ca>; Richardson, Mark <Mark.Richardson@ottawa.ca>; Young, Mark <Mark.Young@ottawa.ca>; Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Subject: PC2021-0233 Pre-application Consultation - 1765 Montreal Road

Hello Murray, Ryan and Matthew,

Please refer to the attached documents regarding the Pre-Application Consultation Meeting held on July 14, 2021 for the property at 1765 Montreal Road for Site Plan Control and Zoning By-Law Amendment in order to allow the proposed development. I have also attached the required Plans & Study List for application submission and Design Brief Information form.

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

Regards,

Jonathan

JONATHAN KATSOULEAS
Urban Planning Co-op Student | *Urbanisme, Étudiant Coop*
Development Review | *Examen des projects d'aménagement*
Planning, Infrastructure and Economic Development | *Service de la planification, de l'infrastructure et du développement économique*
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West, Ottawa, ON | 110, avenue Laurier Ouest (Ontario) K1P 1J1

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Miro Savic

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Thursday, December 15, 2022 1:31 PM
To: Miro Savic
Cc: Larry Colbran
Subject: RE: 1765 Montreal Road - RVCA Pre-Consultation

Thanks Miro,

This is helpful. Based on the distance to the downstream outlet, the RVCA would not require additional on-site water quality treatment for the drainage area outletting to the Cedar Road ditch.

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 **F** 613-692-0831 | www.rvca.ca

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Thursday, December 15, 2022 9:26 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Larry Colbran <l.colbran@novatech-eng.com>
Subject: RE: 1765 Montreal Road - RVCA Pre-Consultation

Hi Jamie,

According to the mapping on GeoOttawa the roadside ditch is tributary to Greens Creek. Refer to the attached sketch. The distance to the downstream outlet is about 3km from the site (more than 2km).

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Wednesday, December 14, 2022 4:36 PM

To: Miro Savic <m.savic@novatech-eng.com>
Cc: Larry Colbran <l.colbran@novatech-eng.com>
Subject: RE: 1765 Montreal Road - RVCA Pre-Consultation

Hi Miro,

It is not clear to me based on the mapping I have available as to where the roadside ditch network ultimately drain to a downstream outlet. Would you be able to shed some light on this?

Jamie Batchelor, MCIP, RPP
Planner, ext. 1191
Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 **F** 613-692-0831 | www.rvca.ca

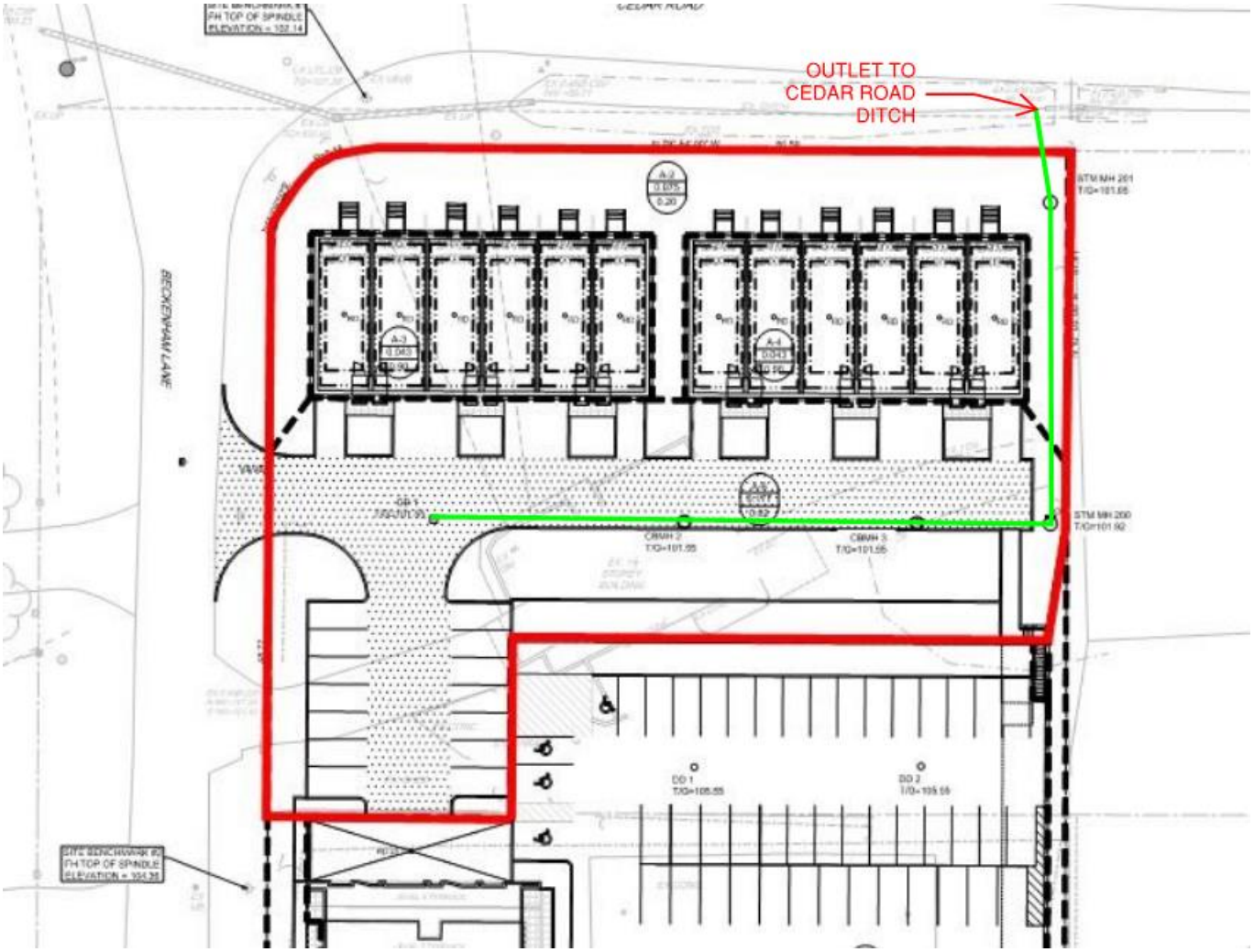
From: Miro Savic <m.savic@novatech-eng.com>
Sent: Tuesday, December 13, 2022 10:55 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Larry Colbran <l.colbran@novatech-eng.com>
Subject: RE: 1765 Montreal Road - RVCA Pre-Consultation

Hello Jamie,

Thank you for quick response.

Can you please confirm whether the storm water quality control is required for outlet to the Cedar Road ditch as well.
The area draining to the ditch consist of 14 parking spaces, driveways, townhouse roofs, and landscaped areas.
See sketch below. Sorry I wasn't clear in my original email.

Please do not hesitate to call should you have any questions or require additional information.



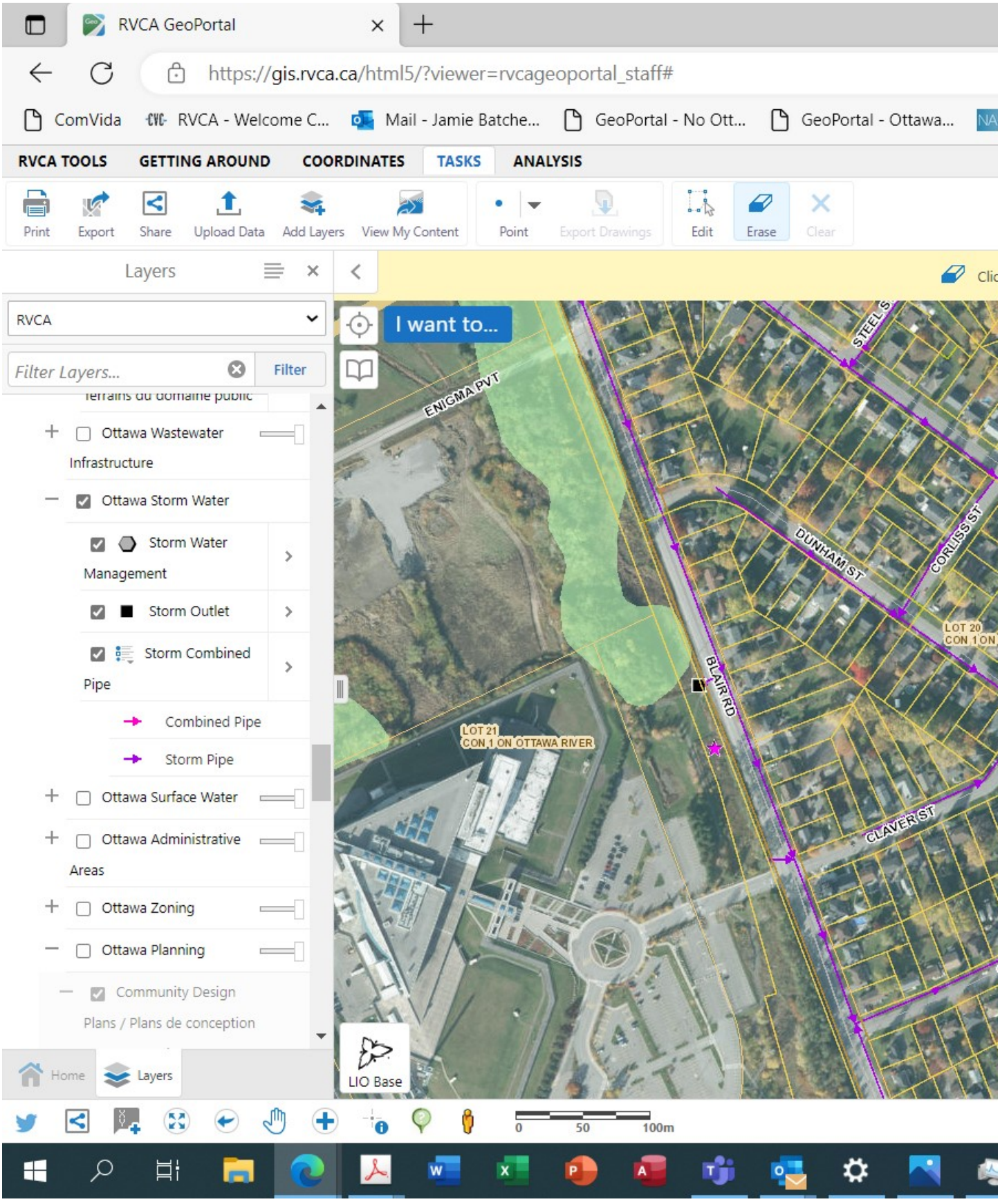
Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Monday, December 12, 2022 9:09 AM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Larry Colbran <l.colbran@novatech-eng.com>
Subject: RE: 1765 Montreal Road - RVCA Pre-Consultation

Good Morning Miro,

Based on the amount of parking spaces and the distance to a downstream outlet, on-site water quality control of enhanced (80% TSS Removal) would be required. Please note, that it was assumed that the downstream outlet is on Blair Road, see snap shot below. Based on the City of Ottawa storm sewer layer, there is an outlet at this location. While there is no arrow indicating direction of flows, it is assumed that storm water would be directed to this outlet given that there is no other source feeding into it. However, if you have any information to suggest otherwise, we'd be happy to further discuss.



Jamie Batchelor, MCIP, RPP
Planner, ext. 1191

Jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority

3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 **F** 613-692-0831 | www.rvca.ca

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Tuesday, December 6, 2022 9:38 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Larry Colbran <l.colbran@novatech-eng.com>
Subject: 1765 Montreal Road - RVCA Pre-Consultation

Hello Jamie,

We are working on servicing and stormwater management design for a residential development located at 1765 Montreal Road in the City of Ottawa. The proposed development will consist of a 9-storey apartment building and two townhouse blocks replacing the existing single-family homes. Refer to the attached preliminary site plan for details.

The storm drainage from the 9-store apartment building and the proposed parking lot will be directed to the existing 300mm diameter storm sewer in Montreal Road. The storm drainage from the townhouses and associated driveway will be directed to the Cedar Road roadside ditch

The stormwater quantity control will be provided by controlling the post development flows from the site up to and including 100-year design event to a target 5-year release rate specified by the City of Ottawa.

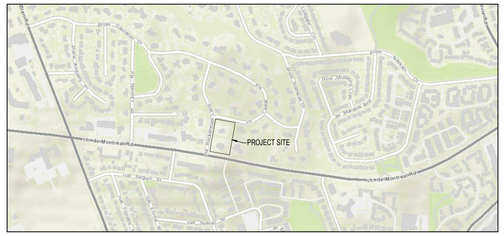
Can you please confirm whether the storm water quality control is required for the proposed development.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 265 | Fax: 613.254.5867

APPENDIX B

Site Plan



2 SP-01 LOCATION PLAN
SCALE: NTS

SURVEY INFO
PART OF LOT 31, REGISTERED PLAN 126 &
PART OF LOT 20, CONCESSION 1 AND
PART OF BLOCK 2, REGISTERED PLAN 118
CITY OF OTTAWA

PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
FIELD WORK COMPLETED ON NOVEMBER 24, 2021

SITE PLAN SYMBOLS LEGEND

- BUILDING ENTRANCE
- BUILDING EXIT
- BICYCLE PARKING
- PROPERTY LINE
- SETBACK LINE
- OHW — OVERHEAD WIRES
- INTERLOCKING STONE PAVERS
- EXISTING TRAFFIC SIGNAL POST
- FDC — FIRE DEPARTMENT CONNECTION
- FH — FIRE HYDRANT
- NEW STREET LIGHT
- STREET LIGHT TO BE REMOVED
- EXISTING STREET LIGHT TO REMAIN
- UP — EXISTING UTILITY POLE TO REMAIN
- UP — UTILITY POLE TO BE REMOVED/RELOCATED
- R.P. — RAISED PLANTER

SITE PLAN NOTES

S1 ASPHALT
S2 EXISTING STRUCTURE TO BE DEMOLISHED
S3 CONCRETE SIDEWALK
S4 SOFT LANDSCAPING
S5 DEPRESSED CURB
S6 LINE OF CANOPY ABOVE
S7 3m x 9m CORNER SIGHT TRIANGLE
S8 CURB TRANSITION
S9 CONCRETE RAMP
S10 PLANTING BED

GENERAL ARCHITECTURAL NOTES:

1. This drawing is the property of the Architect and may not be reproduced or used without the expressed consent of the Architect.
2. Drawings are not to be scaled. The Contractor is responsible for checking and verifying all levels and dimensions and shall report all discrepancies to the Architect and obtain clarification prior to commencing work.
3. Upon notice in writing, the Architect will provide written/graphic clarification or supplementary information regarding the intent of the Contract Documents.
4. The Architectural drawings are to be read in conjuction with all other Contract Documents including Project Manuals and the Structural, Mechanical and Electrical Drawings.
5. Positions of exposed or finished Mechanical or Electrical devices, fittings and fixtures are indicated on the Architectural Drawings. Locations shown on the Architectural Drawings shall govern over Mechanical and Electrical Drawings. Mechanical and Electrical items not clearly located will be located as directed by the Architect.
6. These documents are not to be used for construction unless specifically noted for such purpose.

1 SP-01 SITE PLAN
SCALE: 1 : 200

1 ISSUED FOR ZONING BY-LAW AMEND. 2025-03-19

ISSUE RECORD

project1 studio
Project1 Studio Incorporated
| 613.884.3939 | mail@project1studio.ca

1765 MONTREAL RD

1765 Montreal Road
Ottawa, ON

PROJ	SCALE	DRAWN	REVIEWED
2107	NOTED	BH	JH

SITE PLAN

SP-01

APPENDIX C

Sanitary Sewer Calculations

1765 MONTREAL ROAD
SANITARY FLOW

BUILDING A NUMBER OF UNITS

STUDIO	9	
Persons per STUDIO	1.4	
1 BED	103	
Persons per 1 BED Unit	1.4	
1 BED + DEN	43	
Persons per 1 BED + DEN Unit	1.4	
2 BED	68	
Persons per 2 BED Unit	2.1	
2 BED + DEN	4	
Persons per 1 BED + DEN Unit	2.1	

BUILDING B NUMBER OF UNITS

STUDIO	9	
Persons per STUDIO	1.4	
1 BED	27	
Persons per 1 BED Unit	1.4	
1 BED + DEN	25	
Persons per 1 BED + DEN Unit	1.4	
2 BED	37	
Persons per 2 BED Unit	2.1	
2 BED + DEN	0	
Persons per 1 BED + DEN Unit	2.1	

Total Population	525	
Average Daily Flow	280	L/c/day
Average Daily Volume	147,036	L/day
Peak Factor (Harmon Formula)	3.37	
Peak Sanitary Flow	**5.74**	**L/s**
Site Area	0.80	ha
Infiltration Allowance	0.33	L/s/ha
Peak Extraneous Flows	**0.26**	**L/s**
Peak Sanitary Flow	**6.00**	**L/s**

Miro Savic

From: Adams, Reed <reed.adams@ottawa.ca>
Sent: Friday, February 14, 2025 12:10 PM
To: Miro Savic
Cc: Lee Sheets
Subject: Re: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Miroslav,

To follow up on our conversation, you'll be able to proceed with your proposed 6 L/s of sanitary flow provided you remove adequate extraneous flow from the surrounding system equivalent to the difference of sanitary flow between your current submission and the previous one in December 2022 (~3 L/s).

There are several methods that can be carried out to remove extraneous flow from the surrounding sanitary network, such as replacing manhole covers in low points and/or disconnecting CBs from sanitary sewers and connecting them to storm sewers. If CCTV footage is needed to determine which sanitary sewers have catch basin connections, the City can provide it.

Another thing to note is that there are two other developments in the area, 1649 Montreal Rd and the NRC, who are in a similar situation in terms of having to remove extraneous flows in order to proceed (the NRC may have a private servicing solution to this issue). It may be worthwhile to reach out to them to coordinate the study/removal of the flows to the system, but that's of course up to you.

In terms of process, a section in the site servicing report describing what will be done to remove the required extraneous flows as well as confirmation that this amount of flow will indeed be removed will be required. A condition will be imposed in the delegated authority report that will require that this work be carried out prior to receiving a building permit for the site.

If you have any questions, please let me know.

Thanks,

Reed

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Friday, February 14, 2025 9:22 AM
To: Adams, Reed <reed.adams@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Reed,

Do you have some time this morning for a call on Teams?

Thanks,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Miro Savic
Sent: Thursday, February 13, 2025 12:44 PM
To: Adams, Reed <reed.adams@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Reed,

I'm wandering what has changed since the last submission (December 2022). The City did not raise concerns with the downstream sanitary capacity in the last submission.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Adams, Reed <reed.adams@ottawa.ca>
Sent: Thursday, February 13, 2025 11:26 AM
To: Miro Savic <m.savic@novatech-eng.com>
Subject: Re: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Miro,

Asset Management just got back to me and their models show that there unfortunately is no available capacity in the system and is flooding in its current state.

Let me know if you have any questions or if you'd like to discuss this further.

Thanks,

Reed

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Thursday, February 6, 2025 9:31 AM
To: Adams, Reed <reed.adams@ottawa.ca>
Subject: RE: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Reed,

Thank you for the heads up.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Adams, Reed <reed.adams@ottawa.ca>
Sent: Thursday, February 6, 2025 9:28 AM
To: Miro Savic <m.savic@novatech-eng.com>
Subject: Re: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Miroslav,

Just wanted to update you on your capacity request, our Asset Management team needs to have further internal discussions on the downstream capacity of this sanitary sewer. I'll let you know as soon as I hear back from them.

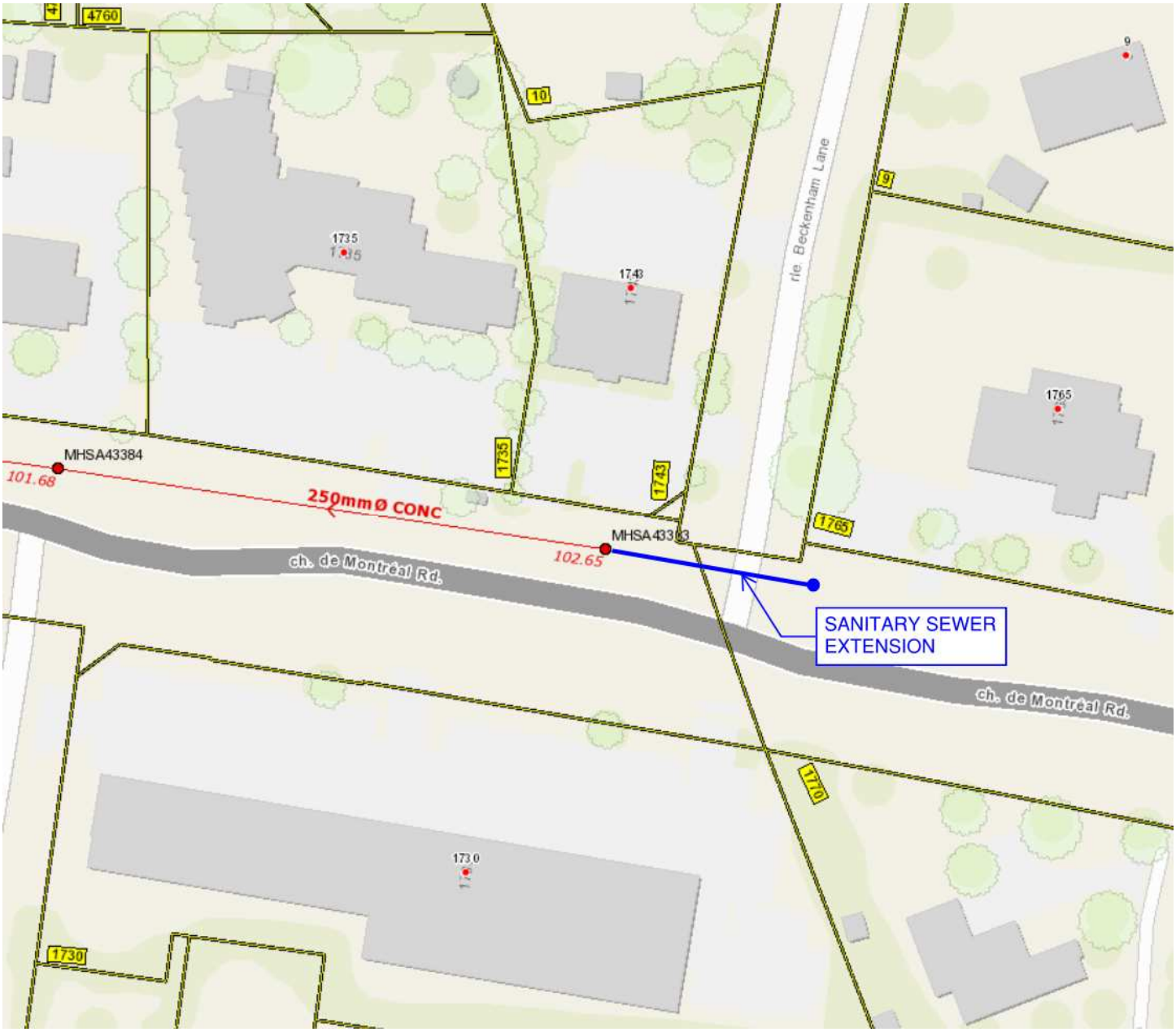
Thanks,

Reed

From: Miro Savic <m.savic@novatech-eng.com>
Sent: January 30, 2025 12:49 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Thank you Rubina.

There are no other sites fronting the sanitary sewer extension that would want to connect to it. The1730 and 1743 Montreal Road sites would have already been connected to the existing sanitary sewer, and the proposed sewer extension does not extend far enough to service 1170 Montreal Road. 1765 Montreal Road is the only site that would be connected to the new sewer extension. See sketch below.



Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Thursday, January 30, 2025 11:39 AM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Miro,

I will see if I can forward your request. Typically when there is a sanitary sewer extension we also require domestic flows and extraneous flows as part of the sewer main. The sewer main design should also account for all sites fronting the property to connect to the sanitary sewer.

Thank you,

Rubina

Rubina Rasool
Project Manager
Planning, Infrastructure and Economic Development Department
Development Review – West Branch
City of Ottawa
110 Laurier Avenue West Ottawa, ON K1P 1J1
613-580-2424 Ext. 24221
rubina.rasool@ottawa.ca

From: Miro Savic <m.savic@novatech-eng.com>
Sent: January 30, 2025 10:26 AM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Rubina,

Sotrry I wasn't clear. The sanitary from the site will outlet to the existing 250mm diameter sanitary sewer in Montreal Road, same as the old design.
The Montreal Road sewer will have to be extended to service the site. See the attached sanitary sewer extension plan & profile that was previously submitted for the site plan approval.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Thursday, January 30, 2025 9:53 AM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Miro,

Would you be able to confirm what sanitary sewer the site will outlet to as there isn't a sewer fronting the property.

Thanks,

Rubina

Rubina Rasool
Project Manager
Planning, Infrastructure and Economic Development Department
Development Review – West Branch
City of Ottawa
110 Laurier Avenue West Ottawa, ON K1P 1J1
613-580-2424 Ext. 24221
rubina.rasool@ottawa.ca

From: Miro Savic <m.savic@novatech-eng.com>
Sent: January 29, 2025 2:12 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: 1765 Montreal Road - Downstream Sanitary Sewer Capacity

Hi Rubina,

I'm writing to confirm available capacity in the municipal sanitary sewer system to accommodate the new development proposal at 1765 Montreal Road. The proposed development consists of two apartment buildings: Building A (17-storey) and Building B (6-storey), having a total of 325 units. I have attached the preliminary site plan for reference.

The peak sanitary flow for the proposed development is calculated to be 6.0L/s. Detailed calculations are attached.

Can the city please confirm if there are any capacity constraints in the municipal sanitary sewer system downstream of the site.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

APPENDIX D

Water Demands, FUS Calculations, and City of Ottawa Boundary Conditions

Miro Savic

From: Adams, Reed <reed.adams@ottawa.ca>
Sent: Friday, March 7, 2025 8:23 AM
To: Miro Savic
Subject: Re: 1765 Montreal Road - Boundary Conditions Request
Attachments: 1765 Montreal Road February 2025.pdf

Hi Miro,

Not quite the end of last week, but here are the boundary conditions for the site:

The following are boundary conditions, HGL, for hydraulic analysis at 1765 Montreal Road (zone MONT) with an *assumed dual connection* to the 203 mm watermain on Beckenham Lane (see attached PDF for location).

Minimum HGL: 142.5 m

Maximum HGL: 143.0 m

Max Day + Fire Flow (67 L/s): 139.8 m

These are for current conditions and are based on computer model simulation.

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.

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Tuesday, February 25, 2025 8:46 AM
To: Adams, Reed <reed.adams@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>; Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Subject: RE: 1765 Montreal Road - Boundary Conditions Request

Yes, that works. Thank you!

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering

NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Adams, Reed <reed.adams@ottawa.ca>
Sent: Tuesday, February 25, 2025 8:45 AM
To: Miro Savic <m.savic@novatech-eng.com>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: Re: 1765 Montreal Road - Boundary Conditions Request

Hi Miro,

I spoke with Water Resources and they said they can provide them by the end of the week at the latest. Does that work for you?

Thanks,

Reed

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Monday, February 24, 2025 4:00 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>; Adams, Reed <reed.adams@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Boundary Conditions Request

Hi Rubina,

Could you please ask the water resources to prioritize this request since the email was missed.

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Monday, February 24, 2025 2:56 PM
To: Miro Savic <m.savic@novatech-eng.com>; Adams, Reed <reed.adams@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: Re: 1765 Montreal Road - Boundary Conditions Request

Hi Miro,

I missed the water boundary request email during the sanitary sewer discussion. We will forward the request off now.

Thank you,

Rubina

Rubina Rasool
Project Manager
Planning, Infrastructure and Economic Development Department
Development Review – West Branch
City of Ottawa
110 Laurier Avenue West Ottawa, ON K1P 1J1
613-580-2424 Ext. 24221
rubina.rasool@ottawa.ca

From: Miro Savic <m.savic@novatech-eng.com>
Sent: Monday, February 24, 2025 2:23 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>; Adams, Reed <reed.adams@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Boundary Conditions Request

Hi Rubina,

Can you please follow up with the water recourses on the boundary conditions.

Thank you,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205

From: Miro Savic
Sent: Monday, January 27, 2025 3:22 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Lee Sheets <l.sheets@novatech-eng.com>
Subject: RE: 1765 Montreal Road - Boundary Conditions Request

Hi Rubina,

Please provide updated boundary conditions for new development proposal on the site. The new development proposal consists of two apartment buildings: Building A (17-storey) and Building B (6-storey). The preliminary site plan is attached for reference.

The FUS fire flows, and domestic water demands are summarized below. The detailed calculations are attached.

FUS Fire Flow

- Building A = 67 L/s (4,000 L/min)
- Building B = 67 L/s (4,000 L/min)

Domestic Water Demands (both buildings)

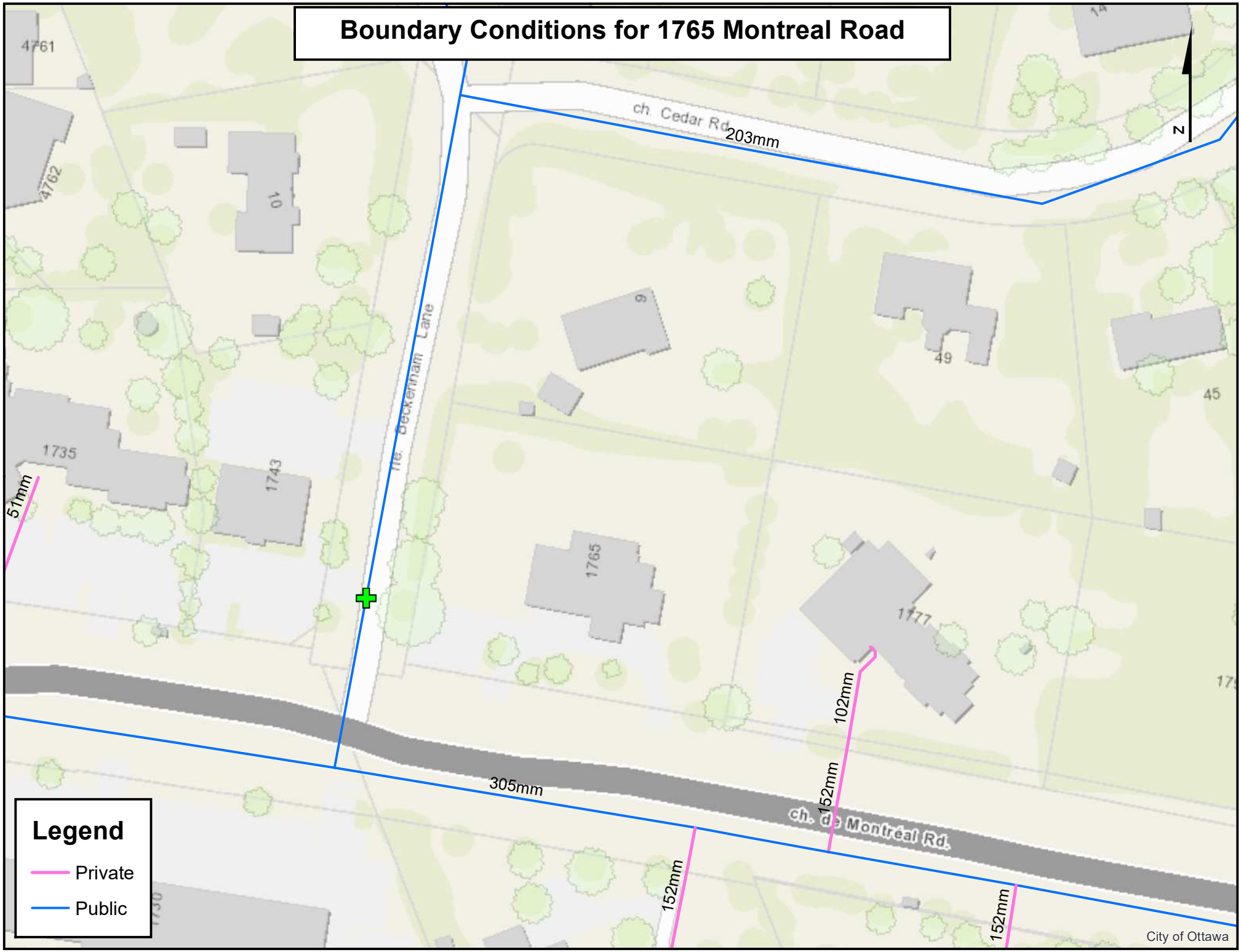
- Average Day Demand = 1.70 L/s
- Maximum Day Demand = 4.25 L/s
- Peak Hour Demand = 9.36 L.s

The water service is proposed to be connected to the existing 203mm waterman in Buckenham Lane at the approximate location shown on the attached sketch. A twin connection to the Beckenham Lane watermain will need to be provided since the basic daily demand for the development exceeds 50m^3/day.

Please contact me should you have any questions.

Regards,

Miroslav Savic, P.Eng., Senior Project Manager | Land Development Engineering
NOVATECH
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6 | Tel: 613.254.9643 x 205


Boundary Conditions for 1765 Montreal Road
4761
4762
10
ch. Cedar Rd.
203mm
N
9
49
45
1735
1743
51mm
rte. Beckenham Lane
1765
1777
102mm
305mm
ch. de Montréal Rd.
152mm
152mm
152mm
Legend
Private
Public
City of Ottawa

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

Novatech Project #: 121060
Project Name: 1765 Montreal Road
Date: 1/22/2025
Input By: MS
Reviewed By:
Drawing Reference:

Legend: Input by User / No Input Required
Reference: Fire Underwriter's Survey Guideline (2020) Formula Method

Building Description: Building A 17-Storey Tower
Type I - Fire resistive construction (2 hrs)

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.6	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction		0.8		
		Type I - Fire resistive construction (2 hrs)	Yes	0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1450			
		Number of Floors/Storeys	17			
		Protected Openings (1 hr) if C<1.0	Yes			
		Area of structure considered (m^2)			**2,175**	
	F	**Base fire flow without reductions**				**6,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**5,100**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-2,550**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	24650	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**1,275**
		East Side	20.1 - 30 m		10%	
		South Side	>30m		0%	
		West Side	>30m		0%	
				Cumulative Total	**25%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057

FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

Novatech Project #: 121060
Project Name: 1765 Montreal Road
Date: 1/23/2025
Input By: MS
Reviewed By:
Drawing Reference:

Legend: Input by User / No Input Required
Reference: Fire Underwriter's Survey Guideline (2020) Formula Method

Building Description: Buildng B 6-Storey Tower
Type II - Non-combustible construction

Step			Choose		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction C	Type V - Wood frame		1.5	0.8	
		Type IV - Mass Timber		Varies		
		Type III - Ordinary construction		1		
		Type II - Non-combustible construction	Yes	0.8		
		Type I - Fire resistive construction (2 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1452			
		Number of Floors/Storeys	6			
		Protected Openings (1 hr) if C<1.0	Yes			
		Area of structure considered (m^2)			**2,178**	
	F	**Base fire flow without reductions**				**8,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**		**FUS Table 3**	**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**6,800**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**		**FUS Table 4**	**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-3,400**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Sub-Total	**-50%**	
		Area of Sprinklered Coverage (m^2)	8712	100%		
				Cumulative Total	**-50%**	
5	**Exposure Surcharge**		**FUS Table 5**		**Surcharge**	
	(3)	North Side	>30m		0%	**1,020**
		East Side	>30m		0%	
		South Side	10.1 - 20 m		15%	
		West Side	>30m		0%	
				Cumulative Total	**15%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**4,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**67**
				or	USGPM	1,057

1765 MONTREAL ROAD
WATERMAIN ANALYSIS

BUILDING A NUMBER OF UNITS

STUDIO	9
Persons per STUDIO	1.4
1 BED	103
Persons per 1 BED Unit	1.4
1 BED + DEN	43
Persons per 1 BED + DEN Unit	1.4
2 BED	68
Persons per 2 BED Unit	2.1
2 BED + DEN	4
Persons per 1 BED + DEN Unit	2.1

BUILDING B NUMBER OF UNITS

STUDIO	9
Persons per STUDIO	1.4
1 BED	27
Persons per 1 BED Unit	1.4
1 BED + DEN	25
Persons per 1 BED + DEN Unit	1.4
2 BED	37
Persons per 2 BED Unit	2.1
2 BED + DEN	0
Persons per 1 BED + DEN Unit	2.1

Total Population	525	
Average Day Demand	280	L/c/day
Average Day Demand	147	m3/day

Average Day Demand	**1.70**	**L/s**
Maximum Day Demand (2.5 x avg. day)	**4.25**	**L/s**
Peak Hour Demand (2.2 x max. day)	**9.36**	**L/s**

BOUNDAY CONDITIONS

Maximum HGL =	143.0	m
Minimum HGL =	142.5	m
Max Day + Fire Flow (67 l/S) =	139.8	m

PRESSURE TESTS

AVERAGE GROUND ELEVATION 105.6 m

MAXIMUM PRESSURE TEST = MAX HGL - AVG GROUND ELEV x 1.42197 PSI/m < 80 PSI

MAX PRESSURE = **53.2** PSI

MINIMUM PRESSURE TEST = MIN HGL - AVG GROUND ELEV x 1.42197 PSI/m > 40 PSI

MIN PRESSURE = **52.5** PSI

MAX DAY + FIRE FLOW TEST = MAX DAY + FIRE - AVG GROUND ELEV x 1.42197 PSI/m > 20 PSI

MAX DAY + FIRE PRESSURE = **48.6** PSI

APPENDIX E

IDF Curves, Pre-Development Drainage Area Plan and SWM Calculations

CEDAR ROAD

BECKENHAM LANE

MONTREAL ROAD

EX-1
0.634
0.31

EX-2
0.165
0.55

EX. 1½ STOREY BUILDING

EX. 1 STOREY BUILDING

EX. GARAGE

EX. SHED

EX.SEPTIC TANK

EX.VOLLEYBALL NET

EX.CONC.

EX.GRASS

EX.TOS

EX.SILL

EX.GARDEN

EX.LS

EX.UP

EX.TB

EX.TB-C

EX.CB
TG=100.60

EX.CB
TG=105.98

EX.SAN MH
TG=106.13
INV.W=102.70

EX.STM MH
TG=106.13
INV.=103.22

EX.CB
TG=103.23

EX.CBMH
TG=104.80
INV.=103.90

EX.300mm PVC STM SEWER @ 1.1%

EX.0.300Ø CSP
N INV=101.25
S INV=101.45

EX.0.490 CSP
INV.=99.71

EX.0.490 CSP
INV.=99.47

EX.0.490 CSP
INV.=99.40

EX. DITCH

N79° 54' 00"W 60.59

N10°11'40"E 57.91

N10°11'40"E 66.85

N79° 54' 00"W 66.85

N10°11'40"E 56.80

48.77

R=9.15

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

1765 MONTREAL ROAD

PRE-DEVELOPMENT DRAINAGE AREA PLAN

SCALE 1 : 300

DATE DEC 2022 | JOB 121060 | FIGURE SWM-PRE

SHT11X17.DWG - 279mmX432mm

M:\2021\121060\CAD\Design\121060-SWM.dwg, SWM(PRE), Dec 16, 2022 - 11:38am, zali

Project #: 124011
Project Name: 100 Bill Leathem Drive
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date: 3/25/2025

Proposed Residential Development
1765 Montreal Road

Pre - Development Site Flows

Description	Area (ha)	$A_{impervious}$ (ha) C=0.9	$A_{pervious}$ (ha) C=0.2	Weighted C_{w5}	Weighted C_{w100}	1:2 Year Flow (L/s)	1:5 Year Flow (L/s)	1:100 Year Flow (L/s)	Allowable C_{value}	Allowable Flow		
										2 Year (L/s)	5 Year (L/s)	100 Year (L/s)
Area Draining to Montreal Road	0.165	0.083	0.082	0.55	0.63	19.5	26.5	51.5	0.55	19.5	19.5	19.5
Area Draining to Cedar Road Ditch	0.634	0.101	0.533	0.31	0.37	42.2	57.2	116.3	0.31	42.16	57.2	116.3
	0.799					T_c = 10mins	T_c = 10mins	T_c = 10mins				

Post - Development Site Flows to Montreal Road

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)		Controlled Flow (L/s)		Storage Required (m^3)		Storage Provided (m^3)
							5 year	100 year	5 year	100 year	5 year	100 year	
A-1	Direct Runoff to Montreal Road	0.033	0.006	0.027	0.33	0.39	3.1	6.3	-	-	-	-	-
R-1	Controlled Roof Flow to Montreal Road	0.122	0.122	0.000	0.90	1.00	-	-	7.6	8.2	16.4	41.1	57.0
R-2	Controlled Roof Flow to Montreal Road	0.122	0.122	0.000	0.90	1.00	-	-	5.5	5.7	19.1	46.7	58.2
	Totals :	0.277	-	-	-	-	**3.1**	**6.3**	**13.1**	**13.9**	**35.5**	**87.9**	**115.2**
								Total Flows :	**16.2**	**20.2**			
								Overcontrolled:	3.3	-0.7			

Post - Development Site Flows to Cedar Creek

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s)			Controlled Flow (L/s)			Storage Required (m^3)			Storage Provided (m^3)
							2 year	5 year	100 year	2 year	5 year	100 year	2 year	5 year	100 year	
A-2	Direct Runoff to Beckenham Lane	0.034	0.005	0.029	0.30	0.36	2.2	3.0	6.1	-	-	-		-	-	-
A-3	Direct Runoff to Cedar Road	0.114	0.007	0.107	0.24	0.30	5.9	8.0	16.8	-	-	-	-	-	-	0.0
A-4	Controlled Flow to Cedar Road	0.374	0.310	0.064	1.00	1.00	-			35.5	42.5	66.5	27.5	38.5	61.0	61.0
	Totals :	0.522	-	-	-	-	**8.1**	**11.0**	**22.8**	**35.5**	**42.5**	**66.5**	**27.5**	**38.5**	**61.0**	**61.0**
		0.799							**Total Flows :**	**43.6**	**53.5**	**89.3**				
									Overcontrolled:	-1.5	3.7	26.9				

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-1 Direct Runoff to Montreal Road

OTTAWA IDF CURVE

Area =	0.033	ha	Qallow =	3.1	L/s
C =	0.33		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	4.24	1.11	0.33
10	104.19	3.13	0.00	0.00
15	83.56	2.51	-0.62	-0.56
20	70.25	2.11	-1.02	-1.22
25	60.90	1.83	-1.30	-1.95
30	53.93	1.62	-1.51	-2.72
35	48.52	1.46	-1.67	-3.51
40	44.18	1.33	-1.80	-4.32
45	40.63	1.22	-1.91	-5.15
50	37.65	1.13	-2.00	-5.99
55	35.12	1.05	-2.07	-6.84
60	32.94	0.99	-2.14	-7.70
65	31.04	0.93	-2.20	-8.57
70	29.37	0.88	-2.25	-9.43
75	27.89	0.84	-2.29	-10.31
80	26.56	0.80	-2.33	-11.19
85	25.37	0.76	-2.37	-12.07
90	24.29	0.73	-2.40	-12.95

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-1 Direct Runoff to Montreal Road

OTTAWA IDF CURVE

Area =	0.033	ha	Qallow =	6.3	L/s
C =	0.39		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	8.60	2.27	0.68
10	178.56	6.33	0.00	0.00
15	142.89	5.06	-1.26	-1.14
20	119.95	4.25	-2.08	-2.49
25	103.85	3.68	-2.65	-3.97
30	91.87	3.26	-3.07	-5.53
35	82.58	2.93	-3.40	-7.14
40	75.15	2.66	-3.67	-8.80
45	69.05	2.45	-3.88	-10.48
50	63.95	2.27	-4.06	-12.19
55	59.62	2.11	-4.22	-13.91
60	55.89	1.98	-4.35	-15.65
65	52.65	1.87	-4.46	-17.41
70	49.79	1.76	-4.56	-19.17
75	47.26	1.67	-4.65	-20.94
80	44.99	1.59	-4.73	-22.72
85	42.95	1.52	-4.81	-24.51
90	41.11	1.46	-4.87	-26.31

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2 Direct Runoff to Beckenham Lane

OTTAWA IDF CURVE

Area =	0.034	ha	Qallow =	3.0	L/s
C =	0.30		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	4.04	1.06	0.32
10	104.19	2.98	0.00	0.00
15	83.56	2.39	-0.59	-0.53
20	70.25	2.01	-0.97	-1.17
25	60.90	1.74	-1.24	-1.86
30	53.93	1.54	-1.44	-2.59
35	48.52	1.39	-1.59	-3.35
40	44.18	1.27	-1.72	-4.12
45	40.63	1.16	-1.82	-4.91
50	37.65	1.08	-1.91	-5.72
55	35.12	1.01	-1.98	-6.53
60	32.94	0.94	-2.04	-7.34
65	31.04	0.89	-2.09	-8.17
70	29.37	0.84	-2.14	-9.00
75	27.89	0.80	-2.18	-9.83
80	26.56	0.76	-2.22	-10.67
85	25.37	0.73	-2.26	-11.51
90	24.29	0.70	-2.29	-12.36

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2 Direct Runoff to Beckenham Lane

OTTAWA IDF CURVE

Area =	0.034	ha	Qallow =	6.1	L/s
C =	0.36		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	8.27	2.18	0.66
10	178.56	6.08	0.00	0.00
15	142.89	4.87	-1.21	-1.09
20	119.95	4.08	-2.00	-2.40
25	103.85	3.54	-2.54	-3.82
30	91.87	3.13	-2.95	-5.31
35	82.58	2.81	-3.27	-6.86
40	75.15	2.56	-3.52	-8.45
45	69.05	2.35	-3.73	-10.07
50	63.95	2.18	-3.90	-11.71
55	59.62	2.03	-4.05	-13.37
60	55.89	1.90	-4.18	-15.04
65	52.65	1.79	-4.29	-16.72
70	49.79	1.70	-4.39	-18.42
75	47.26	1.61	-4.47	-20.12
80	44.99	1.53	-4.55	-21.83
85	42.95	1.46	-4.62	-23.55
90	41.11	1.40	-4.68	-25.28

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2 Direct Runoff to Cedar Road

OTTAWA IDF CURVE

Area =	0.114	ha	Qallow =	8.0	L/s
C =	0.24		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	141.18	10.87	2.85	0.85
10	104.19	8.02	0.00	0.00
15	83.56	6.43	-1.59	-1.43
20	70.25	5.41	-2.61	-3.14
25	60.90	4.69	-3.33	-5.00
30	53.93	4.15	-3.87	-6.97
35	48.52	3.74	-4.29	-9.00
40	44.18	3.40	-4.62	-11.09
45	40.63	3.13	-4.89	-13.22
50	37.65	2.90	-5.12	-15.37
55	35.12	2.70	-5.32	-17.55
60	32.94	2.54	-5.49	-19.75
65	31.04	2.39	-5.63	-21.97
70	29.37	2.26	-5.76	-24.20
75	27.89	2.15	-5.88	-26.44
80	26.56	2.05	-5.98	-28.69
85	25.37	1.95	-6.07	-30.96
90	24.29	1.87	-6.15	-33.23

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2 Direct Runoff to Cedar Road

OTTAWA IDF CURVE

Area =	0.114	ha	Qallow =	16.8	L/s
C =	0.30		Vol(max) =	0.0	m^3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m^3)
5	242.70	22.77	6.02	1.81
10	178.56	16.75	0.00	0.00
15	142.89	13.41	-3.35	-3.01
20	119.95	11.25	-5.50	-6.60
25	103.85	9.74	-7.01	-10.51
30	91.87	8.62	-8.13	-14.64
35	82.58	7.75	-9.01	-18.91
40	75.15	7.05	-9.70	-23.29
45	69.05	6.48	-10.27	-27.74
50	63.95	6.00	-10.75	-32.26
55	59.62	5.59	-11.16	-36.83
60	55.89	5.24	-11.51	-41.43
65	52.65	4.94	-11.81	-46.07
70	49.79	4.67	-12.08	-50.74
75	47.26	4.43	-12.32	-55.44
80	44.99	4.22	-12.53	-60.15
85	42.95	4.03	-12.72	-64.89
90	41.11	3.86	-12.90	-69.64

Structure Data

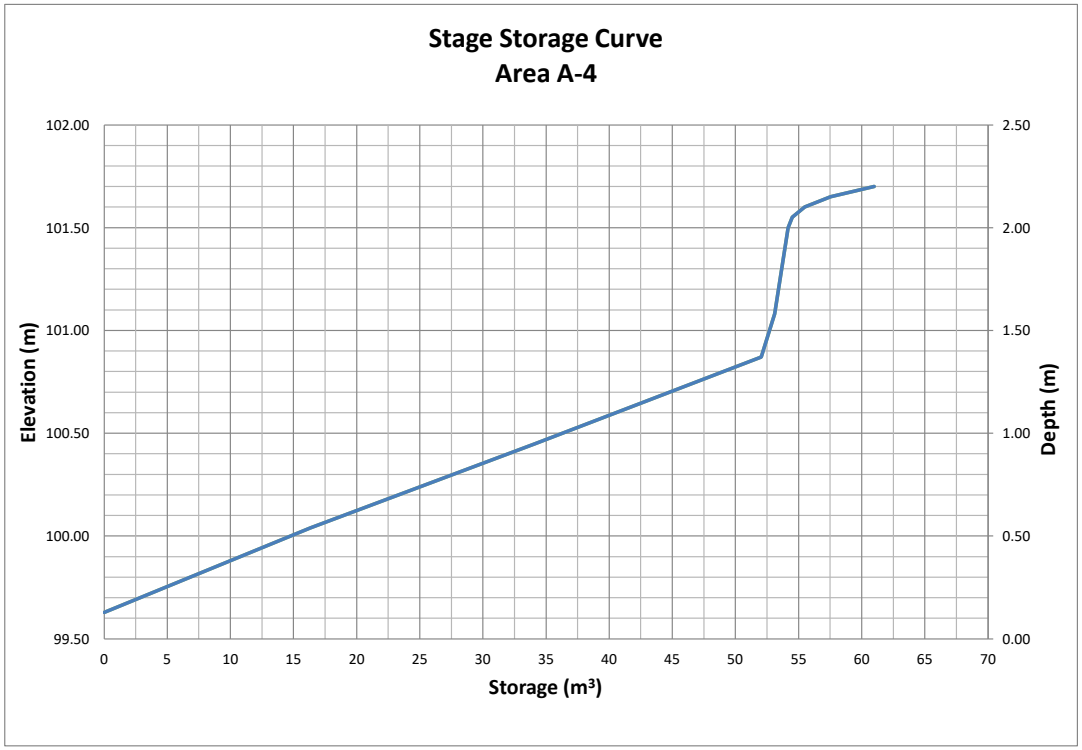
Structures	Size (mm)	Area (m^2)	T/G	INV
STM MH 200	1800mm dia	2.54	102.30	99.63
STM MH 201	1800mm dia	2.54	102.40	99.88
CB2	600x600mm	0.36	101.50	99.94
CB3	600x600mm	0.36	101.95	99.95

Storage Pipe Data

Pipe ID	991 mm	**INV U/S**	99.88
Length	60.1 m	**OBV U/S**	100.87
Volume	46.4 m^3	**INV D/S**	99.63
Max Depth	1.24 m	**OBV D/S**	100.62

Area A-4: Storage Table

Underground Storage						Surface Storage				Total Storage
						CB 2		CB3		
Elevation (m)	System Depth (m)	Storage Pipe (m^3)	STM MH 200 (m^3)	STM MH 201 (m^3)	Underground Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	(m^3)
99.63	0.00	0.00	0.00	0.00	**0.00**	-	-	-	-	**0**
100.04	0.41	15.30	1.04	0.00	**16.34**	-	-	-	-	**16.3**
100.45	0.82	30.60	2.08	1.45	**34.13**	-	-	-	-	**34.1**
100.87	1.24	46.36	3.16	2.52	**52.04**	-	-	-	-	**52.0**
101.08	1.45	46.36	3.69	3.05	**53.10**	-	-	-	-	**53.1**
101.30	1.67	46.36	4.25	3.05	**53.66**	-	-	-	-	**53.7**
101.50	1.87	46.36	4.76	3.05	**54.17**	0.00	0.00	0.0	0.0	**54.2**
101.55	1.92	46.36	4.89	3.05	**54.30**	8.1	0.20	0.0	0.0	**54.5**
101.60	1.97	46.36	5.01	3.05	**54.42**	26.7	1.07	0.0	0.0	**55.5**
101.65	2.02	46.36	5.14	3.05	**54.55**	49.90	2.99	0.0	0.0	**57.5**
101.70	2.07	46.36	5.27	3.05	**54.68**	82.60	6.30	0.0	0.0	**61.0**



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD1

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.47	2.15	0.65
10	104.19	1.82	1.50	0.90
15	83.56	1.46	1.14	1.03
20	70.25	1.23	0.91	1.09
25	60.90	1.07	0.75	1.12
30	53.93	0.94	0.62	1.12
35	48.52	0.85	0.53	1.11
40	44.18	0.77	0.45	1.09
45	40.63	0.71	0.39	1.06
50	37.65	0.66	0.34	1.02
55	35.12	0.62	0.30	0.97
60	32.94	0.58	0.26	0.93
65	31.04	0.54	0.22	0.87
70	29.37	0.51	0.19	0.82
75	27.89	0.49	0.17	0.76
90	24.29	0.43	0.11	0.57
105	21.58	0.38	0.06	0.37
120	19.47	0.34	0.02	0.15

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD1

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.72	4.40	1.32
10	178.56	3.47	3.15	1.89
15	142.89	2.78	2.46	2.21
20	119.95	2.33	2.01	2.42
25	103.85	2.02	1.70	2.55
30	91.87	1.79	1.47	2.64
35	82.58	1.61	1.29	2.70
40	75.15	1.46	1.14	2.74
45	69.05	1.34	1.02	2.76
50	63.95	1.24	0.92	2.77
55	59.62	1.16	0.84	2.77
60	55.89	1.09	0.77	2.76
65	52.65	1.02	0.70	2.75
70	49.79	0.97	0.65	2.73
75	47.26	0.92	0.60	2.70
90	41.11	0.80	0.48	2.59
105	36.50	0.71	0.39	2.46
120	32.89	0.64	0.32	2.30

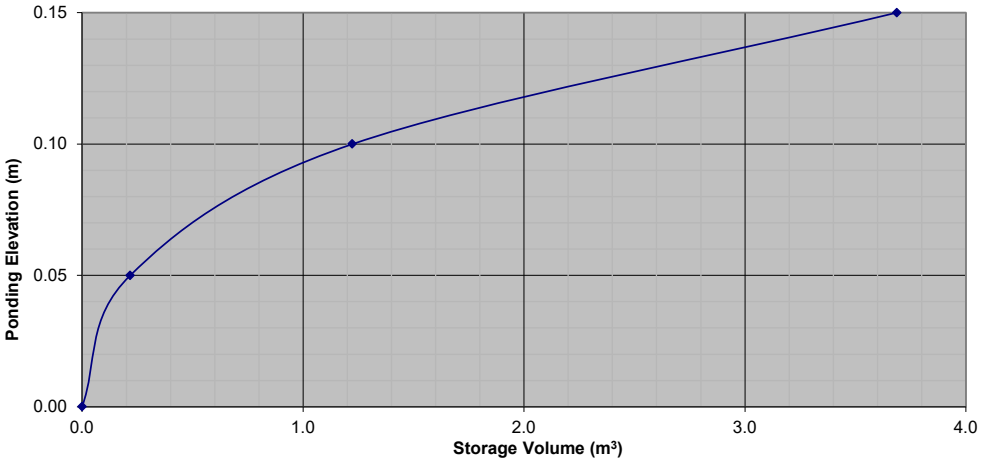
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.1	3.7
1:100 Year	0.32	0.32	13	2.8	3.7

Roof Drain Storage Table for Building A RD-1

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.7	0.2
0.10	31.5	1.2
0.15	67.1	3.7

Stage Storage Curve: Area R-1
Controlled Roof Drain RD1



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD2

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.41	1.09	0.33
10	104.19	1.04	0.72	0.43
15	83.56	0.84	0.52	0.46
20	70.25	0.70	0.38	0.46
25	60.90	0.61	0.29	0.43
30	53.93	0.54	0.22	0.40
35	48.52	0.49	0.17	0.35
40	44.18	0.44	0.12	0.29
45	40.63	0.41	0.09	0.23
50	37.65	0.38	0.06	0.17
55	35.12	0.35	0.03	0.10
60	32.94	0.33	0.01	0.03
65	31.04	0.31	-0.01	-0.04
70	29.37	0.29	-0.03	-0.11
75	27.89	0.28	-0.04	-0.18
90	24.29	0.24	-0.08	-0.42
105	21.58	0.22	-0.10	-0.66
120	19.47	0.19	-0.13	-0.90

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD2

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.70	2.38	0.71
10	178.56	1.99	1.67	1.00
15	142.89	1.59	1.27	1.14
20	119.95	1.33	1.01	1.22
25	103.85	1.15	0.83	1.25
30	91.87	1.02	0.70	1.26
35	82.58	0.92	0.60	1.26
40	75.15	0.84	0.52	1.24
45	69.05	0.77	0.45	1.21
50	63.95	0.71	0.39	1.17
55	59.62	0.66	0.34	1.13
60	55.89	0.62	0.30	1.09
65	52.65	0.59	0.27	1.04
70	49.79	0.55	0.23	0.98
75	47.26	0.53	0.21	0.92
90	41.11	0.46	0.14	0.74
105	36.50	0.41	0.09	0.54
120	32.89	0.37	0.05	0.33

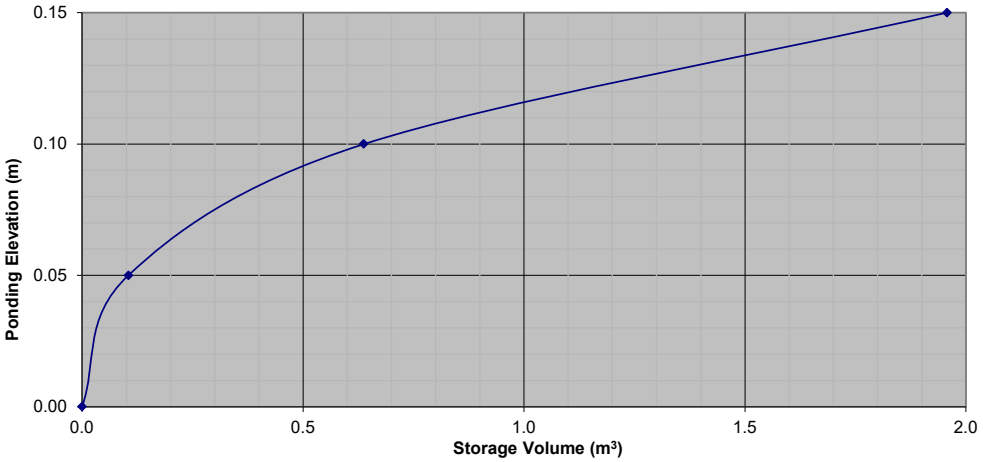
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	9	0.5	2.0
1:100 Year	0.32	0.32	13	1.3	2.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.2	0.1
0.10	17.1	0.6
0.15	35.7	2.0

Stage Storage Curve: Area R-1
Controlled Roof Drain RD2



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD3

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.41	1.09	0.33
10	104.19	1.04	0.72	0.43
15	83.56	0.84	0.52	0.46
20	70.25	0.70	0.38	0.46
25	60.90	0.61	0.29	0.43
30	53.93	0.54	0.22	0.40
35	48.52	0.49	0.17	0.35
40	44.18	0.44	0.12	0.29
45	40.63	0.41	0.09	0.23
50	37.65	0.38	0.06	0.17
55	35.12	0.35	0.03	0.10
60	32.94	0.33	0.01	0.03
65	31.04	0.31	-0.01	-0.04
70	29.37	0.29	-0.03	-0.11
75	27.89	0.28	-0.04	-0.18
90	24.29	0.24	-0.08	-0.42
105	21.58	0.22	-0.10	-0.66
120	19.47	0.19	-0.13	-0.90

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD3

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.70	2.38	0.71
10	178.56	1.99	1.67	1.00
15	142.89	1.59	1.27	1.14
20	119.95	1.33	1.01	1.22
25	103.85	1.15	0.83	1.25
30	91.87	1.02	0.70	1.26
35	82.58	0.92	0.60	1.26
40	75.15	0.84	0.52	1.24
45	69.05	0.77	0.45	1.21
50	63.95	0.71	0.39	1.17
55	59.62	0.66	0.34	1.13
60	55.89	0.62	0.30	1.09
65	52.65	0.59	0.27	1.04
70	49.79	0.55	0.23	0.98
75	47.26	0.53	0.21	0.92
90	41.11	0.46	0.14	0.74
105	36.50	0.41	0.09	0.54
120	32.89	0.37	0.05	0.33

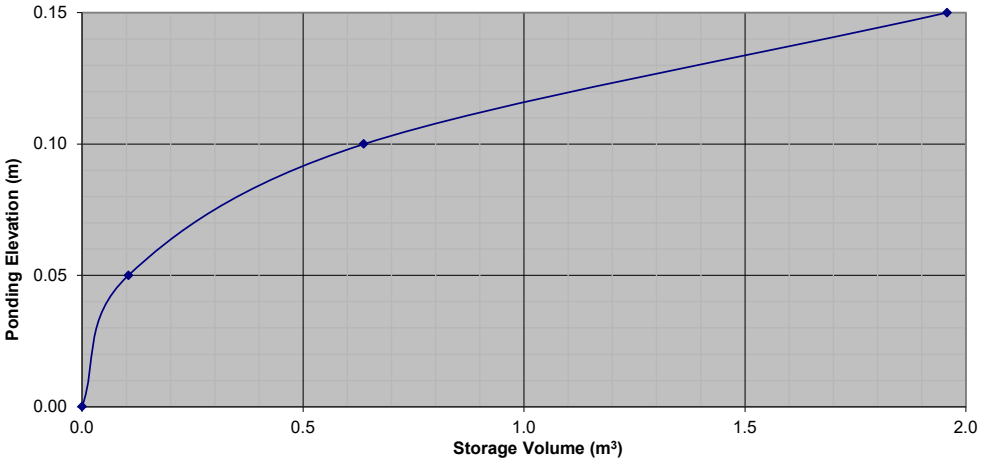
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	9	0.5	2.0
1:100 Year	0.32	0.32	13	1.3	2.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.2	0.1
0.10	17.1	0.6
0.15	35.7	2.0

Stage Storage Curve: Area R-1
Controlled Roof Drain RD3



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD4

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.41	1.09	0.33
10	104.19	1.04	0.72	0.43
15	83.56	0.84	0.52	0.46
20	70.25	0.70	0.38	0.46
25	60.90	0.61	0.29	0.43
30	53.93	0.54	0.22	0.40
35	48.52	0.49	0.17	0.35
40	44.18	0.44	0.12	0.29
45	40.63	0.41	0.09	0.23
50	37.65	0.38	0.06	0.17
55	35.12	0.35	0.03	0.10
60	32.94	0.33	0.01	0.03
65	31.04	0.31	-0.01	-0.04
70	29.37	0.29	-0.03	-0.11
75	27.89	0.28	-0.04	-0.18
90	24.29	0.24	-0.08	-0.42
105	21.58	0.22	-0.10	-0.66
120	19.47	0.19	-0.13	-0.90

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD4

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.70	2.38	0.71
10	178.56	1.99	1.67	1.00
15	142.89	1.59	1.27	1.14
20	119.95	1.33	1.01	1.22
25	103.85	1.15	0.83	1.25
30	91.87	1.02	0.70	1.26
35	82.58	0.92	0.60	1.26
40	75.15	0.84	0.52	1.24
45	69.05	0.77	0.45	1.21
50	63.95	0.71	0.39	1.17
55	59.62	0.66	0.34	1.13
60	55.89	0.62	0.30	1.09
65	52.65	0.59	0.27	1.04
70	49.79	0.55	0.23	0.98
75	47.26	0.53	0.21	0.92
90	41.11	0.46	0.14	0.74
105	36.50	0.41	0.09	0.54
120	32.89	0.37	0.05	0.33

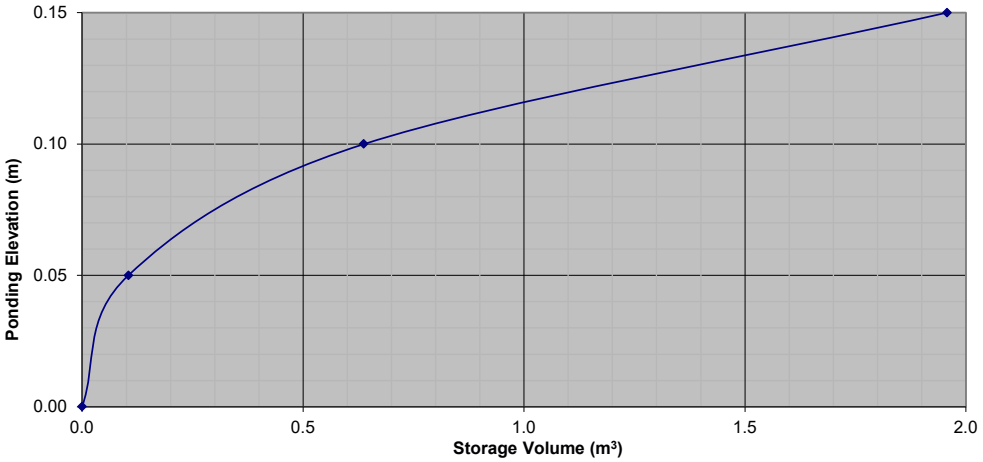
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	9	0.5	2.0
1:100 Year	0.32	0.32	13	1.3	2.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.2	0.1
0.10	17.1	0.6
0.15	35.7	2.0

Stage Storage Curve: Area R-1
Controlled Roof Drain RD4



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD5

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.47	2.15	0.65
10	104.19	1.82	1.50	0.90
15	83.56	1.46	1.14	1.03
20	70.25	1.23	0.91	1.09
25	60.90	1.07	0.75	1.12
30	53.93	0.94	0.62	1.12
35	48.52	0.85	0.53	1.11
40	44.18	0.77	0.45	1.09
45	40.63	0.71	0.39	1.06
50	37.65	0.66	0.34	1.02
55	35.12	0.62	0.30	0.97
60	32.94	0.58	0.26	0.93
65	31.04	0.54	0.22	0.87
70	29.37	0.51	0.19	0.82
75	27.89	0.49	0.17	0.76
90	24.29	0.43	0.11	0.57
105	21.58	0.38	0.06	0.37
120	19.47	0.34	0.02	0.15

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD5

OTTAWA IDF CURVE

Area =	0.007	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.72	4.40	1.32
10	178.56	3.47	3.15	1.89
15	142.89	2.78	2.46	2.21
20	119.95	2.33	2.01	2.42
25	103.85	2.02	1.70	2.55
30	91.87	1.79	1.47	2.64
35	82.58	1.61	1.29	2.70
40	75.15	1.46	1.14	2.74
45	69.05	1.34	1.02	2.76
50	63.95	1.24	0.92	2.77
55	59.62	1.16	0.84	2.77
60	55.89	1.09	0.77	2.76
65	52.65	1.02	0.70	2.75
70	49.79	0.97	0.65	2.73
75	47.26	0.92	0.60	2.70
90	41.11	0.80	0.48	2.59
105	36.50	0.71	0.39	2.46
120	32.89	0.64	0.32	2.30

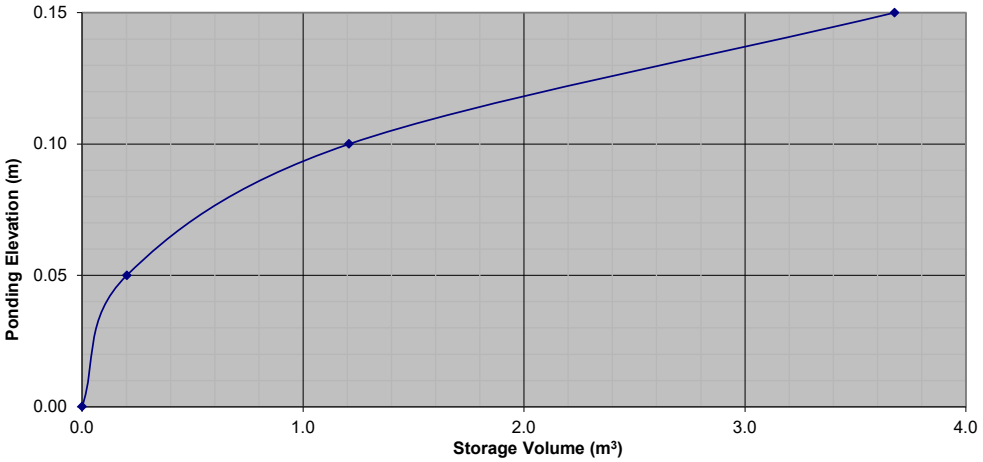
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.1	3.7
1:100 Year	0.32	0.32	13	2.8	3.7

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.1	0.2
0.10	32.1	1.2
0.15	66.7	3.7

Stage Storage Curve: Area R-1
Controlled Roof Drain RD5



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD6

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.83	2.51	0.75
10	104.19	2.09	1.77	1.06
15	83.56	1.67	1.35	1.22
20	70.25	1.41	1.09	1.30
25	60.90	1.22	0.90	1.35
30	53.93	1.08	0.76	1.37
35	48.52	0.97	0.65	1.37
40	44.18	0.88	0.56	1.35
45	40.63	0.81	0.49	1.33
50	37.65	0.75	0.43	1.30
55	35.12	0.70	0.38	1.26
60	32.94	0.66	0.34	1.22
65	31.04	0.62	0.30	1.18
70	29.37	0.59	0.27	1.13
75	27.89	0.56	0.24	1.07
90	24.29	0.49	0.17	0.90
105	21.58	0.43	0.11	0.71
120	19.47	0.39	0.07	0.50

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD6

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.3	m3

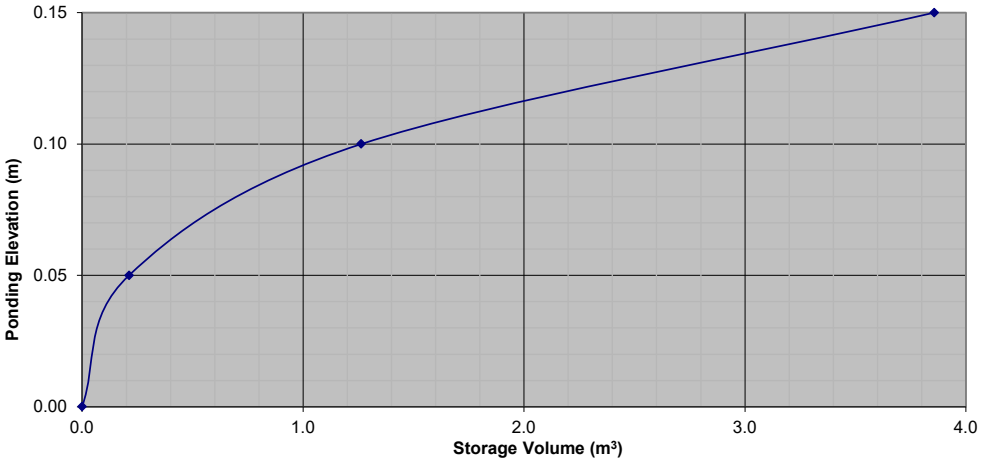
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.40	5.08	1.52
10	178.56	3.97	3.65	2.19
15	142.89	3.18	2.86	2.57
20	119.95	2.67	2.35	2.82
25	103.85	2.31	1.99	2.98
30	91.87	2.04	1.72	3.10
35	82.58	1.84	1.52	3.18
40	75.15	1.67	1.35	3.24
45	69.05	1.54	1.22	3.28
50	63.95	1.42	1.10	3.31
55	59.62	1.33	1.01	3.32
60	55.89	1.24	0.92	3.32
65	52.65	1.17	0.85	3.32
70	49.79	1.11	0.79	3.31
75	47.26	1.05	0.73	3.29
90	41.11	0.91	0.59	3.21
105	36.50	0.81	0.49	3.10
120	32.89	0.73	0.41	2.96

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.32	0.32	10	1.4	3.9
1:100 Year	0.32	0.32	14	3.3	3.9

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.5	0.2
0.10	33.5	1.3
0.15	70.3	3.9

Stage Storage Curve: Area R-1
Controlled Roof Drain RD6



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD7

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.41	1.09	0.33
10	104.19	1.04	0.72	0.43
15	83.56	0.84	0.52	0.46
20	70.25	0.70	0.38	0.46
25	60.90	0.61	0.29	0.43
30	53.93	0.54	0.22	0.40
35	48.52	0.49	0.17	0.35
40	44.18	0.44	0.12	0.29
45	40.63	0.41	0.09	0.23
50	37.65	0.38	0.06	0.17
55	35.12	0.35	0.03	0.10
60	32.94	0.33	0.01	0.03
65	31.04	0.31	-0.01	-0.04
70	29.37	0.29	-0.03	-0.11
75	27.89	0.28	-0.04	-0.18
90	24.29	0.24	-0.08	-0.42
105	21.58	0.22	-0.10	-0.66
120	19.47	0.19	-0.13	-0.90

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD7

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.70	2.38	0.71
10	178.56	1.99	1.67	1.00
15	142.89	1.59	1.27	1.14
20	119.95	1.33	1.01	1.22
25	103.85	1.15	0.83	1.25
30	91.87	1.02	0.70	1.26
35	82.58	0.92	0.60	1.26
40	75.15	0.84	0.52	1.24
45	69.05	0.77	0.45	1.21
50	63.95	0.71	0.39	1.17
55	59.62	0.66	0.34	1.13
60	55.89	0.62	0.30	1.09
65	52.65	0.59	0.27	1.04
70	49.79	0.55	0.23	0.98
75	47.26	0.53	0.21	0.92
90	41.11	0.46	0.14	0.74
105	36.50	0.41	0.09	0.54
120	32.89	0.37	0.05	0.33

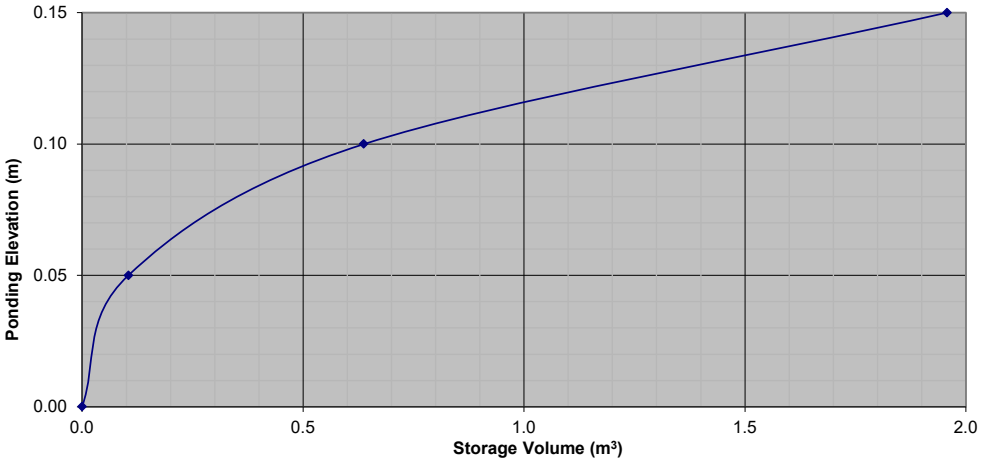
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	9	0.5	2.0
1:100 Year	0.32	0.32	13	1.3	2.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.2	0.1
0.10	17.1	0.6
0.15	35.7	2.0

Stage Storage Curve: Area R-1
Controlled Roof Drain RD7



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD8

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.41	1.09	0.33
10	104.19	1.04	0.72	0.43
15	83.56	0.84	0.52	0.46
20	70.25	0.70	0.38	0.46
25	60.90	0.61	0.29	0.43
30	53.93	0.54	0.22	0.40
35	48.52	0.49	0.17	0.35
40	44.18	0.44	0.12	0.29
45	40.63	0.41	0.09	0.23
50	37.65	0.38	0.06	0.17
55	35.12	0.35	0.03	0.10
60	32.94	0.33	0.01	0.03
65	31.04	0.31	-0.01	-0.04
70	29.37	0.29	-0.03	-0.11
75	27.89	0.28	-0.04	-0.18
90	24.29	0.24	-0.08	-0.42
105	21.58	0.22	-0.10	-0.66
120	19.47	0.19	-0.13	-0.90

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD8

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.70	2.38	0.71
10	178.56	1.99	1.67	1.00
15	142.89	1.59	1.27	1.14
20	119.95	1.33	1.01	1.22
25	103.85	1.15	0.83	1.25
30	91.87	1.02	0.70	1.26
35	82.58	0.92	0.60	1.26
40	75.15	0.84	0.52	1.24
45	69.05	0.77	0.45	1.21
50	63.95	0.71	0.39	1.17
55	59.62	0.66	0.34	1.13
60	55.89	0.62	0.30	1.09
65	52.65	0.59	0.27	1.04
70	49.79	0.55	0.23	0.98
75	47.26	0.53	0.21	0.92
90	41.11	0.46	0.14	0.74
105	36.50	0.41	0.09	0.54
120	32.89	0.37	0.05	0.33

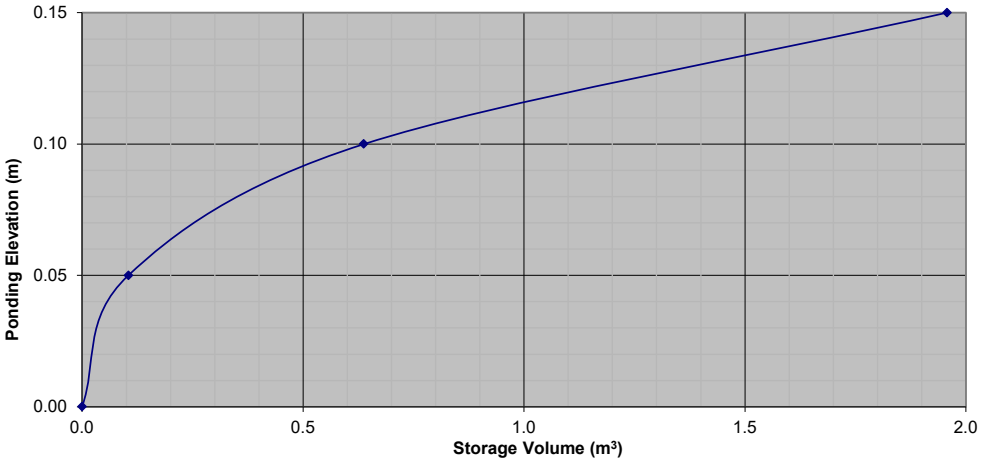
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	9	0.5	2.0
1:100 Year	0.32	0.32	13	1.3	2.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.2	0.1
0.10	17.1	0.6
0.15	35.7	2.0

Stage Storage Curve: Area R-1
Controlled Roof Drain RD8



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD9

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.41	1.09	0.33
10	104.19	1.04	0.72	0.43
15	83.56	0.84	0.52	0.46
20	70.25	0.70	0.38	0.46
25	60.90	0.61	0.29	0.43
30	53.93	0.54	0.22	0.40
35	48.52	0.49	0.17	0.35
40	44.18	0.44	0.12	0.29
45	40.63	0.41	0.09	0.23
50	37.65	0.38	0.06	0.17
55	35.12	0.35	0.03	0.10
60	32.94	0.33	0.01	0.03
65	31.04	0.31	-0.01	-0.04
70	29.37	0.29	-0.03	-0.11
75	27.89	0.28	-0.04	-0.18
90	24.29	0.24	-0.08	-0.42
105	21.58	0.22	-0.10	-0.66
120	19.47	0.19	-0.13	-0.90

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD9

OTTAWA IDF CURVE

Area =	0.004	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	2.70	2.38	0.71
10	178.56	1.99	1.67	1.00
15	142.89	1.59	1.27	1.14
20	119.95	1.33	1.01	1.22
25	103.85	1.15	0.83	1.25
30	91.87	1.02	0.70	1.26
35	82.58	0.92	0.60	1.26
40	75.15	0.84	0.52	1.24
45	69.05	0.77	0.45	1.21
50	63.95	0.71	0.39	1.17
55	59.62	0.66	0.34	1.13
60	55.89	0.62	0.30	1.09
65	52.65	0.59	0.27	1.04
70	49.79	0.55	0.23	0.98
75	47.26	0.53	0.21	0.92
90	41.11	0.46	0.14	0.74
105	36.50	0.41	0.09	0.54
120	32.89	0.37	0.05	0.33

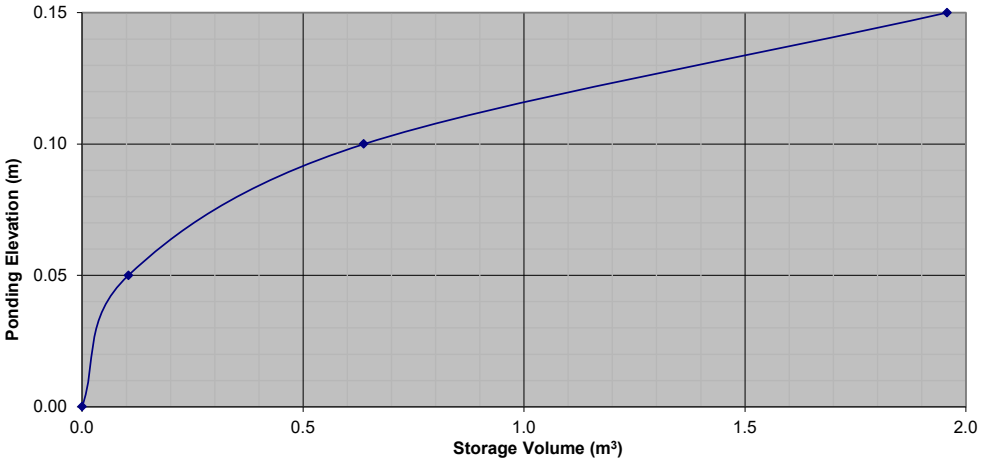
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	9	0.5	2.0
1:100 Year	0.32	0.32	13	1.3	2.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	4.2	0.1
0.10	17.1	0.6
0.15	35.7	2.0

Stage Storage Curve: Area R-1
Controlled Roof Drain RD9



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD10

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.83	2.51	0.75
10	104.19	2.09	1.77	1.06
15	83.56	1.67	1.35	1.22
20	70.25	1.41	1.09	1.30
25	60.90	1.22	0.90	1.35
30	53.93	1.08	0.76	1.37
35	48.52	0.97	0.65	1.37
40	44.18	0.88	0.56	1.35
45	40.63	0.81	0.49	1.33
50	37.65	0.75	0.43	1.30
55	35.12	0.70	0.38	1.26
60	32.94	0.66	0.34	1.22
65	31.04	0.62	0.30	1.18
70	29.37	0.59	0.27	1.13
75	27.89	0.56	0.24	1.07
90	24.29	0.49	0.17	0.90
105	21.58	0.43	0.11	0.71
120	19.47	0.39	0.07	0.50

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD10

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.40	5.08	1.52
10	178.56	3.97	3.65	2.19
15	142.89	3.18	2.86	2.57
20	119.95	2.67	2.35	2.82
25	103.85	2.31	1.99	2.98
30	91.87	2.04	1.72	3.10
35	82.58	1.84	1.52	3.18
40	75.15	1.67	1.35	3.24
45	69.05	1.54	1.22	3.28
50	63.95	1.42	1.10	3.31
55	59.62	1.33	1.01	3.32
60	55.89	1.24	0.92	3.32
65	52.65	1.17	0.85	3.32
70	49.79	1.11	0.79	3.31
75	47.26	1.05	0.73	3.29
90	41.11	0.91	0.59	3.21
105	36.50	0.81	0.49	3.10
120	32.89	0.73	0.41	2.96

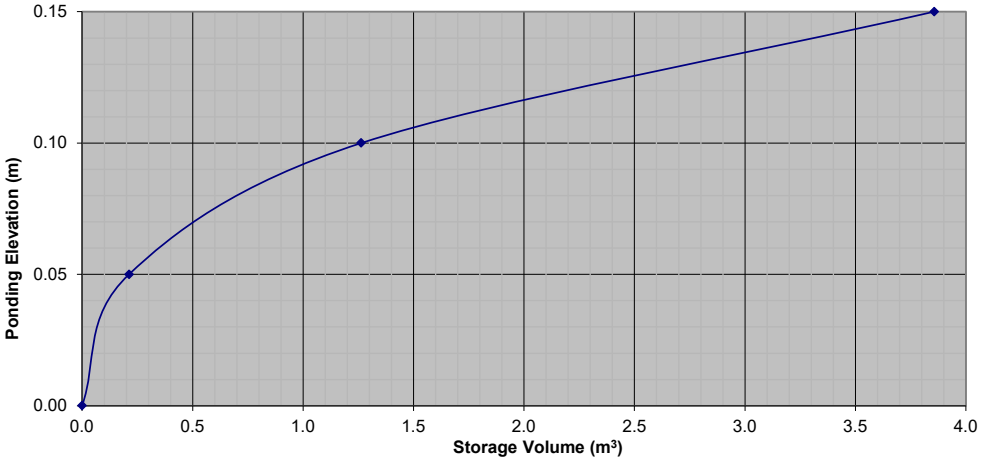
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	11	1.4	3.9
1:100 Year	0.32	0.32	14	3.3	3.9

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.5	0.2
0.10	33.5	1.3
0.15	70.3	3.9

Stage Storage Curve: Area R-1
Controlled Roof Drain RD10



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD11

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD11

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

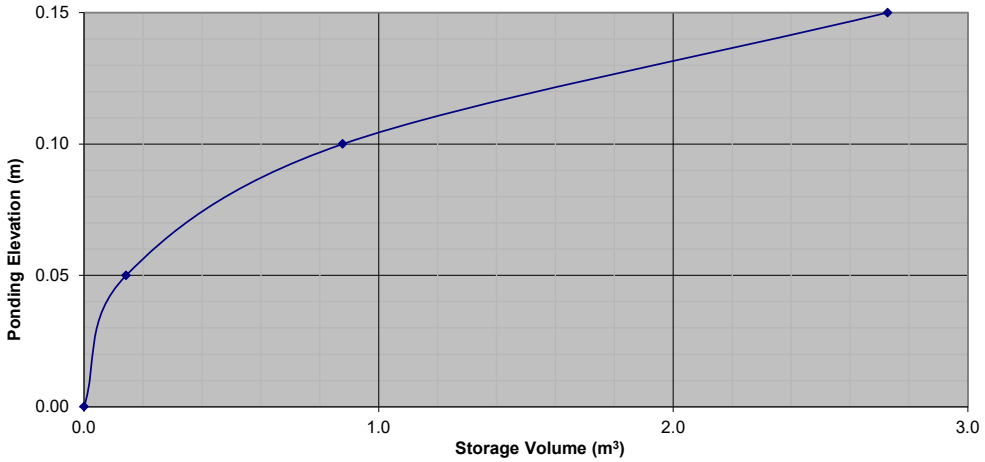
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	0.9	2.7
1:100 Year	0.32	0.32	14	2.2	2.7

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	5.7	0.1
0.10	23.7	0.9
0.15	50.3	2.7

Stage Storage Curve: Area R-1
Controlled Roof Drain RD11



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD12

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	0.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.77	1.06	0.32
10	104.19	1.30	0.59	0.36
15	83.56	1.05	0.34	0.30
20	70.25	0.88	0.17	0.20
25	60.90	0.76	0.05	0.08
30	53.93	0.67	-0.04	-0.06
35	48.52	0.61	-0.10	-0.22
40	44.18	0.55	-0.16	-0.38
45	40.63	0.51	-0.20	-0.54
50	37.65	0.47	-0.24	-0.72
55	35.12	0.44	-0.27	-0.89
60	32.94	0.41	-0.30	-1.07
65	31.04	0.39	-0.32	-1.25
70	29.37	0.37	-0.34	-1.44
75	27.89	0.35	-0.36	-1.63
90	24.29	0.30	-0.41	-2.19
105	21.58	0.27	-0.44	-2.77
120	19.47	0.24	-0.47	-3.36

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD12

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	1.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	3.37	2.50	0.75
10	178.56	2.48	1.61	0.97
15	142.89	1.99	1.12	1.00
20	119.95	1.67	0.80	0.96
25	103.85	1.44	0.57	0.86
30	91.87	1.28	0.41	0.73
35	82.58	1.15	0.28	0.58
40	75.15	1.04	0.17	0.42
45	69.05	0.96	0.09	0.24
50	63.95	0.89	0.02	0.06
55	59.62	0.83	-0.04	-0.14
60	55.89	0.78	-0.09	-0.34
65	52.65	0.73	-0.14	-0.54
70	49.79	0.69	-0.18	-0.75
75	47.26	0.66	-0.21	-0.96
90	41.11	0.57	-0.30	-1.61
105	36.50	0.51	-0.36	-2.28
120	32.89	0.46	-0.41	-2.97

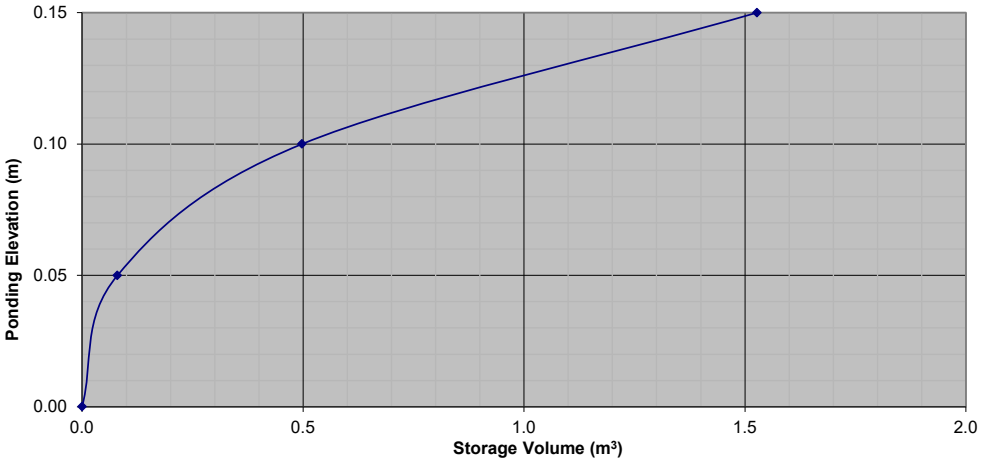
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.71	0.71	9	0.4	1.5
1:100 Year	0.87	0.87	13	1.0	1.5

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	3.2	0.1
0.10	13.5	0.5
0.15	27.7	1.5

Stage Storage Curve: Area R-1
Controlled Roof Drain RD12



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD13

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.83	2.51	0.75
10	104.19	2.09	1.77	1.06
15	83.56	1.67	1.35	1.22
20	70.25	1.41	1.09	1.30
25	60.90	1.22	0.90	1.35
30	53.93	1.08	0.76	1.37
35	48.52	0.97	0.65	1.37
40	44.18	0.88	0.56	1.35
45	40.63	0.81	0.49	1.33
50	37.65	0.75	0.43	1.30
55	35.12	0.70	0.38	1.26
60	32.94	0.66	0.34	1.22
65	31.04	0.62	0.30	1.18
70	29.37	0.59	0.27	1.13
75	27.89	0.56	0.24	1.07
90	24.29	0.49	0.17	0.90
105	21.58	0.43	0.11	0.71
120	19.47	0.39	0.07	0.50

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD13

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.3	m3

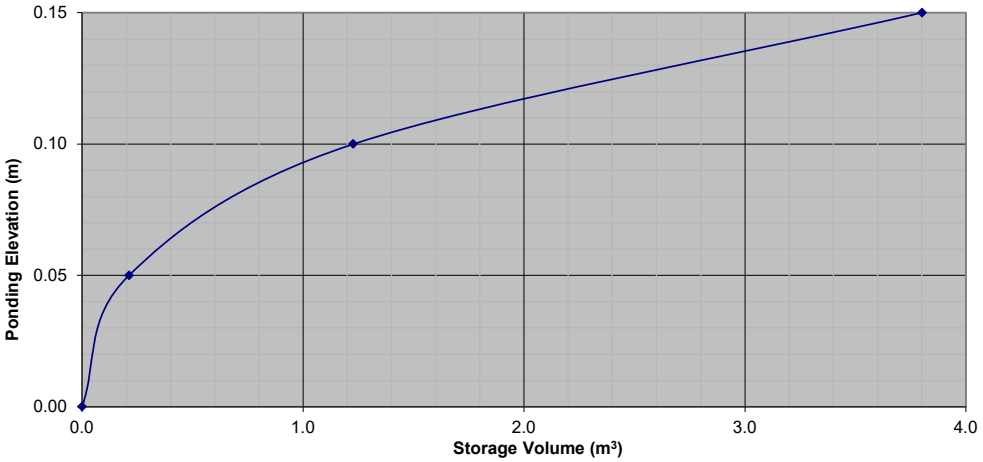
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.40	5.08	1.52
10	178.56	3.97	3.65	2.19
15	142.89	3.18	2.86	2.57
20	119.95	2.67	2.35	2.82
25	103.85	2.31	1.99	2.98
30	91.87	2.04	1.72	3.10
35	82.58	1.84	1.52	3.18
40	75.15	1.67	1.35	3.24
45	69.05	1.54	1.22	3.28
50	63.95	1.42	1.10	3.31
55	59.62	1.33	1.01	3.32
60	55.89	1.24	0.92	3.32
65	52.65	1.17	0.85	3.32
70	49.79	1.11	0.79	3.31
75	47.26	1.05	0.73	3.29
90	41.11	0.91	0.59	3.21
105	36.50	0.81	0.49	3.10
120	32.89	0.73	0.41	2.96

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.32	0.32	11	1.4	3.8
1:100 Year	0.32	0.32	14	3.3	3.8

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.5	0.2
0.10	32.1	1.2
0.15	70.9	3.8

Stage Storage Curve: Area R-1
Controlled Roof Drain RD13



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD14

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.24	3.45	1.03
10	104.19	3.13	2.34	1.40
15	83.56	2.51	1.72	1.55
20	70.25	2.11	1.32	1.58
25	60.90	1.83	1.04	1.56
30	53.93	1.62	0.83	1.49
35	48.52	1.46	0.67	1.40
40	44.18	1.33	0.54	1.29
45	40.63	1.22	0.43	1.16
50	37.65	1.13	0.34	1.02
55	35.12	1.05	0.26	0.87
60	32.94	0.99	0.20	0.72
65	31.04	0.93	0.14	0.55
70	29.37	0.88	0.09	0.39
75	27.89	0.84	0.05	0.21
90	24.29	0.73	-0.06	-0.33
105	21.58	0.65	-0.14	-0.89
120	19.47	0.58	-0.21	-1.48

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD14

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	4.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	8.10	7.23	2.17
10	178.56	5.96	5.09	3.05
15	142.89	4.77	3.90	3.51
20	119.95	4.00	3.13	3.76
25	103.85	3.46	2.59	3.89
30	91.87	3.06	2.19	3.95
35	82.58	2.75	1.88	3.96
40	75.15	2.51	1.64	3.93
45	69.05	2.30	1.43	3.87
50	63.95	2.13	1.26	3.79
55	59.62	1.99	1.12	3.69
60	55.89	1.86	0.99	3.58
65	52.65	1.76	0.89	3.46
70	49.79	1.66	0.79	3.32
75	47.26	1.58	0.71	3.18
90	41.11	1.37	0.50	2.71
105	36.50	1.22	0.35	2.19
120	32.89	1.10	0.23	1.64

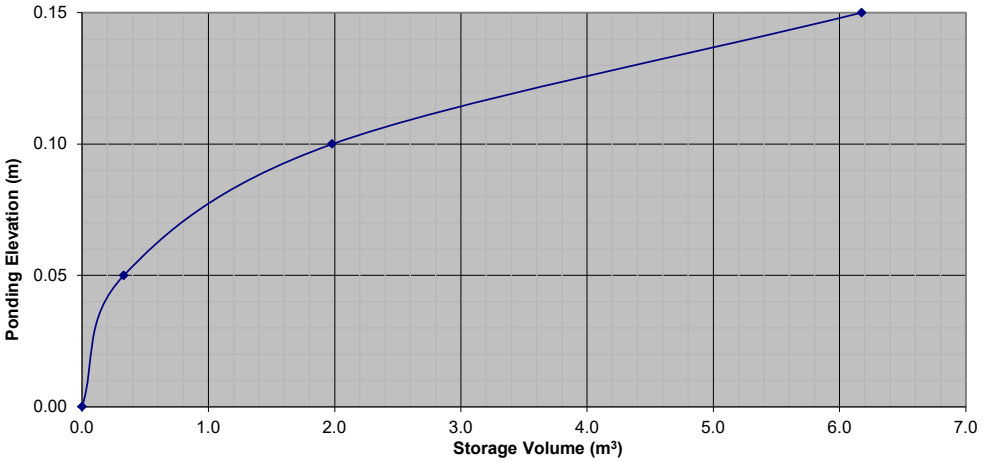
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.79	0.79	9	1.6	6.2
1:100 Year	0.87	0.87	13	4.0	6.2

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	13.2	0.3
0.10	52.8	2.0
0.15	115.0	6.2

Stage Storage Curve: Area R-1
Controlled Roof Drain RD14



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD15

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.79	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	4.24	3.45	1.03
10	104.19	3.13	2.34	1.40
15	83.56	2.51	1.72	1.55
20	70.25	2.11	1.32	1.58
25	60.90	1.83	1.04	1.56
30	53.93	1.62	0.83	1.49
35	48.52	1.46	0.67	1.40
40	44.18	1.33	0.54	1.29
45	40.63	1.22	0.43	1.16
50	37.65	1.13	0.34	1.02
55	35.12	1.05	0.26	0.87
60	32.94	0.99	0.20	0.72
65	31.04	0.93	0.14	0.55
70	29.37	0.88	0.09	0.39
75	27.89	0.84	0.05	0.21
90	24.29	0.73	-0.06	-0.33
105	21.58	0.65	-0.14	-0.89
120	19.47	0.58	-0.21	-1.48

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD15

OTTAWA IDF CURVE

Area =	0.012	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	4.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	8.10	7.23	2.17
10	178.56	5.96	5.09	3.05
15	142.89	4.77	3.90	3.51
20	119.95	4.00	3.13	3.76
25	103.85	3.46	2.59	3.89
30	91.87	3.06	2.19	3.95
35	82.58	2.75	1.88	3.96
40	75.15	2.51	1.64	3.93
45	69.05	2.30	1.43	3.87
50	63.95	2.13	1.26	3.79
55	59.62	1.99	1.12	3.69
60	55.89	1.86	0.99	3.58
65	52.65	1.76	0.89	3.46
70	49.79	1.66	0.79	3.32
75	47.26	1.58	0.71	3.18
90	41.11	1.37	0.50	2.71
105	36.50	1.22	0.35	2.19
120	32.89	1.10	0.23	1.64

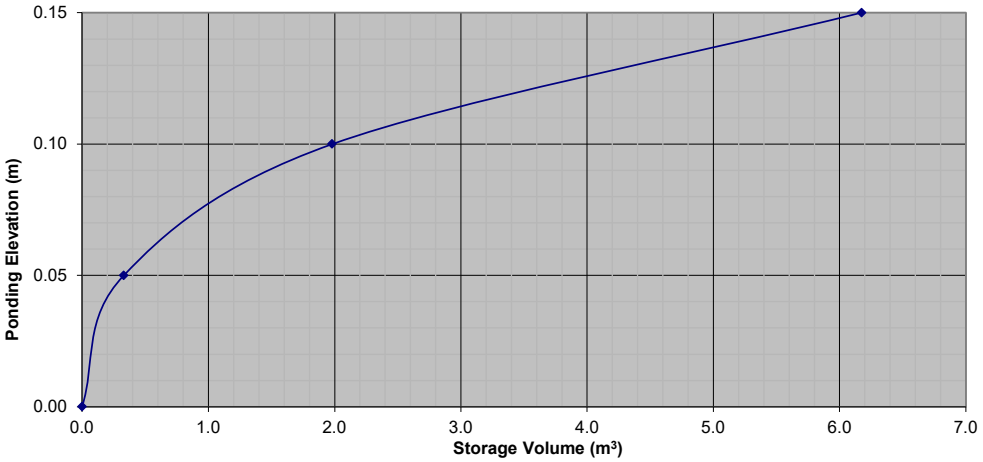
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.79	0.79	9	1.6	6.2
1:100 Year	0.87	0.87	13	4.0	6.2

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	13.2	0.3
0.10	52.8	2.0
0.15	115.0	6.2

Stage Storage Curve: Area R-1
Controlled Roof Drain RD15



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD16

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.53	2.82	0.85
10	104.19	2.61	1.90	1.14
15	83.56	2.09	1.38	1.24
20	70.25	1.76	1.05	1.26
25	60.90	1.52	0.81	1.22
30	53.93	1.35	0.64	1.15
35	48.52	1.21	0.50	1.06
40	44.18	1.11	0.40	0.95
45	40.63	1.02	0.31	0.83
50	37.65	0.94	0.23	0.70
55	35.12	0.88	0.17	0.56
60	32.94	0.82	0.11	0.41
65	31.04	0.78	0.07	0.26
70	29.37	0.73	0.02	0.10
75	27.89	0.70	-0.01	-0.06
90	24.29	0.61	-0.10	-0.55
105	21.58	0.54	-0.17	-1.07
120	19.47	0.49	-0.22	-1.61

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD16

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.89	L/s
C =	1.00		Vol(max) =	3.0	m3

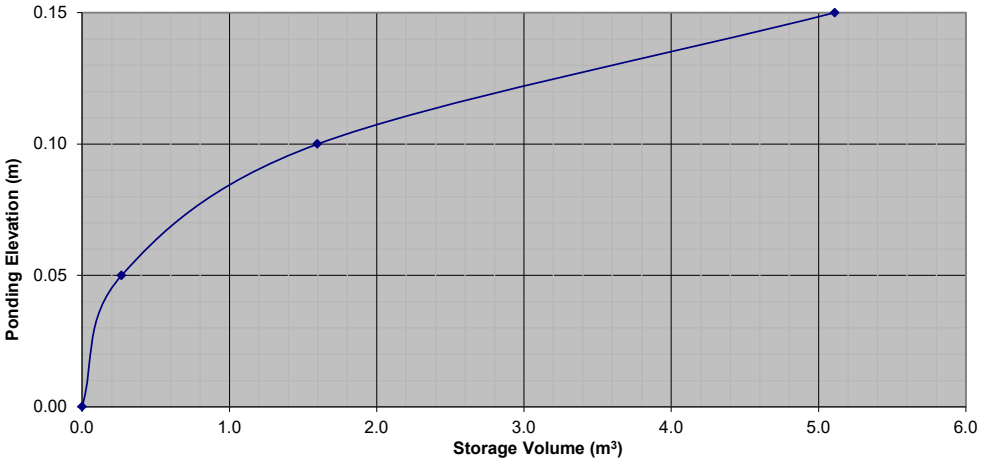
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.75	5.86	1.76
10	178.56	4.96	4.07	2.44
15	142.89	3.97	3.08	2.77
20	119.95	3.33	2.44	2.93
25	103.85	2.89	2.00	3.00
30	91.87	2.55	1.66	3.00
35	82.58	2.30	1.41	2.95
40	75.15	2.09	1.20	2.88
45	69.05	1.92	1.03	2.78
50	63.95	1.78	0.89	2.66
55	59.62	1.66	0.77	2.53
60	55.89	1.55	0.66	2.39
65	52.65	1.46	0.57	2.24
70	49.79	1.38	0.49	2.08
75	47.26	1.31	0.42	1.91
90	41.11	1.14	0.25	1.37
105	36.50	1.01	0.12	0.79
120	32.89	0.91	0.02	0.18

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to 1/4 Exposed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.71	0.71	9	1.3	5.1
1:100 Year	0.89	0.89	12	3.0	5.1

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.7	0.3
0.10	42.5	1.6
0.15	98.0	5.1

Stage Storage Curve: Area R-1
Controlled Roof Drain RD16



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1 Controlled Roof Drain RD17

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	1.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.53	2.82	0.85
10	104.19	2.61	1.90	1.14
15	83.56	2.09	1.38	1.24
20	70.25	1.76	1.05	1.26
25	60.90	1.52	0.81	1.22
30	53.93	1.35	0.64	1.15
35	48.52	1.21	0.50	1.06
40	44.18	1.11	0.40	0.95
45	40.63	1.02	0.31	0.83
50	37.65	0.94	0.23	0.70
55	35.12	0.88	0.17	0.56
60	32.94	0.82	0.11	0.41
65	31.04	0.78	0.07	0.26
70	29.37	0.73	0.02	0.10
75	27.89	0.70	-0.01	-0.06
90	24.29	0.61	-0.10	-0.55
105	21.58	0.54	-0.17	-1.07
120	19.47	0.49	-0.22	-1.61

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1 Controlled Roof Drain RD17

OTTAWA IDF CURVE

Area =	0.010	ha	Qallow =	0.89	L/s
C =	1.00		Vol(max) =	3.0	m3

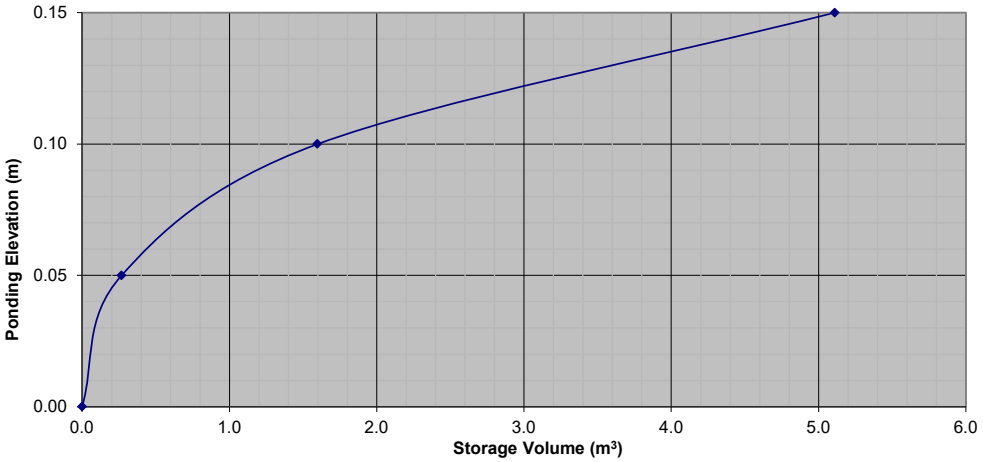
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.75	5.86	1.76
10	178.56	4.96	4.07	2.44
15	142.89	3.97	3.08	2.77
20	119.95	3.33	2.44	2.93
25	103.85	2.89	2.00	3.00
30	91.87	2.55	1.66	3.00
35	82.58	2.30	1.41	2.95
40	75.15	2.09	1.20	2.88
45	69.05	1.92	1.03	2.78
50	63.95	1.78	0.89	2.66
55	59.62	1.66	0.77	2.53
60	55.89	1.55	0.66	2.39
65	52.65	1.46	0.57	2.24
70	49.79	1.38	0.49	2.08
75	47.26	1.31	0.42	1.91
90	41.11	1.14	0.25	1.37
105	36.50	1.01	0.12	0.79
120	32.89	0.91	0.02	0.18

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to 1/4 Exposed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.71	0.71	9	1.3	5.1
1:100 Year	0.89	0.89	12	3.0	5.1

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.7	0.3
0.10	42.5	1.6
0.15	98.0	5.1

Stage Storage Curve: Area R-1
Controlled Roof Drain RD17



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD1

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.18	2.86	0.86
10	104.19	2.35	2.03	1.22
15	83.56	1.88	1.56	1.41
20	70.25	1.58	1.26	1.51
25	60.90	1.37	1.05	1.58
30	53.93	1.21	0.89	1.61
35	48.52	1.09	0.77	1.62
40	44.18	0.99	0.67	1.62
45	40.63	0.91	0.59	1.61
50	37.65	0.85	0.53	1.58
55	35.12	0.79	0.47	1.55
60	32.94	0.74	0.42	1.52
65	31.04	0.70	0.38	1.48
70	29.37	0.66	0.34	1.43
75	27.89	0.63	0.31	1.39
90	24.29	0.55	0.23	1.23
105	21.58	0.49	0.17	1.05
120	19.47	0.44	0.12	0.85

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD1

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.07	5.75	1.73
10	178.56	4.47	4.15	2.49
15	142.89	3.58	3.26	2.93
20	119.95	3.00	2.68	3.22
25	103.85	2.60	2.28	3.42
30	91.87	2.30	1.98	3.56
35	82.58	2.07	1.75	3.67
40	75.15	1.88	1.56	3.74
45	69.05	1.73	1.41	3.80
50	63.95	1.60	1.28	3.84
55	59.62	1.49	1.17	3.87
60	55.89	1.40	1.08	3.88
65	52.65	1.32	1.00	3.89
70	49.79	1.25	0.93	3.89
75	47.26	1.18	0.86	3.88
90	41.11	1.03	0.71	3.83
105	36.50	0.91	0.59	3.74
120	32.89	0.82	0.50	3.62

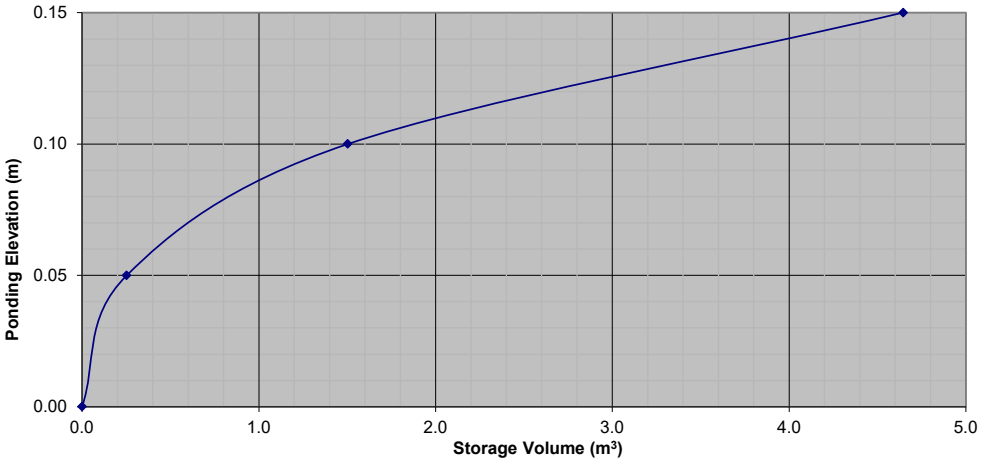
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.6	4.6
1:100 Year	0.32	0.32	14	3.9	4.6

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.1	0.3
0.10	39.9	1.5
0.15	85.8	4.6

Stage Storage Curve: Area R-2
Controlled Roof Drain RD1



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD2

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD2

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

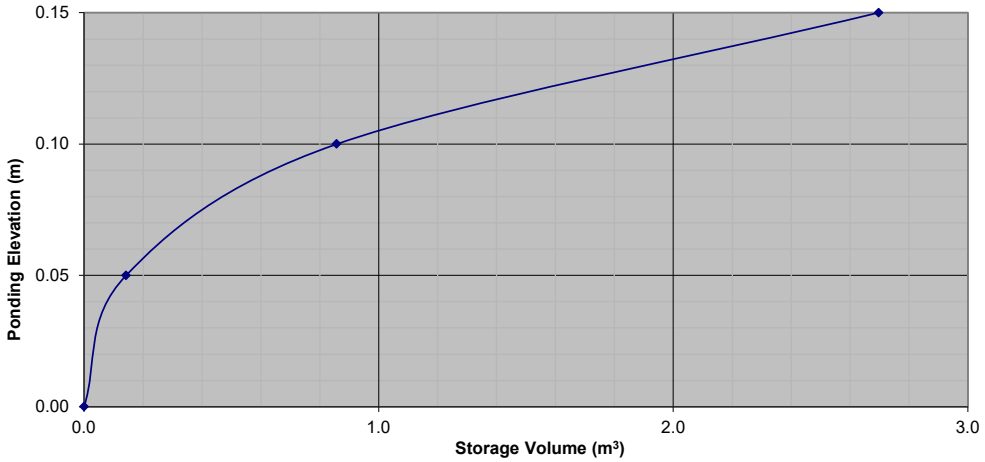
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	0.9	2.7
1:100 Year	0.32	0.32	14	2.2	2.7

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	5.7	0.1
0.10	22.9	0.9
0.15	50.7	2.7

Stage Storage Curve: Area R-2
Controlled Roof Drain RD2



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD3

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.83	2.51	0.75
10	104.19	2.09	1.77	1.06
15	83.56	1.67	1.35	1.22
20	70.25	1.41	1.09	1.30
25	60.90	1.22	0.90	1.35
30	53.93	1.08	0.76	1.37
35	48.52	0.97	0.65	1.37
40	44.18	0.88	0.56	1.35
45	40.63	0.81	0.49	1.33
50	37.65	0.75	0.43	1.30
55	35.12	0.70	0.38	1.26
60	32.94	0.66	0.34	1.22
65	31.04	0.62	0.30	1.18
70	29.37	0.59	0.27	1.13
75	27.89	0.56	0.24	1.07
90	24.29	0.49	0.17	0.90
105	21.58	0.43	0.11	0.71
120	19.47	0.39	0.07	0.50

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD3

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.40	5.08	1.52
10	178.56	3.97	3.65	2.19
15	142.89	3.18	2.86	2.57
20	119.95	2.67	2.35	2.82
25	103.85	2.31	1.99	2.98
30	91.87	2.04	1.72	3.10
35	82.58	1.84	1.52	3.18
40	75.15	1.67	1.35	3.24
45	69.05	1.54	1.22	3.28
50	63.95	1.42	1.10	3.31
55	59.62	1.33	1.01	3.32
60	55.89	1.24	0.92	3.32
65	52.65	1.17	0.85	3.32
70	49.79	1.11	0.79	3.31
75	47.26	1.05	0.73	3.29
90	41.11	0.91	0.59	3.21
105	36.50	0.81	0.49	3.10
120	32.89	0.73	0.41	2.96

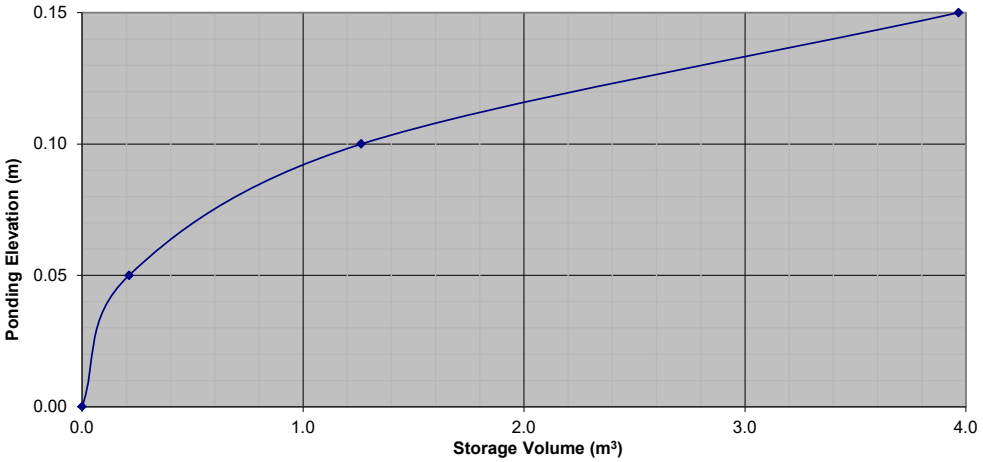
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.4	4.0
1:100 Year	0.32	0.32	14	3.3	4.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.5	0.2
0.10	33.5	1.3
0.15	74.7	4.0

Stage Storage Curve: Area R-2 Controlled Roof Drain RD3



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD4

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.18	2.86	0.86
10	104.19	2.35	2.03	1.22
15	83.56	1.88	1.56	1.41
20	70.25	1.58	1.26	1.51
25	60.90	1.37	1.05	1.58
30	53.93	1.21	0.89	1.61
35	48.52	1.09	0.77	1.62
40	44.18	0.99	0.67	1.62
45	40.63	0.91	0.59	1.61
50	37.65	0.85	0.53	1.58
55	35.12	0.79	0.47	1.55
60	32.94	0.74	0.42	1.52
65	31.04	0.70	0.38	1.48
70	29.37	0.66	0.34	1.43
75	27.89	0.63	0.31	1.39
90	24.29	0.55	0.23	1.23
105	21.58	0.49	0.17	1.05
120	19.47	0.44	0.12	0.85

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD4

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.07	5.75	1.73
10	178.56	4.47	4.15	2.49
15	142.89	3.58	3.26	2.93
20	119.95	3.00	2.68	3.22
25	103.85	2.60	2.28	3.42
30	91.87	2.30	1.98	3.56
35	82.58	2.07	1.75	3.67
40	75.15	1.88	1.56	3.74
45	69.05	1.73	1.41	3.80
50	63.95	1.60	1.28	3.84
55	59.62	1.49	1.17	3.87
60	55.89	1.40	1.08	3.88
65	52.65	1.32	1.00	3.89
70	49.79	1.25	0.93	3.89
75	47.26	1.18	0.86	3.88
90	41.11	1.03	0.71	3.83
105	36.50	0.91	0.59	3.74
120	32.89	0.82	0.50	3.62

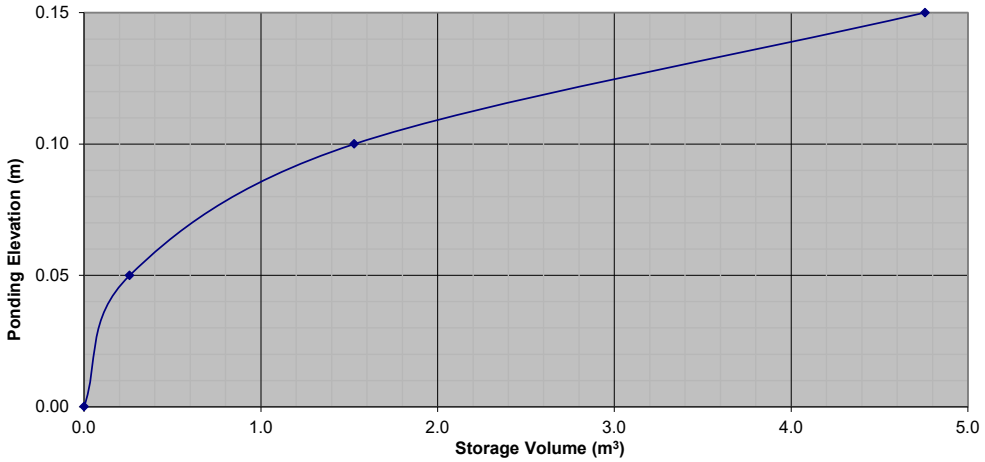
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.6	4.8
1:100 Year	0.32	0.32	14	3.9	4.8

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.3	0.3
0.10	40.5	1.5
0.15	88.7	4.8

Stage Storage Curve: Area R-2 Controlled Roof Drain RD4



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD5

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.18	2.86	0.86
10	104.19	2.35	2.03	1.22
15	83.56	1.88	1.56	1.41
20	70.25	1.58	1.26	1.51
25	60.90	1.37	1.05	1.58
30	53.93	1.21	0.89	1.61
35	48.52	1.09	0.77	1.62
40	44.18	0.99	0.67	1.62
45	40.63	0.91	0.59	1.61
50	37.65	0.85	0.53	1.58
55	35.12	0.79	0.47	1.55
60	32.94	0.74	0.42	1.52
65	31.04	0.70	0.38	1.48
70	29.37	0.66	0.34	1.43
75	27.89	0.63	0.31	1.39
90	24.29	0.55	0.23	1.23
105	21.58	0.49	0.17	1.05
120	19.47	0.44	0.12	0.85

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD5

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.07	5.75	1.73
10	178.56	4.47	4.15	2.49
15	142.89	3.58	3.26	2.93
20	119.95	3.00	2.68	3.22
25	103.85	2.60	2.28	3.42
30	91.87	2.30	1.98	3.56
35	82.58	2.07	1.75	3.67
40	75.15	1.88	1.56	3.74
45	69.05	1.73	1.41	3.80
50	63.95	1.60	1.28	3.84
55	59.62	1.49	1.17	3.87
60	55.89	1.40	1.08	3.88
65	52.65	1.32	1.00	3.89
70	49.79	1.25	0.93	3.89
75	47.26	1.18	0.86	3.88
90	41.11	1.03	0.71	3.83
105	36.50	0.91	0.59	3.74
120	32.89	0.82	0.50	3.62

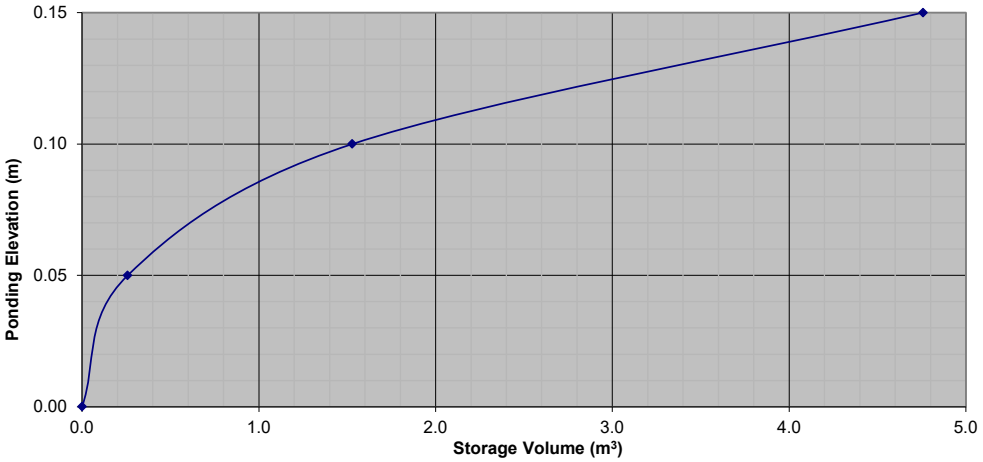
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.6	4.8
1:100 Year	0.32	0.32	14	3.9	4.8

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.3	0.3
0.10	40.5	1.5
0.15	88.7	4.8

Stage Storage Curve: Area R-2 Controlled Roof Drain RD5



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD6

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.18	2.86	0.86
10	104.19	2.35	2.03	1.22
15	83.56	1.88	1.56	1.41
20	70.25	1.58	1.26	1.51
25	60.90	1.37	1.05	1.58
30	53.93	1.21	0.89	1.61
35	48.52	1.09	0.77	1.62
40	44.18	0.99	0.67	1.62
45	40.63	0.91	0.59	1.61
50	37.65	0.85	0.53	1.58
55	35.12	0.79	0.47	1.55
60	32.94	0.74	0.42	1.52
65	31.04	0.70	0.38	1.48
70	29.37	0.66	0.34	1.43
75	27.89	0.63	0.31	1.39
90	24.29	0.55	0.23	1.23
105	21.58	0.49	0.17	1.05
120	19.47	0.44	0.12	0.85

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD6

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.07	5.75	1.73
10	178.56	4.47	4.15	2.49
15	142.89	3.58	3.26	2.93
20	119.95	3.00	2.68	3.22
25	103.85	2.60	2.28	3.42
30	91.87	2.30	1.98	3.56
35	82.58	2.07	1.75	3.67
40	75.15	1.88	1.56	3.74
45	69.05	1.73	1.41	3.80
50	63.95	1.60	1.28	3.84
55	59.62	1.49	1.17	3.87
60	55.89	1.40	1.08	3.88
65	52.65	1.32	1.00	3.89
70	49.79	1.25	0.93	3.89
75	47.26	1.18	0.86	3.88
90	41.11	1.03	0.71	3.83
105	36.50	0.91	0.59	3.74
120	32.89	0.82	0.50	3.62

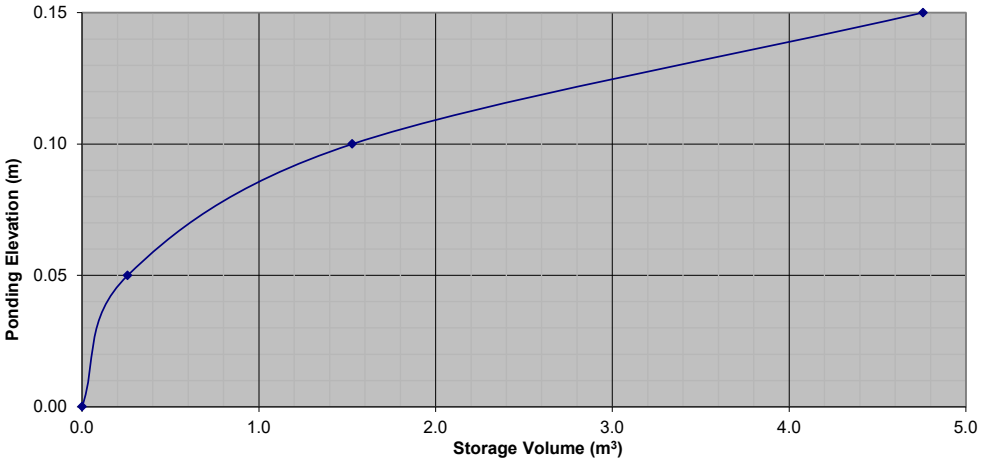
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.6	4.8
1:100 Year	0.32	0.32	14	3.9	4.8

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.3	0.3
0.10	40.5	1.5
0.15	88.7	4.8

Stage Storage Curve: Area R-2 Controlled Roof Drain RD6



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD7

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.18	2.86	0.86
10	104.19	2.35	2.03	1.22
15	83.56	1.88	1.56	1.41
20	70.25	1.58	1.26	1.51
25	60.90	1.37	1.05	1.58
30	53.93	1.21	0.89	1.61
35	48.52	1.09	0.77	1.62
40	44.18	0.99	0.67	1.62
45	40.63	0.91	0.59	1.61
50	37.65	0.85	0.53	1.58
55	35.12	0.79	0.47	1.55
60	32.94	0.74	0.42	1.52
65	31.04	0.70	0.38	1.48
70	29.37	0.66	0.34	1.43
75	27.89	0.63	0.31	1.39
90	24.29	0.55	0.23	1.23
105	21.58	0.49	0.17	1.05
120	19.47	0.44	0.12	0.85

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD7

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.07	5.75	1.73
10	178.56	4.47	4.15	2.49
15	142.89	3.58	3.26	2.93
20	119.95	3.00	2.68	3.22
25	103.85	2.60	2.28	3.42
30	91.87	2.30	1.98	3.56
35	82.58	2.07	1.75	3.67
40	75.15	1.88	1.56	3.74
45	69.05	1.73	1.41	3.80
50	63.95	1.60	1.28	3.84
55	59.62	1.49	1.17	3.87
60	55.89	1.40	1.08	3.88
65	52.65	1.32	1.00	3.89
70	49.79	1.25	0.93	3.89
75	47.26	1.18	0.86	3.88
90	41.11	1.03	0.71	3.83
105	36.50	0.91	0.59	3.74
120	32.89	0.82	0.50	3.62

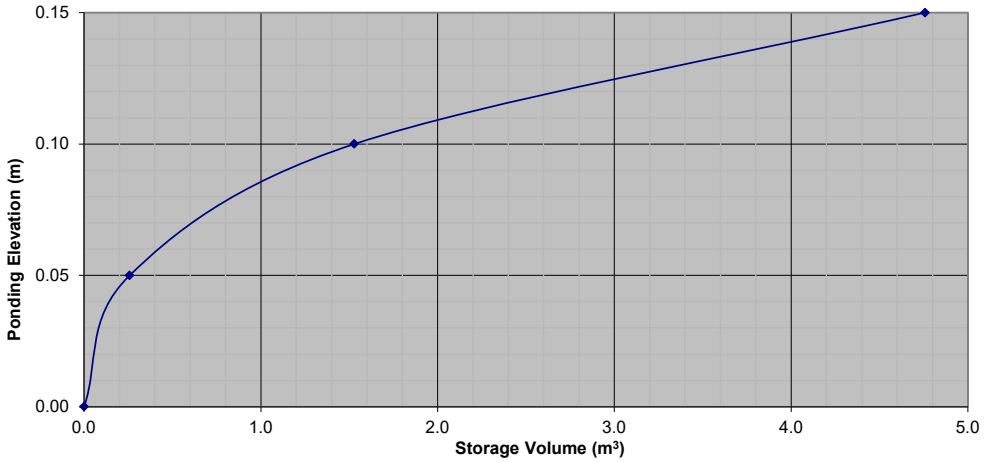
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.6	4.8
1:100 Year	0.32	0.32	14	3.9	4.8

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.3	0.3
0.10	40.5	1.5
0.15	88.7	4.8

Stage Storage Curve: Area R-2 Controlled Roof Drain RD7



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD8

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.83	2.51	0.75
10	104.19	2.09	1.77	1.06
15	83.56	1.67	1.35	1.22
20	70.25	1.41	1.09	1.30
25	60.90	1.22	0.90	1.35
30	53.93	1.08	0.76	1.37
35	48.52	0.97	0.65	1.37
40	44.18	0.88	0.56	1.35
45	40.63	0.81	0.49	1.33
50	37.65	0.75	0.43	1.30
55	35.12	0.70	0.38	1.26
60	32.94	0.66	0.34	1.22
65	31.04	0.62	0.30	1.18
70	29.37	0.59	0.27	1.13
75	27.89	0.56	0.24	1.07
90	24.29	0.49	0.17	0.90
105	21.58	0.43	0.11	0.71
120	19.47	0.39	0.07	0.50

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD8

OTTAWA IDF CURVE

Area =	0.008	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.3	m3

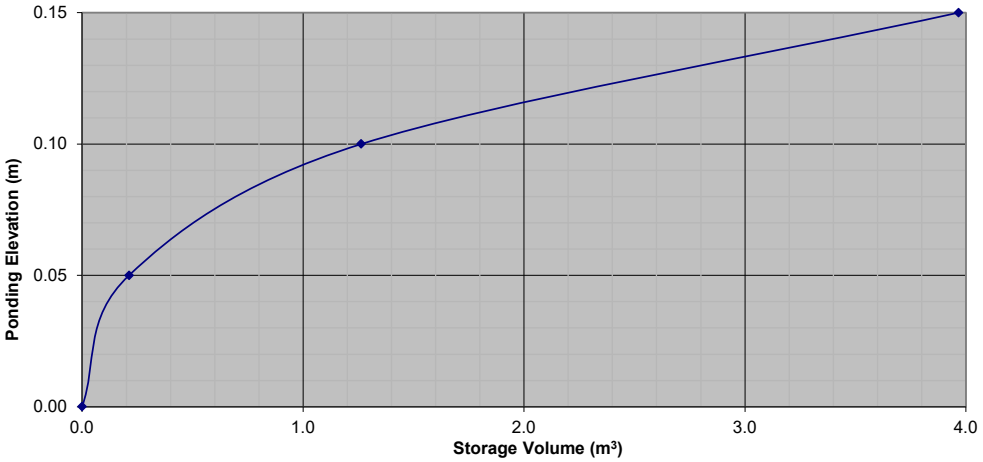
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	5.40	5.08	1.52
10	178.56	3.97	3.65	2.19
15	142.89	3.18	2.86	2.57
20	119.95	2.67	2.35	2.82
25	103.85	2.31	1.99	2.98
30	91.87	2.04	1.72	3.10
35	82.58	1.84	1.52	3.18
40	75.15	1.67	1.35	3.24
45	69.05	1.54	1.22	3.28
50	63.95	1.42	1.10	3.31
55	59.62	1.33	1.01	3.32
60	55.89	1.24	0.92	3.32
65	52.65	1.17	0.85	3.32
70	49.79	1.11	0.79	3.31
75	47.26	1.05	0.73	3.29
90	41.11	0.91	0.59	3.21
105	36.50	0.81	0.49	3.10
120	32.89	0.73	0.41	2.96

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:5 Year	0.32	0.32	10	1.4	4.0
1:100 Year	0.32	0.32	14	3.3	4.0

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	8.5	0.2
0.10	33.5	1.3
0.15	74.7	4.0

Stage Storage Curve: Area R-2
Controlled Roof Drain RD7



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD9

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD9

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

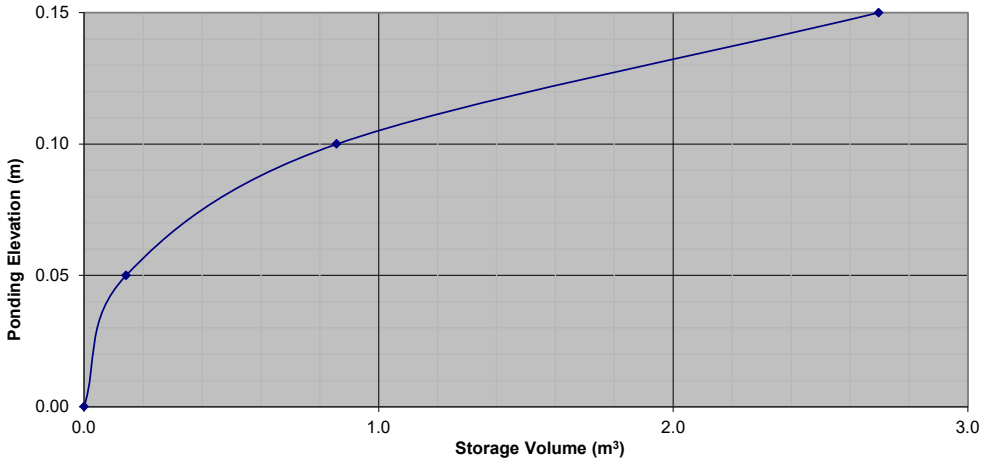
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	10	0.9	2.7
1:100 Year	0.32	0.32	14	2.2	2.7

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	5.7	0.1
0.10	22.9	0.9
0.15	50.7	2.7

Stage Storage Curve: Area R-2
Controlled Roof Drain RD8



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD10

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	1.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	3.18	2.86	0.86
10	104.19	2.35	2.03	1.22
15	83.56	1.88	1.56	1.41
20	70.25	1.58	1.26	1.51
25	60.90	1.37	1.05	1.58
30	53.93	1.21	0.89	1.61
35	48.52	1.09	0.77	1.62
40	44.18	0.99	0.67	1.62
45	40.63	0.91	0.59	1.61
50	37.65	0.85	0.53	1.58
55	35.12	0.79	0.47	1.55
60	32.94	0.74	0.42	1.52
65	31.04	0.70	0.38	1.48
70	29.37	0.66	0.34	1.43
75	27.89	0.63	0.31	1.39
90	24.29	0.55	0.23	1.23
105	21.58	0.49	0.17	1.05
120	19.47	0.44	0.12	0.85

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD10

OTTAWA IDF CURVE

Area =	0.009	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	3.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	6.07	5.75	1.73
10	178.56	4.47	4.15	2.49
15	142.89	3.58	3.26	2.93
20	119.95	3.00	2.68	3.22
25	103.85	2.60	2.28	3.42
30	91.87	2.30	1.98	3.56
35	82.58	2.07	1.75	3.67
40	75.15	1.88	1.56	3.74
45	69.05	1.73	1.41	3.80
50	63.95	1.60	1.28	3.84
55	59.62	1.49	1.17	3.87
60	55.89	1.40	1.08	3.88
65	52.65	1.32	1.00	3.89
70	49.79	1.25	0.93	3.89
75	47.26	1.18	0.86	3.88
90	41.11	1.03	0.71	3.83
105	36.50	0.91	0.59	3.74
120	32.89	0.82	0.50	3.62

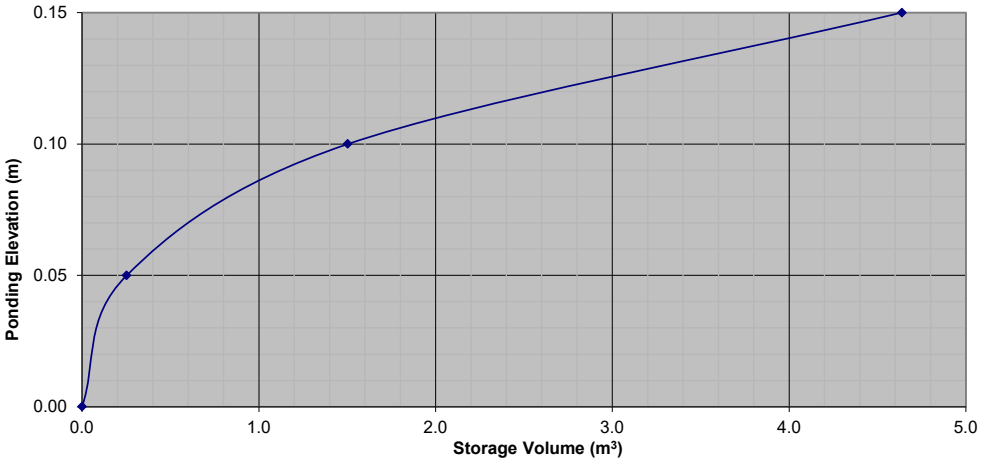
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	1.6	4.6
1:100 Year	0.32	0.32	14	3.9	4.6

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	10.1	0.3
0.10	39.9	1.5
0.15	85.5	4.6

Stage Storage Curve: Area R-2
Controlled Roof Drain RD10



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD11

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD11

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

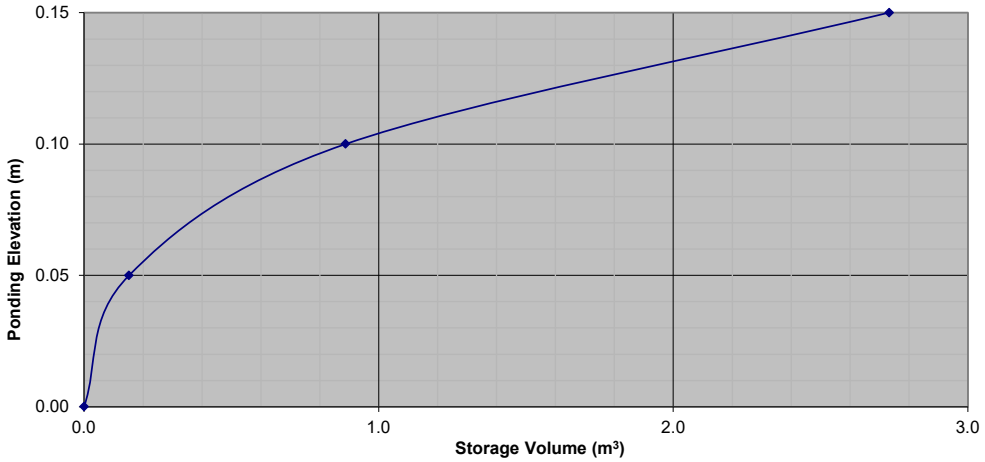
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	10	0.9	2.7
1:100 Year	0.32	0.32	14	2.2	2.7

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	6.1	0.2
0.10	23.3	0.9
0.15	50.5	2.7

Stage Storage Curve: Area R-2
Controlled Roof Drain RD11



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD12

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.71	L/s
C =	0.90		Vol(max) =	0.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	1.77	1.06	0.32
10	104.19	1.30	0.59	0.36
15	83.56	1.05	0.34	0.30
20	70.25	0.88	0.17	0.20
25	60.90	0.76	0.05	0.08
30	53.93	0.67	-0.04	-0.06
35	48.52	0.61	-0.10	-0.22
40	44.18	0.55	-0.16	-0.38
45	40.63	0.51	-0.20	-0.54
50	37.65	0.47	-0.24	-0.72
55	35.12	0.44	-0.27	-0.89
60	32.94	0.41	-0.30	-1.07
65	31.04	0.39	-0.32	-1.25
70	29.37	0.37	-0.34	-1.44
75	27.89	0.35	-0.36	-1.63
90	24.29	0.30	-0.41	-2.19
105	21.58	0.27	-0.44	-2.77
120	19.47	0.24	-0.47	-3.36

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD12

OTTAWA IDF CURVE

Area =	0.005	ha	Qallow =	0.87	L/s
C =	1.00		Vol(max) =	1.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	3.37	2.50	0.75
10	178.56	2.48	1.61	0.97
15	142.89	1.99	1.12	1.00
20	119.95	1.67	0.80	0.96
25	103.85	1.44	0.57	0.86
30	91.87	1.28	0.41	0.73
35	82.58	1.15	0.28	0.58
40	75.15	1.04	0.17	0.42
45	69.05	0.96	0.09	0.24
50	63.95	0.89	0.02	0.06
55	59.62	0.83	-0.04	-0.14
60	55.89	0.78	-0.09	-0.34
65	52.65	0.73	-0.14	-0.54
70	49.79	0.69	-0.18	-0.75
75	47.26	0.66	-0.21	-0.96
90	41.11	0.57	-0.30	-1.61
105	36.50	0.51	-0.36	-2.28
120	32.89	0.46	-0.41	-2.97

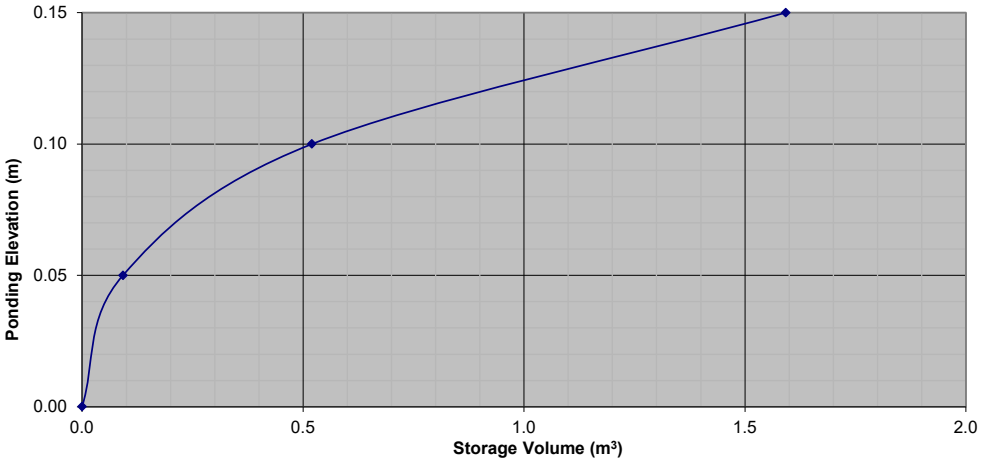
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.71	0.71	9	0.4	1.6
1:100 Year	0.87	0.87	13	1.0	1.6

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	3.7	0.1
0.10	13.4	0.5
0.15	29.5	1.6

Stage Storage Curve: Area R-2 Controlled Roof Drain RD12



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD13

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD13

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

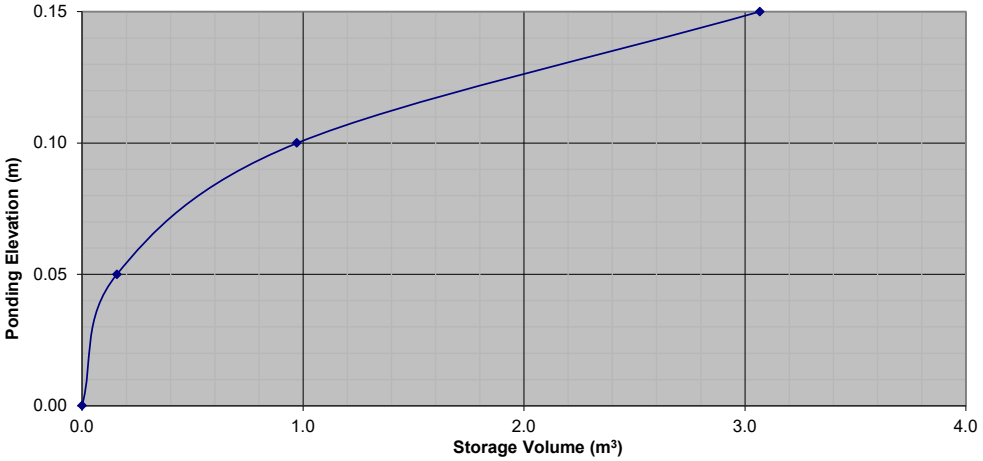
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Closed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:5 Year	0.32	0.32	10	0.9	3.1
1:100 Year	0.32	0.32	13	2.2	3.1

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	6.3	0.2
0.10	26.3	1.0
0.15	57.5	3.1

Stage Storage Curve: Area R-2
Controlled Roof Drain RD13



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD14

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD14

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

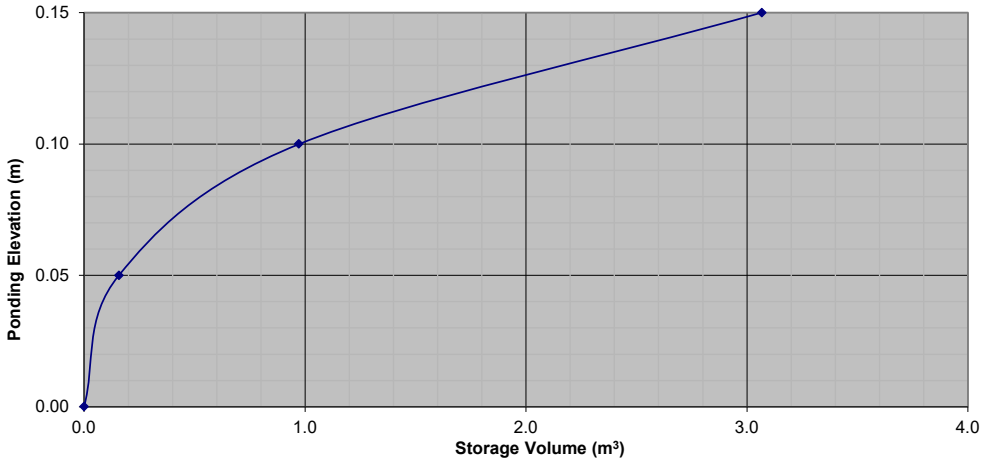
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	10	0.9	3.1
1:100 Year	0.32	0.32	13	2.2	3.1

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	6.3	0.2
0.10	26.3	1.0
0.15	57.5	3.1

Stage Storage Curve: Area R-2
Controlled Roof Drain RD14



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD15

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD15

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

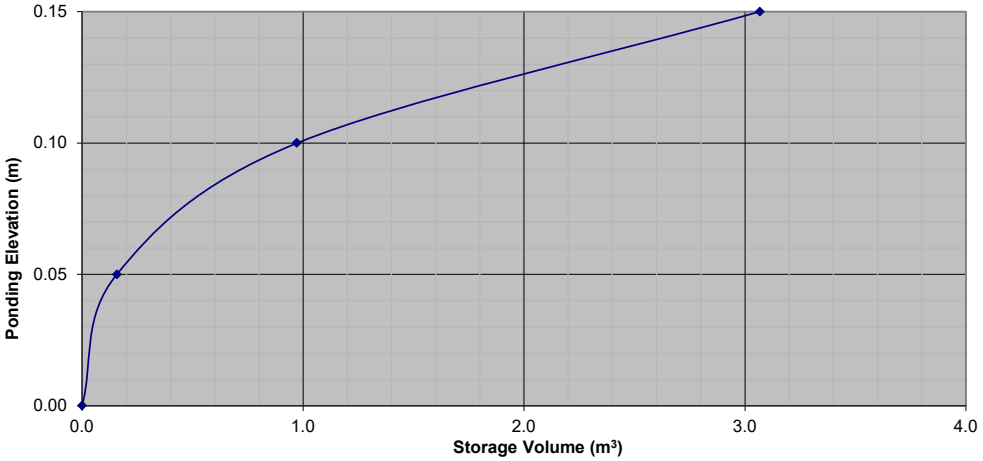
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	10	0.9	3.1
1:100 Year	0.32	0.32	13	2.2	3.1

Roof Drain Storage Table

Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	6.3	0.2
0.10	26.3	1.0
0.15	57.5	3.1

Stage Storage Curve: Area R-2
Controlled Roof Drain RD15



1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2 Controlled Roof Drain RD16

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	0.90		Vol(max) =	0.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	2.12	1.80	0.54
10	104.19	1.56	1.24	0.75
15	83.56	1.25	0.93	0.84
20	70.25	1.05	0.73	0.88
25	60.90	0.91	0.59	0.89
30	53.93	0.81	0.49	0.88
35	48.52	0.73	0.41	0.86
40	44.18	0.66	0.34	0.82
45	40.63	0.61	0.29	0.78
50	37.65	0.57	0.25	0.74
55	35.12	0.53	0.21	0.68
60	32.94	0.49	0.17	0.63
65	31.04	0.47	0.15	0.57
70	29.37	0.44	0.12	0.51
75	27.89	0.42	0.10	0.44
90	24.29	0.36	0.04	0.24
105	21.58	0.32	0.00	0.03
120	19.47	0.29	-0.03	-0.20

1765 MONTREAL ROAD
PROJECT NO: 121060
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2 Controlled Roof Drain RD16

OTTAWA IDF CURVE

Area =	0.006	ha	Qallow =	0.32	L/s
C =	1.00		Vol(max) =	2.2	m3

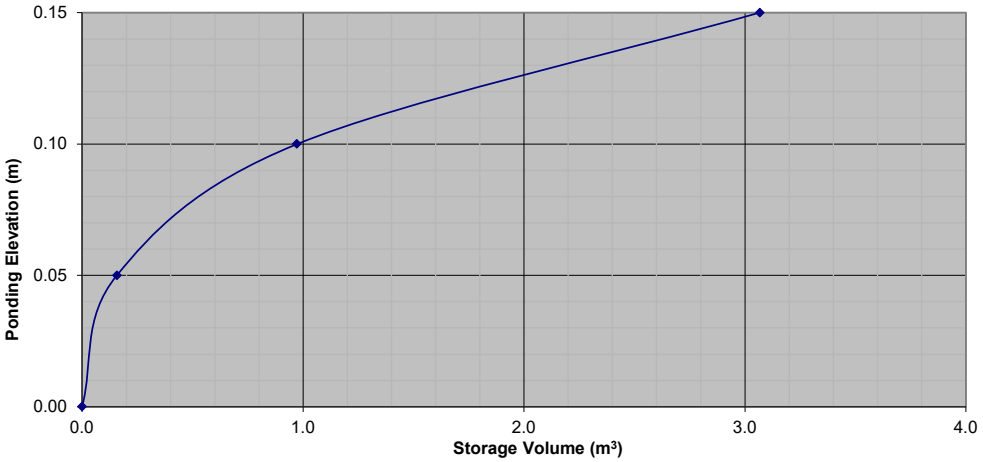
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	4.05	3.73	1.12
10	178.56	2.98	2.66	1.60
15	142.89	2.38	2.06	1.86
20	119.95	2.00	1.68	2.02
25	103.85	1.73	1.41	2.12
30	91.87	1.53	1.21	2.18
35	82.58	1.38	1.06	2.22
40	75.15	1.25	0.93	2.24
45	69.05	1.15	0.83	2.25
50	63.95	1.07	0.75	2.24
55	59.62	0.99	0.67	2.23
60	55.89	0.93	0.61	2.20
65	52.65	0.88	0.56	2.18
70	49.79	0.83	0.51	2.14
75	47.26	0.79	0.47	2.11
90	41.11	0.69	0.37	1.97
105	36.50	0.61	0.29	1.82
120	32.89	0.55	0.23	1.65

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to Fully Closed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3) Required**	**Provided**
1:5 Year	0.32	0.32	10	0.9	3.1
1:100 Year	0.32	0.32	13	2.2	3.1

Roof Drain Storage Table

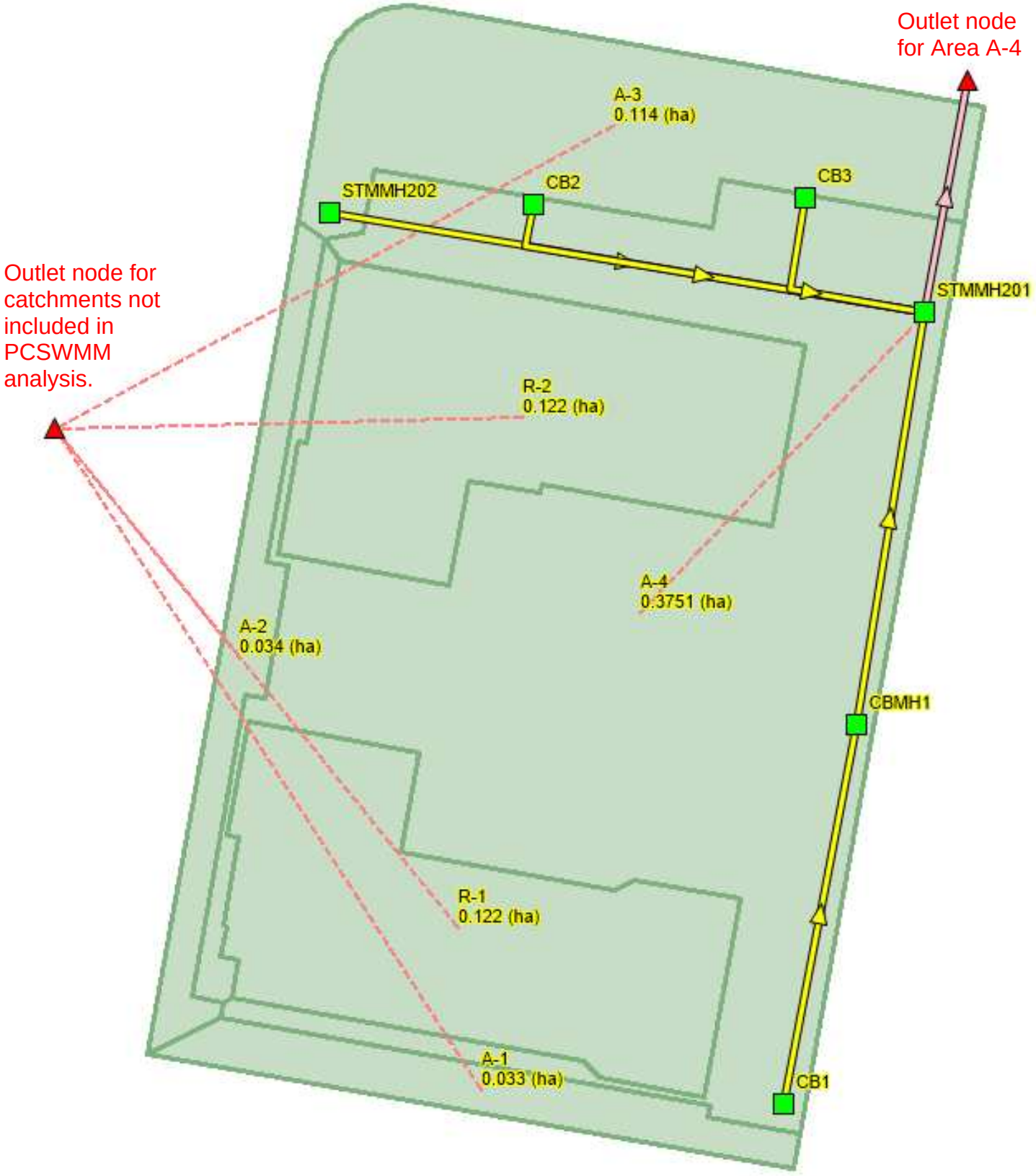
Elevation	Area RD 1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	6.3	0.2
0.10	26.3	1.0
0.15	57.5	3.1

Stage Storage Curve: Area R-2
Controlled Roof Drain RD16



APPENDIX F

PCSWMM Model Schematic and Output Files (Area A-4)


Outlet node for Area A-4
A-3
0.114 (ha)
STMMH202
CB2
CB3
STMMH201
Outlet node for catchments not included in PCSWMM analysis.
R-2
0.122 (ha)
A-4
0.3751 (ha)
A-2
0.034 (ha)
CBMH1
R-1
0.122 (ha)
A-1
0.033 (ha)
CB1

Structure Data

Structures	Size (mm)	Area (m^2)	T/G	INV
STM MH 201	1800mm dia	2.54	102.30	99.63
STM MH 202	1800mm dia	2.54	102.40	99.88
CB2	600x600mm	0.36	101.50	99.94
CB3	600x600mm	0.36	101.95	99.95

Storage Pipe Data

Pipe ID	991 mm	**INV U/S**	99.88
Length	60.1 m	**OBV U/S**	100.87
Volume	46.4 m^3	**INV D/S**	99.63
Max Depth	1.24 m	**OBV D/S**	100.62

PCSWMM Model Results

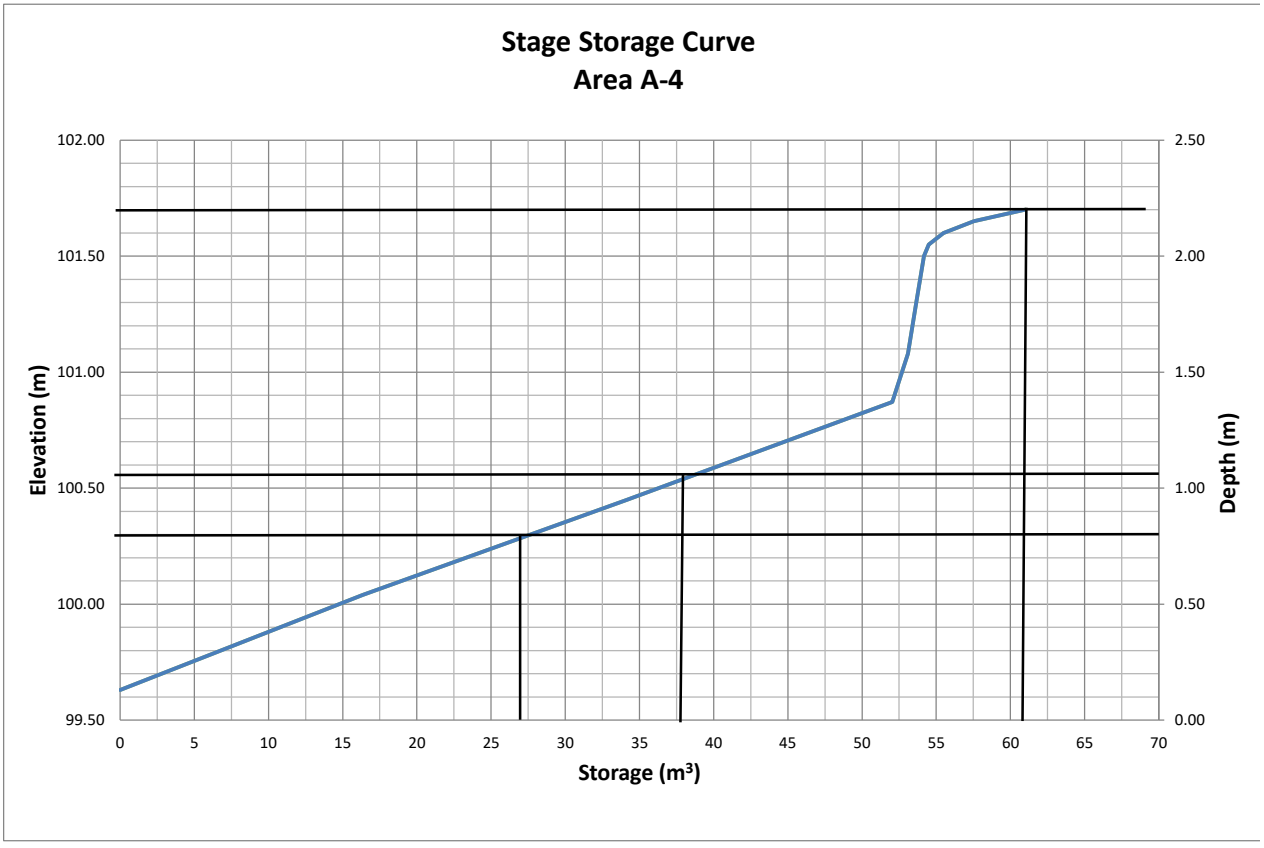
Design Event	Release Rate (L/s)	HGL (m)	Head* (m)
2yr	35.5	100.30	0.60
5yr	42.6	100.57	0.87
100yr	64.4	101.70	2.00
Stress Test	67.4	101.89	2.19

ICD Location:	STMMH 201	
ICD Size:	142	mm
Invert:	99.63	m
C/L:	99.70	m

** Head is measured from centreline of orifice*

Area A-4: Storage Table

Underground Storage						Surface Storage				Total Storage
						CB 2		CB3		
Elevation (m)	System Depth (m)	Storage Pipe (m^3)	STM MH 201 (m^3)	STM MH 202 (m^3)	Underground Volume (m^3)	Area (m^2)	Volume (m^3)	Area (m^2)	Volume (m^3)	(m^3)
99.63	0.00	0.00	0.00	0.00	**0.00**	-	-	-	-	**0**
100.04	0.41	15.30	1.04	0.00	**16.34**	-	-	-	-	**16.3**
100.45	0.82	30.60	2.08	1.45	**34.13**	-	-	-	-	**34.1**
100.87	1.24	46.36	3.16	2.52	**52.04**	-	-	-	-	**52.0**
101.08	1.45	46.36	3.69	3.05	**53.10**	-	-	-	-	**53.1**
101.30	1.67	46.36	4.25	3.05	**53.66**	-	-	-	-	**53.7**
101.50	1.87	46.36	4.76	3.05	**54.17**	0.00	0.00	0.0	0.0	**54.2**
101.55	1.92	46.36	4.89	3.05	**54.30**	8.1	0.20	0.0	0.0	**54.5**
101.60	1.97	46.36	5.01	3.05	**54.42**	26.7	1.07	0.0	0.0	**55.5**
101.65	2.02	46.36	5.14	3.05	**54.55**	49.90	2.99	0.0	0.0	**57.5**
101.70	2.07	46.36	5.27	3.05	**54.68**	82.60	6.30	0.0	0.0	**61.0**



ICD Table

ICD TYPE	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	DESIGN EVENT	PEAK FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE (m^3)
CIRCULAR PLUG TYPE 142mm	STMMH201 1800mm	375mm PVC	1:2 YR	35.5	0.60	100.30	27.5	61.0
			1:5 YR	42.6	0.87	100.57	38.5	
			1:100 YR	64.4	2.00	101.70	61.0	

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 2
Number of subcatchments ... 6
Number of nodes ........... 8
Number of links ........... 6
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
------------------------------------------------------------------------
Blank                NoRain6hr                   INTENSITY   60 min.
Raingage             100yr4hrChicago             INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                        Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------------
A-1                         0.03     35.00      0.00    0.5000 Blank                2
A-2                         0.03     40.00      0.00    0.5000 Blank                2
A-3                         0.11     50.00      0.00    0.5000 Blank                2
A-4                         0.38    150.00    100.00    0.5000 Raingage             STMMH201
R-1                         0.12     35.00    100.00    0.5000 Blank                2
R-2                         0.12     35.00    100.00    0.5000 Blank                2


************
Node Summary
************
                                      Invert      Max.    Ponded    External
Name                 Type              Elev.     Depth      Area    Inflow
------------------------------------------------------------------------
1                    OUTFALL            99.56      0.00       0.0
2                    OUTFALL             0.00      0.00       0.0
CB1                  STORAGE           101.45      2.30       0.0
CB2                  STORAGE            99.94      1.76       0.0
CB3                  STORAGE            99.95      2.00       0.0
CBMH1                STORAGE           101.26      4.24       0.0
STMMH201             STORAGE            99.63      2.77       0.0
STMMH202             STORAGE            99.88      1.97       0.0


************
Link Summary
************
Name             From Node        To Node          Type            Length    %Slope Roughness
-----------------------------------------------------------------------------------------------
1                CB1              CBMH1            CONDUIT           41.0    0.3415    0.0130
2                CBMH1            STMMH201         CONDUIT           44.5    0.3596    0.0130
3                STMMH202         STMMH201         CONDUIT           60.1    0.4160    0.0130
4                CB2              STMMH201         CONDUIT            3.5    0.8572    0.0130
5                CB3              STMMH201         CONDUIT            9.5    0.5263    0.0130
6                STMMH201         1                ORIFICE


**********************
Cross Section Summary
**********************
                                      Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape               Depth     Area     Rad.    Width  Barrels     Flow
-------------------------------------------------------------------------------------
1                CIRCULAR             0.30     0.07     0.07     0.30        1    56.51
2                CIRCULAR             0.30     0.07     0.07     0.30        1    57.99
```

3	CIRCULAR	0.99	0.77	0.25	0.99	1	1509.61
4	CIRCULAR	0.30	0.07	0.07	0.30	1	89.53
5	CIRCULAR	0.30	0.07	0.07	0.30	1	70.16

****
Analysis Options
****
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date 03/04/2025 00:00:00
Ending Date 03/05/2025 00:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step ..... 2.00 sec
Variable Time Step ..... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.029	35.631
Evaporation Loss	0.000	0.000
Infiltration Loss	0.000	0.000
Surface Runoff	0.028	35.108
Final Storage	0.000	0.552
Continuity Error (%)	-0.082	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.028	0.281
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.028	0.281
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.000
Continuity Error (%)	0.052	

****
Time-Step Critical Elements
****
None

****
Highest Flow Instability Indexes
****
All links are stable.

****
Most Frequent Nonconverging Nodes

****
Convergence obtained at all time steps.

****
Routing Time Step Summary
****
Minimum Time Step : 0.12 sec
Average Time Step : 2.00 sec
Maximum Time Step : 2.00 sec
% of Time in Steady State : 0.00
Average Iterations per Step : 2.00
% of Steps Not Converging : 0.00
Time Step Frequencies :
2.000 - 1.516 sec : 99.95 %
1.516 - 1.149 sec : 0.03 %
1.149 - 0.871 sec : 0.02 %
0.871 - 0.660 sec : 0.00 %
0.660 - 0.500 sec : 0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
A-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
A-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
A-4	76.00	0.00	0.00	0.00	74.89	0.00	74.89	0.28	185.94	0.985
R-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
R-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
1	OUTFALL	0.00	0.00	99.56	0 00:00	0.00
2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
CB1	STORAGE	0.00	0.26	101.71	0 01:35	0.25
CB2	STORAGE	0.05	1.76	101.70	0 01:34	1.75
CB3	STORAGE	0.04	1.75	101.70	0 01:34	1.74
CBMH1	STORAGE	0.01	0.45	101.71	0 01:35	0.44
STMMH201	STORAGE	0.07	2.07	101.70	0 01:34	2.06
STMMH202	STORAGE	0.05	1.82	101.70	0 01:34	1.82

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
1	OUTFALL	0.00	64.41	0 01:34	0	0.281	0.000
2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 ltr
CB1	STORAGE	0.00	25.10	0 01:31	0	0.00216	1.439
CB2	STORAGE	0.00	5.35	0 01:27	0	0.00208	0.121
CB3	STORAGE	0.00	5.71	0 01:26	0	0.00218	0.127
CBMH1	STORAGE	0.00	43.89	0 01:30	0	0.00856	-0.123
STMMH201	STORAGE	185.94	185.94	0 01:30	0.281	0.33	0.000
STMMH202	STORAGE	0.00	82.98	0 01:26	0	0.0381	0.317

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CB2	STORAGE	0.95	1.456	0.004

****
Node Flooding Summary
****

No nodes were flooded.

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
CB1	0.000	0.1	0.0	0.0	0.000	11.4	0 01:35	8.42
CB2	0.000	2.6	0.0	0.0	0.001	99.7	0 01:34	1.41
CB3	0.000	2.2	0.0	0.0	0.001	87.3	0 01:34	1.49
CBMH1	0.000	0.1	0.0	0.0	0.001	10.6	0 01:35	25.10
STMMH201	0.000	2.7	0.0	0.0	0.005	74.6	0 01:34	140.22
STMMH202	0.000	2.5	0.0	0.0	0.005	92.2	0 01:34	17.47

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
1	23.36	13.94	64.41	0.281
2	0.00	0.00	0.00	0.000
System	11.68	13.94	64.41	0.281

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
1	CONDUIT	25.10	0 01:31	0.49	0.44	0.94
2	CONDUIT	43.89	0 01:30	0.67	0.76	1.00
3	CONDUIT	82.98	0 01:26	0.22	0.05	1.00
4	CONDUIT	5.35	0 01:27	0.16	0.06	1.00
5	CONDUIT	5.71	0 01:26	0.11	0.08	1.00
6	ORIFICE	64.41	0 01:34			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
1	1.00	0.06	0.00	0.00	0.01	0.00	0.00	0.92	0.00	0.00
2	1.00	0.06	0.00	0.00	0.02	0.00	0.00	0.92	0.00	0.00
3	1.00	0.01	0.88	0.00	0.12	0.00	0.00	0.00	0.89	0.00
4	1.00	0.05	0.00	0.00	0.06	0.00	0.00	0.89	0.00	0.00
5	1.00	0.05	0.00	0.00	0.06	0.00	0.00	0.89	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
1	0.01	0.01	0.19	0.01	0.01
2	0.22	0.22	0.32	0.01	0.01
3	0.53	0.53	0.64	0.01	0.01
4	0.95	0.95	0.98	0.01	0.01
5	0.94	0.94	0.99	0.01	0.01

Analysis begun on: Thu Mar 13 13:28:03 2025
Analysis ended on: Thu Mar 13 13:28:03 2025
Total elapsed time: < 1 sec

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)
------------------------------------------------------------


*************
Element Count
*************
Number of rain gages ...... 2
Number of subcatchments ... 6
Number of nodes ........... 8
Number of links ........... 6
Number of pollutants ...... 0
Number of land uses ....... 0


****************
Raingage Summary
****************
                                                 Data       Recording
Name                 Data Source                 Type       Interval
---------------------------------------------------------------------
Blank                NoRain6hr                   INTENSITY   60 min.
Raingage             StressTest(100yr+20%)       INTENSITY   10 min.


********************
Subcatchment Summary
********************
Name                        Area     Width   %Imperv    %Slope Rain Gage            Outlet
-----------------------------------------------------------------------------------------------
A-1                         0.03     35.00      0.00    0.5000 Blank                2
A-2                         0.03     40.00      0.00    0.5000 Blank                2
A-3                         0.11     50.00      0.00    0.5000 Blank                2
A-4                         0.38    150.00    100.00    0.5000 Raingage             STMMH201
R-1                         0.12     35.00    100.00    0.5000 Blank                2
R-2                         0.12     35.00    100.00    0.5000 Blank                2


************
Node Summary
************
                                    Invert      Max.    Ponded    External
Name                 Type            Elev.     Depth      Area    Inflow
-----------------------------------------------------------------------
1                    OUTFALL         99.56      0.00       0.0
2                    OUTFALL          0.00      0.00       0.0
CB1                  STORAGE        101.45      2.30       0.0
CB2                  STORAGE         99.94      1.76       0.0
CB3                  STORAGE         99.95      2.00       0.0
CBMH1                STORAGE        101.26      4.24       0.0
STMMH201             STORAGE         99.63      2.77       0.0
STMMH202             STORAGE         99.88      1.97       0.0


************
Link Summary
************
Name             From Node        To Node          Type            Length    %Slope Roughness
---------------------------------------------------------------------------------------------
1                CB1              CBMH1            CONDUIT           41.0    0.3415    0.0130
2                CBMH1            STMMH201         CONDUIT           44.5    0.3596    0.0130
3                STMMH202         STMMH201         CONDUIT           60.1    0.4160    0.0130
4                CB2              STMMH201         CONDUIT            3.5    0.8572    0.0130
5                CB3              STMMH201         CONDUIT            9.5    0.5263    0.0130
6                STMMH201         1                ORIFICE


**********************
Cross Section Summary
**********************
                                     Full     Full     Hyd.     Max.   No. of     Full
Conduit          Shape              Depth     Area     Rad.    Width  Barrels     Flow
-----------------------------------------------------------------------------------
1                CIRCULAR            0.30     0.07     0.07     0.30        1    56.51
2                CIRCULAR            0.30     0.07     0.07     0.30        1    57.99
3                CIRCULAR            0.99     0.77     0.25     0.99        1  1509.61
4                CIRCULAR            0.30     0.07     0.07     0.30        1    89.53
```

```
5                CIRCULAR             0.30      0.07      0.07      0.30        1     70.16


****************
Analysis Options
****************
Flow Units ..... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 03/04/2025 00:00:00
Ending Date .............. 03/05/2025 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:01:00
Routing Time Step ........ 2.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.034        42.757
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.000         0.000
Surface Runoff ...........         0.034        42.242
Final Storage ............         0.000         0.552
Continuity Error (%) .....        -0.087


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.034         0.338
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.032         0.318
Flooding Loss ............         0.002         0.019
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.064


***************************
Time-Step Critical Elements
***************************
None


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


*******************************
Most Frequent Nonconverging Nodes
*******************************
Convergence obtained at all time steps.
```

****
Routing Time Step Summary
****

Minimum Time Step	:	0.73 sec
Average Time Step	:	2.00 sec
Maximum Time Step	:	2.00 sec
% of Time in Steady State	:	0.00
Average Iterations per Step	:	2.00
% of Steps Not Converging	:	0.00
Time Step Frequencies	:	
2.000 - 1.516 sec	:	99.93 %
1.516 - 1.149 sec	:	0.04 %
1.149 - 0.871 sec	:	0.03 %
0.871 - 0.660 sec	:	0.00 %
0.660 - 0.500 sec	:	0.00 %

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
A-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
A-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
A-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
A-4	91.20	0.00	0.00	0.00	90.10	0.00	90.10	0.34	223.18	0.988
R-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
R-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
1	OUTFALL	0.00	0.00	99.56	0 00:00	0.00
2	OUTFALL	0.00	0.00	0.00	0 00:00	0.00
CB1	STORAGE	0.01	0.50	101.95	0 01:30	0.45
CB2	STORAGE	0.06	1.95	101.89	0 01:29	1.92
CB3	STORAGE	0.06	1.94	101.89	0 01:29	1.92
CBMH1	STORAGE	0.01	0.67	101.93	0 01:30	0.61
STMMH201	STORAGE	0.09	2.26	101.89	0 01:29	2.23
STMMH202	STORAGE	0.06	1.97	101.85	0 01:29	1.97

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
1	OUTFALL	0.00	67.42	0 01:29	0	0.318	0.000	
2	OUTFALL	0.00	0.00	0 00:00	0	0	0.000	ltr
CB1	STORAGE	0.00	38.12	0 01:29	0	0.00344	0.559	
CB2	STORAGE	0.00	7.22	0 01:25	0	0.00215	-4.249	
CB3	STORAGE	0.00	7.34	0 01:25	0	0.00255	0.091	
CBMH1	STORAGE	0.00	56.93	0 01:28	0	0.0131	0.597	
STMMH201	STORAGE	223.18	227.10	0 01:29	0.338	0.393	0.033	
STMMH202	STORAGE	0.00	160.35	0 01:30	0	0.0596	0.138	

****
Node Surcharge Summary
****

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
CB2	STORAGE	1.06	1.647	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate LPS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
STMMH202	0.12	160.23	0 01:30	0.019	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
CB1	0.000	0.2	0.0	0.0	0.001	21.7	0 01:30	16.38
CB2	0.000	3.1	0.0	0.0	0.001	100.0	0 01:28	1.51
CB3	0.000	2.8	0.0	0.0	0.001	97.1	0 01:29	3.21
CBMH1	0.000	0.2	0.0	0.0	0.001	15.8	0 01:30	38.12
STMMH201	0.000	3.1	0.0	0.0	0.006	81.5	0 01:29	265.51
STMMH202	0.000	3.0	0.0	0.0	0.005	100.0	0 01:29	17.85

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
1	23.46	15.74	67.42	0.318
2	0.00	0.00	0.00	0.000
System	11.73	15.74	67.42	0.318

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
1	CONDUIT	38.12	0 01:29	0.63	0.67	1.00
2	CONDUIT	56.93	0 01:28	0.81	0.98	1.00
3	CONDUIT	160.35	0 01:30	0.22	0.11	1.00
4	CONDUIT	7.22	0 01:25	0.19	0.08	1.00
5	CONDUIT	7.34	0 01:25	0.14	0.10	1.00
6	ORIFICE	67.42	0 01:29			1.00

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class: Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
1	1.00	0.06	0.00	0.00	0.02	0.00	0.00	0.92	0.00	0.00
2	1.00	0.06	0.00	0.00	0.02	0.00	0.00	0.92	0.00	0.00
3	1.00	0.01	0.87	0.00	0.12	0.00	0.00	0.00	0.89	0.00
4	1.00	0.05	0.00	0.00	0.06	0.00	0.00	0.88	0.00	0.00
5	1.00	0.05	0.00	0.00	0.06	0.00	0.00	0.88	0.00	0.00

****
Conduit Surcharge Summary
****

Conduit	Hours Full: Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
1	0.25	0.25	0.32	0.01	0.01
2	0.35	0.35	0.44	0.01	0.01
3	0.65	0.65	0.75	0.01	0.01
4	1.06	1.06	1.09	0.01	0.01
5	1.05	1.05	1.10	0.01	0.01

Analysis begun on: Thu Mar 20 09:31:24 2025
Analysis ended on: Thu Mar 20 09:31:24 2025
Total elapsed time: < 1 sec

APPENDIX G

Control Flow Rood Drain Information

WATTS®	Adjustable Accutrol Weir Tag: RD-100-A-ADJ	Adjustable Flow Control for Roof Drains

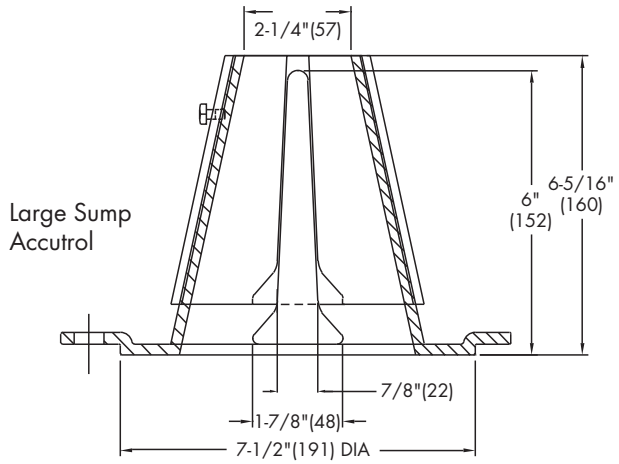
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

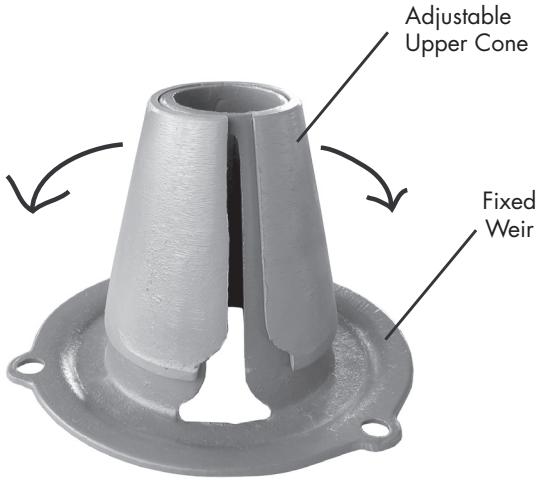
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2"of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3"of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
[5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.





1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	1"	2"	3"	4"	5"	6"
	Flow Rate (gallons per minute)					
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	5	5	5	5	5

Job Name _____ Contractor _____

Job Location _____ Contractor's P.O. No. _____

Engineer _____ Representative _____

USA: Tel: (800) 338-2581 • Fax: (828) 248-3929 • Watts.com
Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

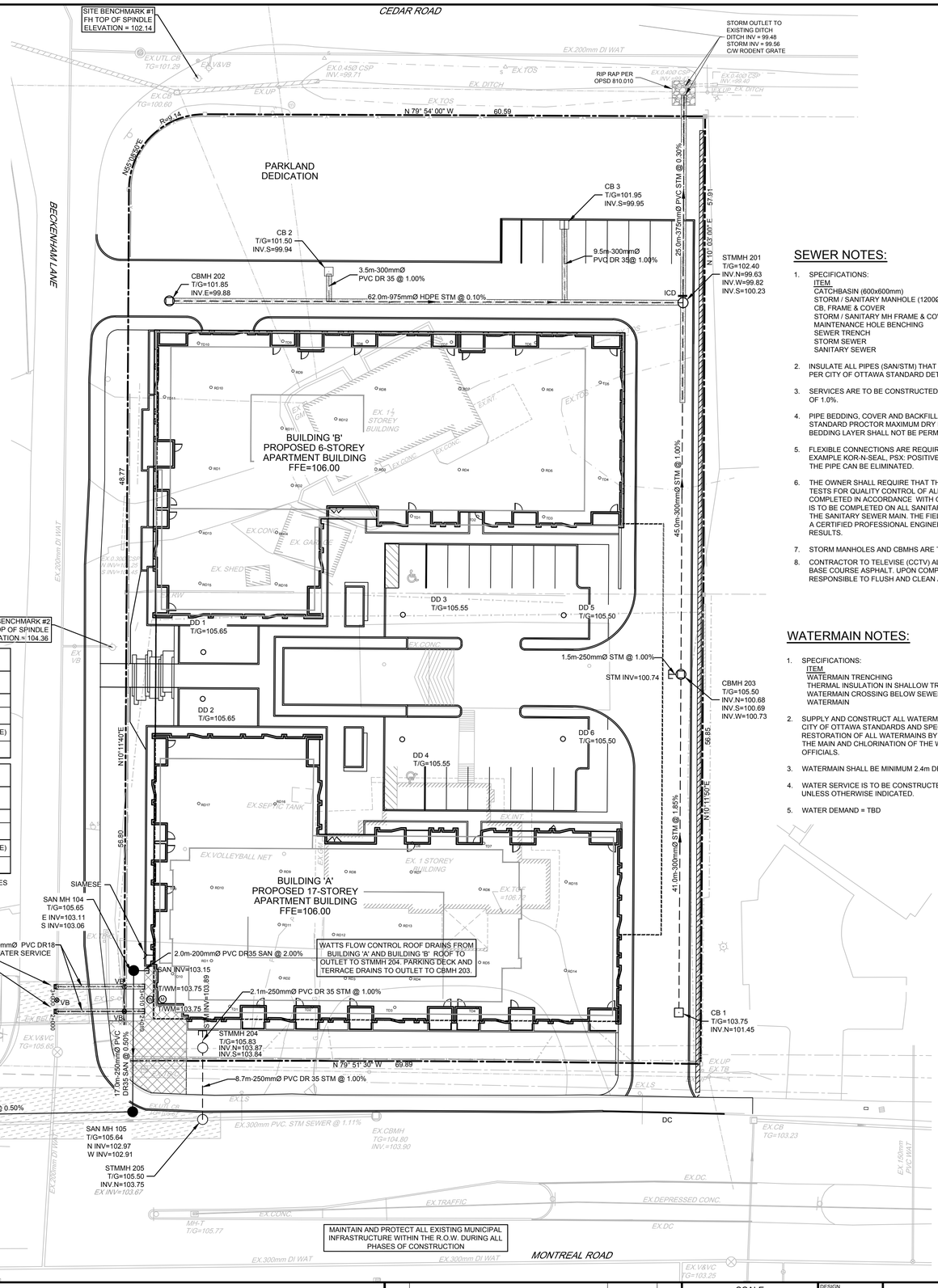
WATTS®
A Watts Water Technologies Company

APPENDIX H

Drawings

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 $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION, DISINFECTION AND ALL RELEVANT REFERENCES TO OPSS, OPSD, & AWWA GUIDELINES - ALL CURRENT VERSIONS AND AS AMENDED.
6. 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 THE CITY OF OTTAWA AND ENGINEER.
7. 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.
8. ALL ELEVATIONS ARE GEODETIC.
9. REFER TO GEOTECHNICAL REPORT (No. PG5736-1, DATED APRIL 23, 2021), PREPARED BY PATERSON GROUP. 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.
10. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
11. REFER TO DEVELOPMENT SERVICING AND STORMWATER MANAGEMENT REPORT(R-2022-206) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
12. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
13. PROVIDE LINE/PARKING PAINTING.
14. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES AND GRADING PLAN INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THE PLANS. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIALS, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS, ANY ALIGNMENT CHANGES, AND ALL SURFACE ELEVATION AS BUILT GRADES



SEWER NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
STORM / SANITARY MANHOLE (1200Ø)	701.010	OPSD
CB, FRAME & COVER	400.020	OPSD
STORM / SANITARY MH FRAME & COVER	401.010	OPSD
MAINTENANCE HOLE BENCHING	701.021	OPSD
SEWER TRENCH	S6	CITY OF OTTAWA
STORM SEWER	PVC DR 35	
SANITARY SEWER	PVC DR 35	

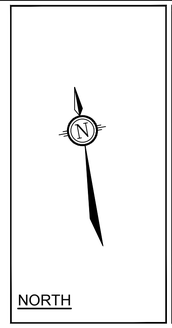
2. INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 2.0m COVER WITH HI-40 INSULATION PER CITY OF OTTAWA STANDARD DETAIL S35 INSULATION FOR SHALLOW SEWERS.
3. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
4. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 98% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
5. 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.
6. 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 ACCORDANCE 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.
7. STORM MANHOLES AND CBMHS ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED.
8. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.

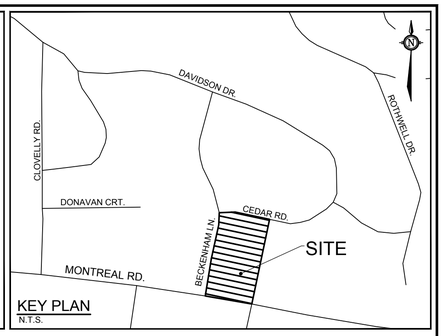
WATERMAIN NOTES:

1. SPECIFICATIONS:

ITEM	SPEC. No.	REFERENCE
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN	PVC DR 18	

2. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. 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.
3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
4. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.
5. WATER DEMAND = TBD





LEGEND:

	PROPERTY LINE	FFE	FINISHED FLOOR ELEVATION
RD 1	PROPOSED ROOF DRAIN	T/FND	TOP OF FOUNDATION WALL ELEVATION
DD 1	PROPOSED PARKING GARAGE DECK DRAIN	USF	UNDERSIDE OF FOOTING ELEVATION
TD 1	PROPOSED ROOF TERRACE DRAIN	X	REMOVAL AND/OR ABANDONMENT
M RM	PROPOSED WATER METER AND REMOTE METER		PROPOSED CAP
	PROPOSED BARRIER CURB		PROPOSED SANITARY SERVICE
DC	PROPOSED DEPRESSED CURB		PROPOSED STORM SERVICE
	PROPOSED WATER SERVICE		PROPOSED SIAMESE CONNECTION
V&VB	PROPOSED VALVE AND VALVE BOX	HYD V&VB	EXISTING HYDRANT & VALVE
	PROPOSED THERMAL INSULATION	EX.UP	EXISTING TREES / VEGETATION
SANMH	PROPOSED SANITARY MANHOLE		EXISTING UTILITY POLE
CBMH	PROPOSED CATCHBASIN MANHOLE		EXISTING FENCE
STMMH	PROPOSED STORM MANHOLE	300mmØ WM	EXISTING WATERMAIN
CB	PROPOSED CATCHBASIN	HYD	EXISTING HYDRANT C/W VALVE & LEAD
	PROPOSED RETAINING WALL		EXISTING HYDRO TRANSFORMER
OHW	EXISTING OVERHEAD WIRES	CBMH	EXISTING CATCHBASIN MANHOLE
	EXISTING CONCRETE CURB	STMMH	EXISTING STORM MANHOLE & SEWER
CB	EXISTING CATCHBASIN C/W CATCHBASIN LEAD	SANMH	EXISTING SANITARY MANHOLE & SEWER

PROPOSED WATERMAIN (150mmØ PVC)			
STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
2+000.0	105.40	±103.82 *	CONNECTION TO EXISTING 200mmØ DI WM
2+008.2	±105.70	±103.77 *	VB
2+009.9	±105.77	±103.76 *	CROSS ABOVE 250mmØ SAN (±0.30m CLEARANCE)
2+010.7	±105.77	103.75 *	CAP 1.0m FROM BUILDING FACE

PROPOSED WATERMAIN (150mmØ PVC)			
STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
3+000.0	105.40	±103.82 *	CONNECTION TO EXISTING 200mmØ DI WM
3+008.2	±105.70	±103.77 *	VB
3+009.9	±105.77	±103.76 *	CROSS ABOVE 250mmØ SAN (±0.30m CLEARANCE)
3+010.7	±105.77	103.75 *	CAP 1.0m FROM BUILDING FACE

* PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAIL W22 IN SHALLOW TRENCHES AND/OR CITY OF OTTAWA DETAIL W23 ADJACENT TO OPEN STRUCTURES.

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2022-206) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

ROOF DRAIN TABLE: BUILDING A - AREA R-1 (ROOF DRAINS 1-17)						
AREA ID * (RD)	ROOF DRAIN No. (WATTS MODEL)	WEIR SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-1	RD 2 (RD-100-A-ADJ)	CLOSED	0.32 L/S	9 cm	0.32 L/s	13 cm
R-1	RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-1	RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 7 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 8 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 9 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 10 (RD-100-A-ADJ)	CLOSED	0.32 L/s	11 cm	0.32 L/s	14 cm
R-1	RD 11 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.87 L/s	13 cm
R-1	RD 13 (RD-100-A-ADJ)	CLOSED	0.32 L/s	11 cm	0.32 L/s	14 cm
R-1	RD 14 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	9 cm	0.87 L/s	13 cm
R-1	RD 15 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	9 cm	0.87 L/s	13 cm
R-1	RD 16 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.89 L/s	12 cm
R-1	RD 17 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.89 L/s	12 cm
TOTAL	-	-	7.55 L/s	-	8.23 L/s	-

ROOF DRAIN TABLE: BUILDING B - AREA R-2 (ROOF DRAINS 1-16)						
AREA ID * (RD)	ROOF DRAIN No. (WATTS MODEL)	WEIR SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-2	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 2 (RD-100-A-ADJ)	CLOSED	0.32 L/S	10 cm	0.32 L/s	14 cm
R-2	RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 7 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 8 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 9 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 10 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 11 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.87 L/s	13 cm
R-2	RD 13 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-2	RD 14 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-2	RD 15 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-2	RD 16 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
TOTAL	-	-	5.51 L/s	-	5.67 L/s	-

INLET CONTROL DEVICE DATA TABLE - AREA A-4							
DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR PLUG TYPE 142mmØ ORIFICE	1800mmØ STMMH 201	375mmØ PVC	35.5	0.60	100.30	27.5	61.0 m^3
1:5 YR				42.6	0.87	100.57	38.5	
1:100 YR				64.4	2.00	101.70	61.0	

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.

OWNER INFORMATION
LANDRIC HOMES
63 MONTREAL ROAD EAST
GATINEAU, QUEBEC, J8M 1K3
NAME: ERIC DANIS
PHONE: (819) 593-4805
ericdanis@constructionlaverendrye.com

No.	REVISION	DATE	BY
2	ISSUED FOR ZBA APPLICATION	MAR 28/25	MS
1	ISSUED FOR SITE PLAN APPLICATION	DEC 20/22	MS

SCALE
1:300
1:300
0 3 6 9 12

DESIGN LSC
CHECKED MS
DRAWN ZA
CHECKED MS
APPROVED MS

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
1765 MONTREAL ROAD

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 121060
REV REV # 2
DRAWING No. 121060-GP

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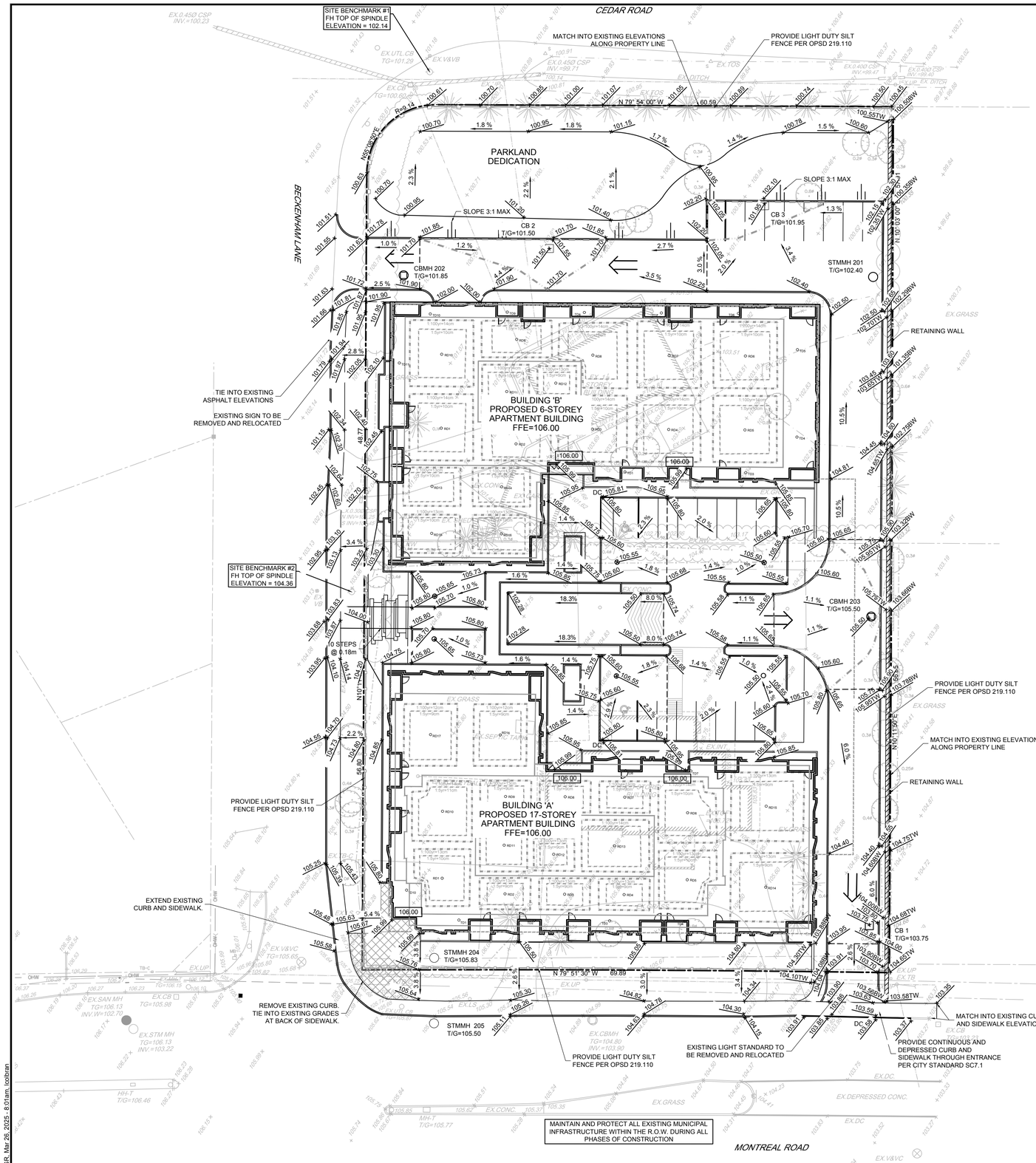

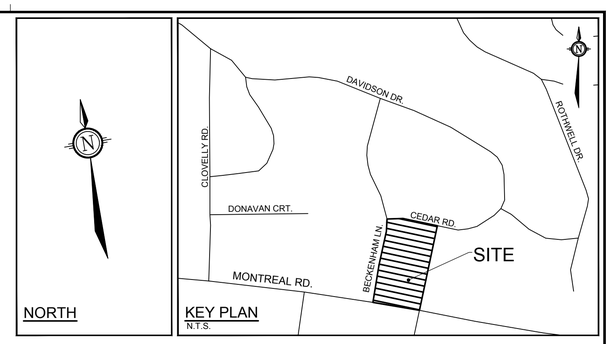

LEGEND

- 73.05 — PROPOSED ELEVATION
- + 73.03 — EXISTING ELEVATION
- 1.5 % — GRADE AND DIRECTION
- MAXIMUM 3:1 SIDESLOPE
- PROPOSED SILT FENCING (OPSD 219.110)
- DIRECTION OF MAJOR SYSTEM OVERLAND FLOW
- FFE — FINISHED FLOOR ELEVATION
- T/FND — TOP OF FOUNDATION WALL ELEVATION
- USF — UNDERSIDE OF FOOTING ELEVATION
- M M — PROPOSED MUD MAT / CONSTRUCTION ENTRANCE
- RD 1 — PROPOSED ROOF DRAIN
- DD 1 — PROPOSED PARKING GARAGE DECK DRAIN
- TD 1 — PROPOSED ROOF TERRACE DRAIN
- PROPOSED BARRIER CURB (PER SC1.1)
- DC — PROPOSED DEPRESSED CURB (PER SC1.1)
- 1:5 YEAR PONDING LIMIT
- 1:100 YEAR PONDING LIMIT
- DD 1 — PROPOSED AREA DECK DRAIN
- PROPOSED RETAINING WALL
- SAN MH 01 — PROPOSED SAN MANHOLE
- STM MH 01 — PROPOSED STORM MANHOLE
- CB — PROPOSED CATCHBASIN
- CBMH — EXISTING CATCHBASIN MANHOLE
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- V&VB — EXISTING VALVE & VALVE BOX
- SP — EXISTING SERVICE POST
- HYD — EXISTING HYDRANT
- CB — EXISTING CATCHBASIN
- CBMH — EXISTING CATCHBASIN MANHOLE
- EX UP — EXISTING UTILITY POLE

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 $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION, DISINFECTION AND ALL RELEVANT REFERENCES TO OPSS, OPSD, & AWWA GUIDELINES - ALL CURRENT VERSIONS AND AS AMENDED.
6. 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 THE CITY OF OTTAWA AND ENGINEER.
7. 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.
8. ALL ELEVATIONS ARE GEODETIC.
9. REFER TO GEOTECHNICAL REPORT (No. PG5736-1, DATED APRIL 23, 2021), PREPARED BY PATERSON GROUP. 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.
10. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
11. REFER TO DEVELOPMENT SERVICING AND STORMWATER MANAGEMENT REPORT(R-2022-206) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
12. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
13. PROVIDE LINE/PARKING PAINTING.
14. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES AND GRADING PLAN INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THE PLANS. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIALS, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS, ANY ALIGNMENT CHANGES, AND ALL SURFACE ELEVATION AS BUILT GRADES

GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED PAVED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHOULD BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. THE GRANULAR BASE 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. MINIMUM OF 2% GRADE FOR ALL GRASS AREAS UNLESS OTHERWISE NOTED.
6. MAXIMUM TERRACING GRADE TO BE 3:1 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.
13. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

PAVEMENT STRUCTURE:

LIGHT DUTY
50mm HL3 OR SUPERPAVE 12.5 ASPHALTIC CONCRETE
150mm OPSS GRAN "A" CRUSHED STONE
300mm OPSS GRAN "B" TYPE II

HEAVY DUTY
40mm SUPERPAVE 12.5 ASPHALTIC CONCRETE
50mm SUPERPAVE 19.0 ASPHALTIC CONCRETE
150mm OPSS GRAN "A" CRUSHED STONE
400mm OPSS GRAN "B" TYPE II

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.

No.	REVISION	DATE	BY
2	ISSUED FOR ZBA APPLICATION	MAR 28/25	MS
1	ISSUED FOR SITE PLAN APPLICATION	DEC 20/22	MS

SCALE
1:300
1:300
0 3 6 9 12

DESIGN LSC
CHECKED MS
DRAWN LSC
CHECKED MS
APPROVED MS

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
1765 MONTREAL ROAD

DRAWING NAME
GRADING AND EROSION & SEDIMENT CONTROL PLAN

PROJECT No. 121060
REV REV # 2
DRAWING No. 121060-GR

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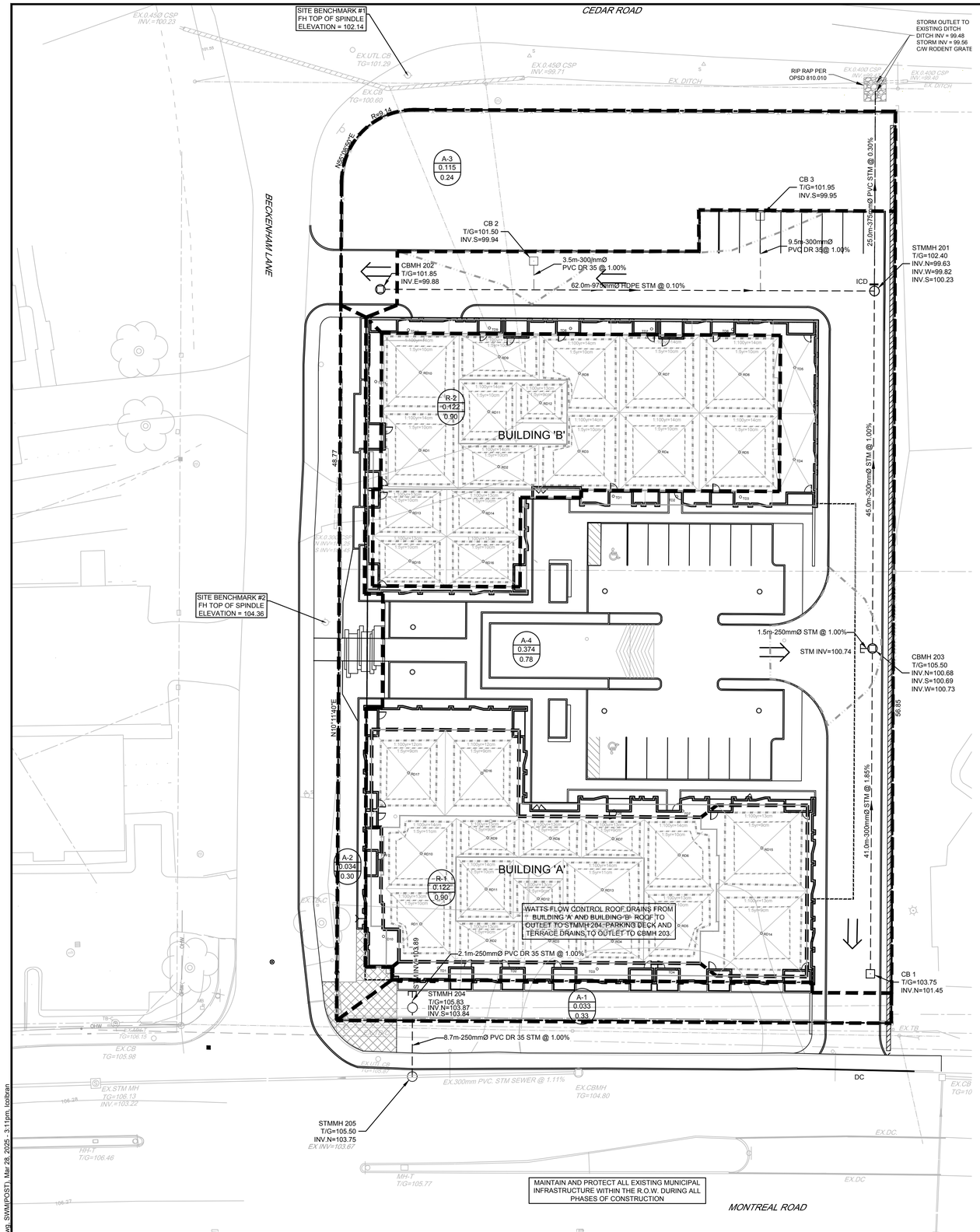
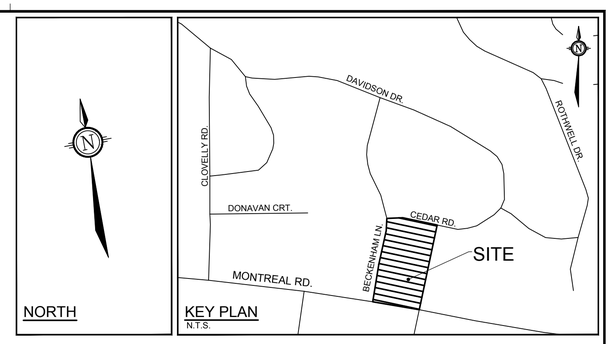
PLAN1.DWG - 841mm x 594mm





LEGEND

- DRAINAGE AREA LIMITS
- A-2 / 0.153 / 0.88 — POST-DEVELOPMENT AREA ID; POST-DEVELOPMENT DRAINAGE AREA (ha); 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- 1:5 YEAR PONDING LIMIT
- 1:100 YEAR PONDING LIMIT
- RD 1 — PROPOSED ROOF DRAIN
- DD 1 — PROPOSED PARKING GARAGE DECK DRAIN
- TD 1 — PROPOSED ROOF TERRACE DRAIN
- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- PROPOSED RETAINING WALL
- STM MH 01 — PROPOSED STORM MANHOLE
- CB 01 — PROPOSED CATCHBASIN
- CBMH 01 — PROPOSED CATCHBASIN MANHOLE
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- VV/VB — EXISTING VALVE & VALVE BOX
- SP — EXISTING SERVICE POST
- HYD — EXISTING HYDRANT
- EX. CB — EXISTING CATCHBASIN
- EX. CBMH — EXISTING CATCHBASIN MH
- EX UP — EXISTING UTILITY POLE
- EX. STM MH — EXISTING STORM MH & SEWER

ROOF DRAIN TABLE: BUILDING A - AREA R-1 (ROOF DRAINS 1-17)

AREA ID * (RD)	ROOF DRAIN No. (WATTS MODEL)	WEIR SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-1	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-1	RD 2 (RD-100-A-ADJ)	CLOSED	0.32 L/S	9 cm	0.32 L/s	13 cm
R-1	RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-1	RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 7 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 8 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 9 (RD-100-A-ADJ)	CLOSED	0.32 L/s	9 cm	0.32 L/s	13 cm
R-1	RD 10 (RD-100-A-ADJ)	CLOSED	0.32 L/s	11 cm	0.32 L/s	14 cm
R-1	RD 11 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-1	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.87 L/s	13 cm
R-1	RD 13 (RD-100-A-ADJ)	CLOSED	0.32 L/s	11 cm	0.32 L/s	14 cm
R-1	RD 14 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	9 cm	0.87 L/s	13 cm
R-1	RD 15 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	9 cm	0.87 L/s	13 cm
R-1	RD 16 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.89 L/s	12 cm
R-1	RD 17 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.89 L/s	12 cm
TOTAL	-	-	7.55 L/s		8.23 L/s	-

ROOF DRAIN TABLE: BUILDING B - AREA R-2 (ROOF DRAINS 1-16)

AREA ID * (RD)	ROOF DRAIN No. (WATTS MODEL)	WEIR SETTING	1:5 YEAR RELEASE RATE	APPROX. 5 YR PONDING DEPTH	1:100 YEAR RELEASE RATE	APPROX. 100 YR PONDING DEPTH
R-2	RD 1 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 2 (RD-100-A-ADJ)	CLOSED	0.32 L/S	10 cm	0.32 L/s	14 cm
R-2	RD 3 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 4 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 5 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 6 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 7 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 8 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 9 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 10 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 11 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	14 cm
R-2	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.71 L/s	9 cm	0.87 L/s	13 cm
R-2	RD 13 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-2	RD 14 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-2	RD 15 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
R-2	RD 16 (RD-100-A-ADJ)	CLOSED	0.32 L/s	10 cm	0.32 L/s	13 cm
TOTAL	-	-	5.51 L/s	-	5.67 L/s	-

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2022-206) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

INLET CONTROL DEVICE DATA TABLE - AREA A-4

DESIGN EVENT	ICD TYPE (PLUG TYPE)	OUTLET STRUCTURE	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR PLUG TYPE 142mmØ ORIFICE	1800mmØ STMMH 201	375mmØ PVC	35.5	0.60	100.30	27.5	61.0 m^3
1:5 YR				42.6	0.87	100.57	38.5	
1:100 YR				64.4	2.00	101.70	61.0	

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 $5,000,000.00. INSURANCE POLICY TO NAME OWNERS, ENGINEERS AND ARCHITECTS AS CO-INSURED.
5. COMPLETE ALL WORKS IN ACCORDANCE WITH THE MOST CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS USING THE CURRENT GUIDELINES, BYLAWS AND STANDARDS INCLUDING MATERIALS OF CONSTRUCTION, DISINFECTION AND ALL RELEVANT REFERENCES TO OPSS, OPSD, & AWWA GUIDELINES - ALL CURRENT VERSIONS AND AS AMENDED.
6. 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 THE CITY OF OTTAWA AND ENGINEER.
7. 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.
8. ALL ELEVATIONS ARE GEODETIC.
9. REFER TO GEOTECHNICAL REPORT (No. PG5736-1, DATED APRIL 23, 2021), PREPARED BY PATERSON GROUP. 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.
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NOTE:
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OWNER INFORMATION
LANDRIC HOMES
63 MONTREAL ROAD EAST
GATINEAU, QUEBEC, J8M 1K3
NAME: ERIC DANIS
PHONE: (819) 593-4805
ericdanis@constructionlaverendrye.com

No.	REVISION	DATE	BY
2	ISSUED FOR ZBA APPLICATION	MAR 28/25	MS
1	ISSUED FOR SITE PLAN APPLICATION	DEC 20/22	MS

SCALE
1:300
1:300
0 3 6 9 12

DESIGN ZA
CHECKED MS
DRAWN ZA
CHECKED MS
APPROVED MS

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
1765 MONTREAL ROAD

DRAWING NAME
STORMWATER MANAGEMENT PLAN

PROJECT No. 121060
REV REV # 2
DRAWING No. 121060-SWM

M:\2021\121060\CAD\Design\121060-SWM.dwg, SWM(POST), Mar 28, 2025 - 5:11pm, lcobran

PLAN A1.DWG - 841mmx594mm