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PROPOSED WAREHOUSE DEVELOPMENT
480 & 486 CITIGATE DRIVE

Site Servicing and Stormwater Management Report

Prepared For: ROSEFELLOW

PROPOSED WAREHOUSE DEVELOPMENT

480 & 486 CITIGATE DRIVE

OTTAWA, ONTARIO

SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared By:

NOVATECH
Suite 200, 240 Michael Cowpland Drive
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K2M 1P6

Issued: May 03, 2023
Revised: October 6, 2023

Novatech File: 119123
Ref: R-2023-070

October 6, 2023

City of Ottawa
Planning Infrastructure and Economic Development Department
110 Laurier Avenue West, 4th Floor
Ottawa, ON
K1P 1J1

Attention: **Kelby Lodoen Unseth**

Reference: **Proposed Warehouse Development**
480 & 486 Citigate Drive, Ottawa
Site Servicing and Stormwater Management Report
Our File No.: 119123

Please find enclosed the revised 'Site Servicing and Stormwater Management Report' dated October 6, 2023, for the above noted project. This report is prepared in support of the Site Plan Application and is hereby submitted for review and approval.

Should you have any questions or comments, please do not hesitate to contact us.

Yours truly,

NOVATECH

Drew Blair, P.Eng.
Senior Project Manager

cc: Julian Nini, Rosefellow

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1.0 INTRODUCTION

Novatech has been retained to prepare a Site Servicing and Stormwater Management Report for the proposed development located at 480 and 486 Citigate Drive within Ottawa, Ontario. This report is submitted in support of a Site Plan Application for the proposed development.

Figure 1 – Key Plan shows the site location in respect to the CitiGate Corporate Campus.

This report outlines the site sanitary and water servicing, along with the proposed storm drainage and stormwater management strategy for the proposed development.

1.1 Existing Conditions

The total site area is approximately 6.26 hectares in size and is located within the CitiGate 416 Corporate Campus development southeast of the Highway 416 and Strandherd Drive interchange. Within the CitiGate development, the subject site is located west of the Dealership Drive and CitiGate Drive intersection. The site is bounded by undeveloped lands to the north and south, CitiGate Drive to the east, and Highway 416 to the west. The topography of the site slopes downwards from west to east from Highway 416 to CitiGate Drive.

Figure 2 – Existing Conditions Plan highlights the site's existing conditions.

It should be noted that the CitiGate development has been designed, approved, and constructed to provide sanitary, storm and water servicing including stormwater management for the subject site.

1.2 Proposed Development

The proposed development consists of two (2) large warehouses (Building A (480 Citigate Dr.) and Building B (486 Citigate Dr.)), associated truck and trailer parking, and surface parking lots. The proposed warehouse buildings cover approximately 3.00 hectares of the 6.26-hectare site. Access to the site will be provided by three (3) entrances; the first from Dealership Drive, the second at the northeastern portion of the site to CitiGate Drive, and the third from the Building A parking lot to the midpoint on CitiGate Drive.

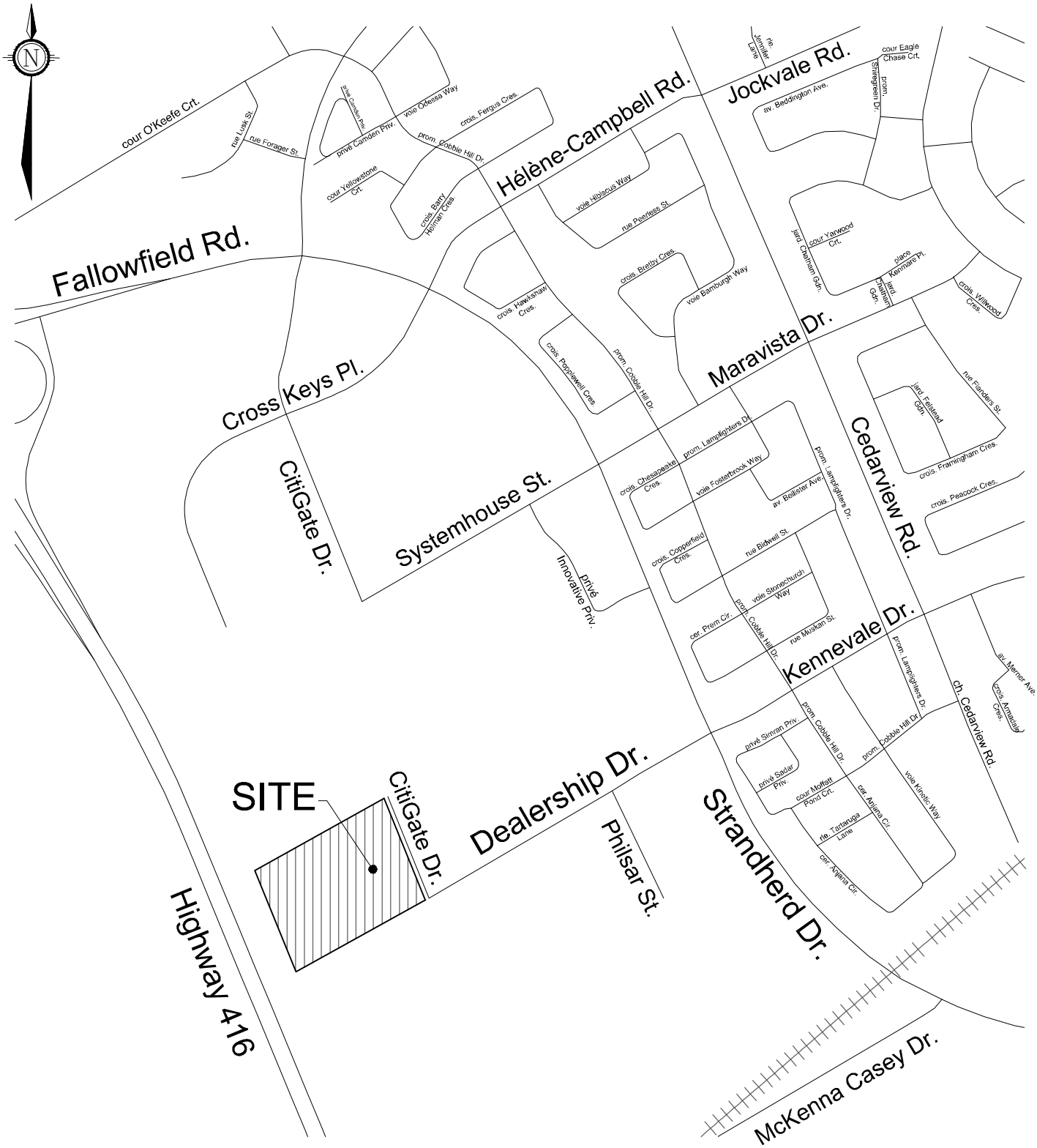
Figure 3 – Concept Plan presents the proposed warehouse development.

This report should be read in conjunction with the following engineering drawing set which can be found in **Appendix F**:

119123-NLD	Notes, Legends, and Details
119123-ESC	Erosion and Sediment Control Plan
119123-GP1	General Plan of Services
119123-GP2	General Plan of Services
119123-GR1	Grading Plan
119123-GR2	Grading Plan
119123-SWM	Post-Development Stormwater Management Plan

1.3 Site Design and Constraints

As indicated previously, the subject site is part of the CitiGate 416 Corporate Campus development. Design criteria and information for the overall development is provided in the approved report *'CitiGate 416 Corporate Campus – Detailed Servicing and Stormwater Management Report (Phase 1)'* prepared by Novatech dated January 9, 2015. This site servicing report conforms to design criteria and constraints based on the CitiGate Servicing and Stormwater Management Report for each sewer and watermain system. Design criteria and constraints for each system are discussed in more detail in the appropriate sections of this report.



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480 & 486 CITIGATE DRIVE

KEY PLAN

SCALE: NOT TO SCALE

DATE: OCT 2023 | JOB: 119123 | FIGURE: FIGURE 1

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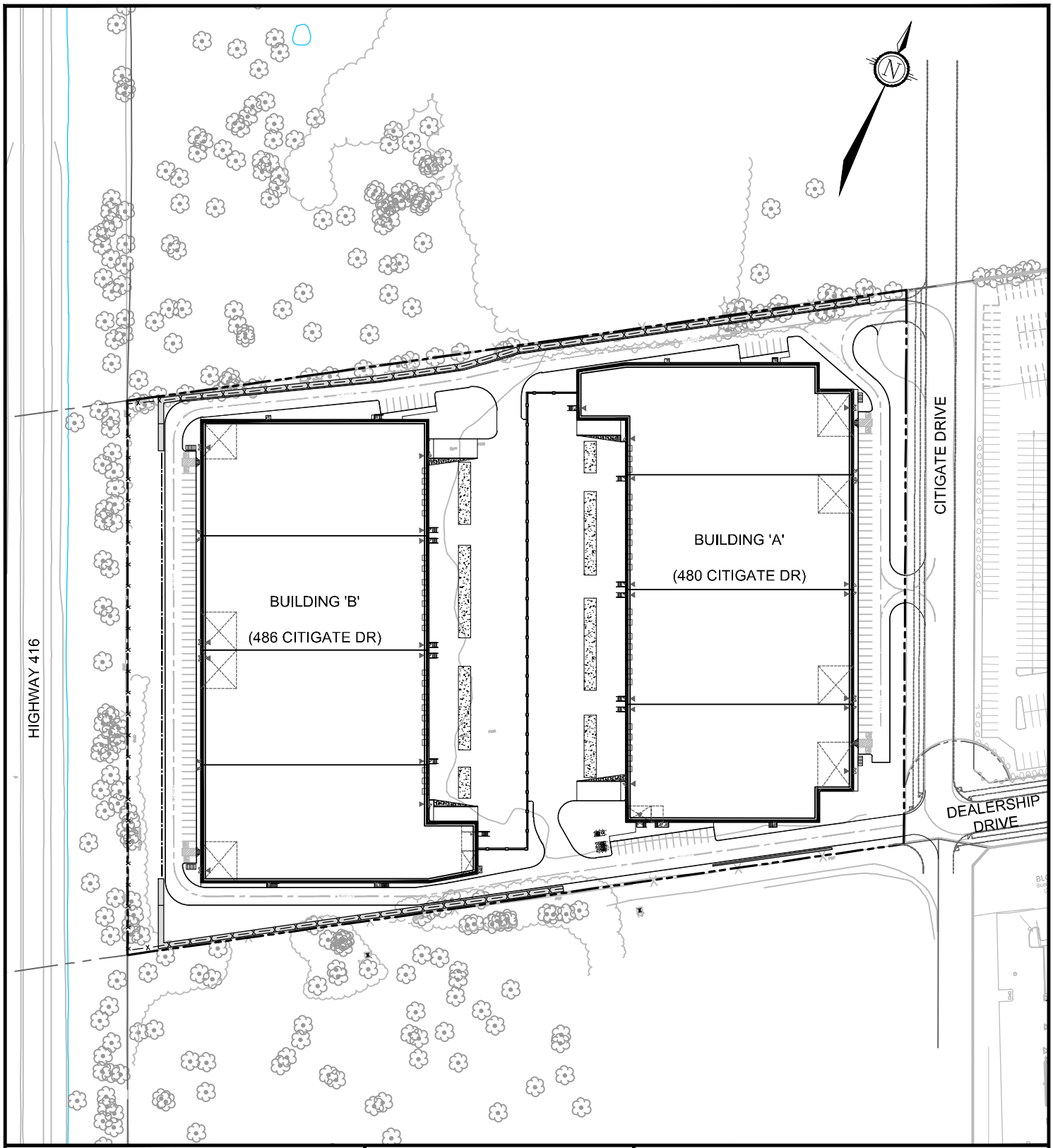
480 & 486 CITIGATE DRIVE

EXISTING CONDITIONS PLAN

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE OCT 2023 | JOB 119123 | FIGURE FIGURE 2



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480 & 486 CITIGATE DRIVE

CONCEPT PLAN

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE OCT 2023 | JOB 119123 | FIGURE FIGURE 3

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1.4 Geotechnical Investigation

The report titled '*Geotechnical Investigation – Proposed Commercial Development, 575 Dealership Drive'* prepared by Paterson Group Rev.#2 dated October 10, 2023, provides geotechnical recommendations for the proposed development. A summary of the geotechnical investigation's findings are as follows:

- The ground surface across the site slopes gradually upwards from east to west from an approximate geodetic elevation of 97m to 109m.
- The site consists of a thin layer of topsoil underlain by a fill layer of silty sand to sandy silt with gravel, cobbles, and boulders. The thickness of the fill layer ranges between 0.5m to 1.8m.
- The eastern portion of the site is underlain by a hard brown deposit of silty clay which is underlain by a compact to very dense glacial till deposit.
- Bedrock information is based on available geological mapping of the site's location. The bedrock consists of interbedded limestone and dolomite of the Gull River formation with overburden drift thickness of 1m to 15m.
- Long-term groundwater levels are estimated to be at depths of 1.1m to 4.5m below existing grade.
- A permissible grade raise restriction of 2.0m is recommended for the site.

The report provides engineering guidelines based on Paterson Group's interpretation of the geotechnical information and project requirements. Refer to the Geotechnical Investigation for complete details.

1.5 Consultations and Approvals

The proposed site plan was presented at a pre-consultation meeting with the City of Ottawa on July 12, 2022. Notes from the meeting were received and incorporated into the site plan submission. The pre-consultation notes are included in **Appendix A**.

As part of the site plan approval process, the Rideau Valley Conservation Authority (RVCA) will be included in the circulation by the City of Ottawa for review and comments. Clearance from the RVCA will be required as part of the site plan approval process.

Following site plan approval, an Environmental Compliance Approval (ECA) application may be submitted for approval (if required) to the Ministry of the Environment, Conservation and Parks (MECP). An ECA may be required as the subject site is zoned as an industrial development and may not qualify for an ECA exemption. The ECA requirement to be reviewed with the City.

1.6 Background Reports

This report provides information on the considerations and approach by which Novatech has designed and evaluated the proposed servicing and stormwater management strategies. This report should be read in conjunction with the following:

- CitiGate 416 Corporate Campus Detailed Servicing and Stormwater Management Report (Phase 1), prepared by Novatech revised date January 9, 2015.
- Geotechnical Investigation, Proposed Commercial Development, 575 Dealership Drive, Ottawa, ON, Report PG6514-1 Revision 2, prepared by Paterson Group dated October 10, 2023.

2.0 WATER SERVICING

2.1 Introduction

The municipal watermain network for the general area surrounding the proposed development was designed as part of the CitiGate 416 Corporate Campus development. The water distribution system for the sites located on Dealership Drive are fed by an existing 250mm dia. watermain that connects to the 400mm dia. watermain within Strandherd Drive. There is an existing 250mm dia. watermain extended north on CitiGate Drive adjacent to the site. Currently, the watermain within CitiGate Drive is a dead-end run with multiple service stubs leading to the subject site.

2.2 Proposed Watermain System

Water servicing for the proposed development includes on-site watermain installation. A 250mm dia. watermain will be extended on-site from Dealership Drive and a 200mm dia. watermain will be extended on-site from Citigate Drive and connect to the proposed 250mm dia. watermain creating a looped system for redundancy. Proposed on-site 200mm and 250mm dia. watermains will connect to the existing 200mm dia. watermain service stub at the northeast entrance on CitiGate Drive and to the 250mm dia. service stub at the southeast entrance on Dealership Drive, respectively.

Building A will be serviced directly with 50mm dia. watermain connecting to an extension of the existing 200mm dia. service stub in the middle of CitiGate Drive.

Refer to **Figure 4** – Watermain Network Plan for details.

There are three (3) proposed on-site fire hydrants to service the subject site. Additionally, there are three (3) existing hydrants northeast of the Subject Site on CitiGate Drive. The location and details of the proposed hydrants are illustrated on the drawings **119123-GP1** and **119123-GP2** in **Appendix F**. The combination of the proposed and existing hydrants will be sufficient to service the 480 and 486 Citigate Drive development based on a 150m radius from each hydrant as shown on **Figure 5** – Hydrant Coverage Plan. Buildings A and B will both be provided with sprinklers and supplied with fire department (siamese) connections.

2.2.1 Proposed Domestic Water Demands

Design Criteria from the City of Ottawa Water Distribution Guidelines and Section 8 of the Ontario Building Code were used to calculate the theoretical water demands for the proposed development. The demand calculations are based on flow requirements from the proposed different uses on site.

The water demand calculations for the proposed development are calculated based on the following criteria:

- Industrial Water Demand
  - Per each water closet = 950L/day
  - Per each loading bay = 150L/day (each)
- Commercial Office Water Demand
  - Per each 9.3m^2 floor space = 75L/day
- Peaking Factor
  - Max Day = 1.5 x Avg. Day
  - Peak Hour = 1.8 x Max. Day

It is recognised that the City of Ottawa recommends using the Fire Underwriters Survey (FUS) to calculate fire flow demands for proposed site plans. For sites that consist of very large warehouse buildings that are constructed of non-combustible materials, the FUS fire flow calculations are

LEGEND

- SITE BOUNDARY
- 300mmØ — EXISTING WATERMAIN AND DIAMETER
- 300mmØ — PROPOSED WATERMAIN AND DIAMETER

CONNECTION TO
200mmØ WATERMAIN

CONNECTION TO
200mmØ WATERMAIN

CONNECTION TO
250mmØ WATERMAIN

200mmØ
200mmØ
200mmØ
200mmØ
200mmØ
50mmØ
250mmØ
250mmØ
250mmØ
250mmØ
250mmØ

CITIGATE DRIVE

DEALERSHIP DRIVE

HIGHWAY 416

BUILDING 'A'
480 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 98.70 m
USF = 96.67 m

BUILDING 'B'
486 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 104.40 m
MECH. ROOM FFE = 100.00 m
USF = 102.37 m

BLOCK 11
Business Park
(2.72 ha)

BLOCK 10
Business Park
(2.18 ha)

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480 & 486 CITIGATE DRIVE

WATERMAIN NETWORK PLAN

SCALE 1 : 1500 (0, 15, 30, 45, 60)

DATE OCT 2023 | JOB 122151 | FIGURE FIGURE 4

LEGEND

- H3 — PROPOSED FIRE HYDRANT
- E2 — EXISTING FIRE HYDRANT
- 75m RADIUS COVERAGE
- 150m RADIUS COVERAGE

H3 H2 H1 E1 E2 E3 E4

BUILDING 'A'
486 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 96,70 m
USF = 90,07 m

BUILDING 'B'
486 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 101,50 m
MECH. ROOM FFE = 100,00 m
USF = 100,07 m²

CITIGATE DRIVE

DEALERSHIP DRIVE

BLOCK 11
Business Park
(2.72 ha)

BLOCK 10
Business Park
(2.18 ha)

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480 & 486 CITIGATE DRIVE

HYDRANT COVERAGE PLAN

SCALE 1 : 1500 (0, 15, 30, 45, 60)

DATE OCT 2023 | JOB 119123 | FIGURE FIGURE 5

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very conservative and result in large fire flow demands (greater than 300 L/s) that are unreasonable. Fire flows of this magnitude are typically not acceptable to the city. To determine a more realistic and attainable fire flow, the client has retained a fire consultant (Superior Sprinkler Co. Ltd.) to analyze the sprinkler system for each building within the proposed development. In the sprinkler consultant's report, it is determined that a maximum fire flow of 150 L/s is required for Buildings A and B based on information provided by the architect. The hydraulic analysis for the proposed development has been completed based on the fire flow provided by the fire consultant (150 L/s). Reports from the fire consultant are included in **Appendix B**.

The domestic water demands and fire flow for the proposed development are summarized in **Table 2.1** below.

Table 2.1: Domestic Water Demand Summary

Proposed Use	Ave. Daily Demand (L/s)	Max. Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire flow (L/s)
Building A				
Industrial Flows	0.26	0.39	0.70	150
Commercial Flows	0.08	0.13	0.23	
Sub-Total	0.34	0.52	0.93	
Building B				
Industrial Flows	0.26	0.39	0.70	150
Commercial Flows	0.08	0.12	0.22	
Sub-Total	0.34	0.51	0.92	
Total Domestic Demands	**0.68**	**1.03**	**2.02**	**150 (Max)**

2.3 Boundary Conditions and Hydraulic Analysis

The boundary conditions provided by the City of Ottawa are specific to the southeastern connection point to the 250mm diameter watermain in Dealership Drive. These boundary conditions were determined based on the proposed domestic water demands as shown in **Table 2.1**. Municipal watermain boundary conditions provided by the City of Ottawa can be found in **Appendix B**.

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:

- Normal operating pressures are to range between 345 kPa (50 psi) and 483 kPa (70 psi) under Max Day demands.
- Minimum system pressures are to be greater than 276 kPa (40 psi) under Peak Hour demands.
- Minimum system pressures are to be greater than 140 kPa (20 psi) under Max Day + Fire flow demands.

The hydraulic model EPANET was used to analyze the performance of the proposed watermain configuration for three (3) theoretical conditions:

- Maximum HGL
- Peak Hour
- Maximum Day + Fire Flow Demand (150 L/s)

A schematic representation of the hydraulic network depicts the node and pipe numbers used in the model. The model is based on hydraulic boundary conditions provided by the City of Ottawa.

The model indicates that adequate pressure will exist throughout the watermain system under the specified design conditions. Refer to **Appendix B** for the hydraulic modeling schematic and modeling results.

The hydraulic requirements and hydraulic model results are summarized in **Table 2.2** below.

Table 2.2: Hydraulic Model Summary

Operating Conditions	Demand (L/s)	Fire Flow (L/s)	Min. / Max. Allowable Pressure (kPa/psi)	Min. / Max. Pressure (kPa/psi)
High Pressure (Max HGL)	0.68	N/A	690/80 (Max)	569.0 / 82.5 (Max)
Peak Hour	2.02	N/A	276/40 (Min)	420.8 / 61.0 (Min)
Max Daily + Fire Flow Demand (Building B)	1.03	150	138/20 (Min)	184.4 / 26.7 (Min)

The proposed water distribution system was checked for high pressures during average daily demand using a hydraulic boundary condition provided by the City of Ottawa. The model indicated that pressures above 550 kPa (80 psi) exist within the site. Therefore, pressure reducing valves will be required for each building. A note has been added to the drawings located in **Appendix F** to indicate pressure reducing valves are required.

The downstream system was checked for headloss, and the results are provided in **Appendix B**.

The model indicates that the municipal watermain within Dealership Drive and CitiGate Drive along with the on-site watermain will provide adequate fire flows and system pressures to service the subject site under each operating condition.

It should be noted that the existing watermain within CitiGate Drive adjacent to the proposed development will be extended in the future by the adjacent property at 444 CitiGate Drive and ultimately connect to the north at the CitiGate Drive and Systemhouse Street intersection. As this future connection will provide a looped system to Dealership Drive, it is anticipated that watermain system pressures within the proposed development may improve as a direct result of the future connection.

3.0 SANITARY SERVICING

3.1 Introduction

The Subject Site is within the CitiGate 416 Corporate Campus that designed the sanitary wastewater outlet for the area. The sanitary flows ultimately outlet to the South Nepean Collector (SNC) within Strandherd Drive. The CitiGate Detailed Servicing and Stormwater Management Report (Phase 1) dated January 9, 2015, outlined allowable release rates for the subject site within its design. Sanitary drainage plans and design sheets from the CitiGate 416 Corporate Campus servicing report are included in **Appendix C**.

For the purposes of this report, sanitary flow analysis will focus on the subject site and the contributing flows to the overall CitiGate development.

The proposed development will be serviced by 250mm dia. gravity on-site sanitary sewers. Buildings A and B will have separate service connections, ultimately outletting to existing sanitary sewers within Dealership Drive.

- Building A 250mm dia. sanitary service will connect to the existing 250mm dia. sanitary service stub and 250mm sanitary sewer on CitiGate Drive.

- Building B sanitary flows will be directed by 250mm dia. sewers to connect to the existing 300mm dia. sanitary sewer at the CitiGate Drive and Dealership Drive intersection.

Refer to **Figure 6** – Sanitary Sewer Alignment for details.

3.2 Proposed On-Site Sanitary Servicing

The proposed sanitary servicing for 480 and 486 Citigate Drive follows the sanitary servicing design provided in the *'CitiGate 416 Corporate Campus – Detailed Servicing and Stormwater Management Report (Phase 1)'* prepared by Novatech (January 9, 2015) and conforms to the recommendations from the *Ottawa Sewer Design Guidelines (October 2012)* and technical bulletin *ISTB-2018-01* (March 2018).

3.2.1 Proposed Peak Sanitary Flows

Design Criteria

The total theoretical peak sanitary flow from the proposed development was calculated based on the following criteria from Section 4 of the City of Ottawa Sewer Design Guidelines and Section 8 of the Ontario Building Code:

- Site Area = 6.26 ha
- Industrial Sanitary Flow
  - Per each water closet = 950L/day
  - Per each loading bay = 150L/day (each)
- Commercial Office Water Demand
  - Per each water closet = 950L/day
- Commercial Peaking Factor = 1.5
- Industrial Peak Factor = per MOE/City of Ottawa graph (included in **Appendix C**)
- Infiltration Rate = 0.33 L/s/ha
- Minimum Velocity = 0.6 m/s
- Manning's n = 0.013

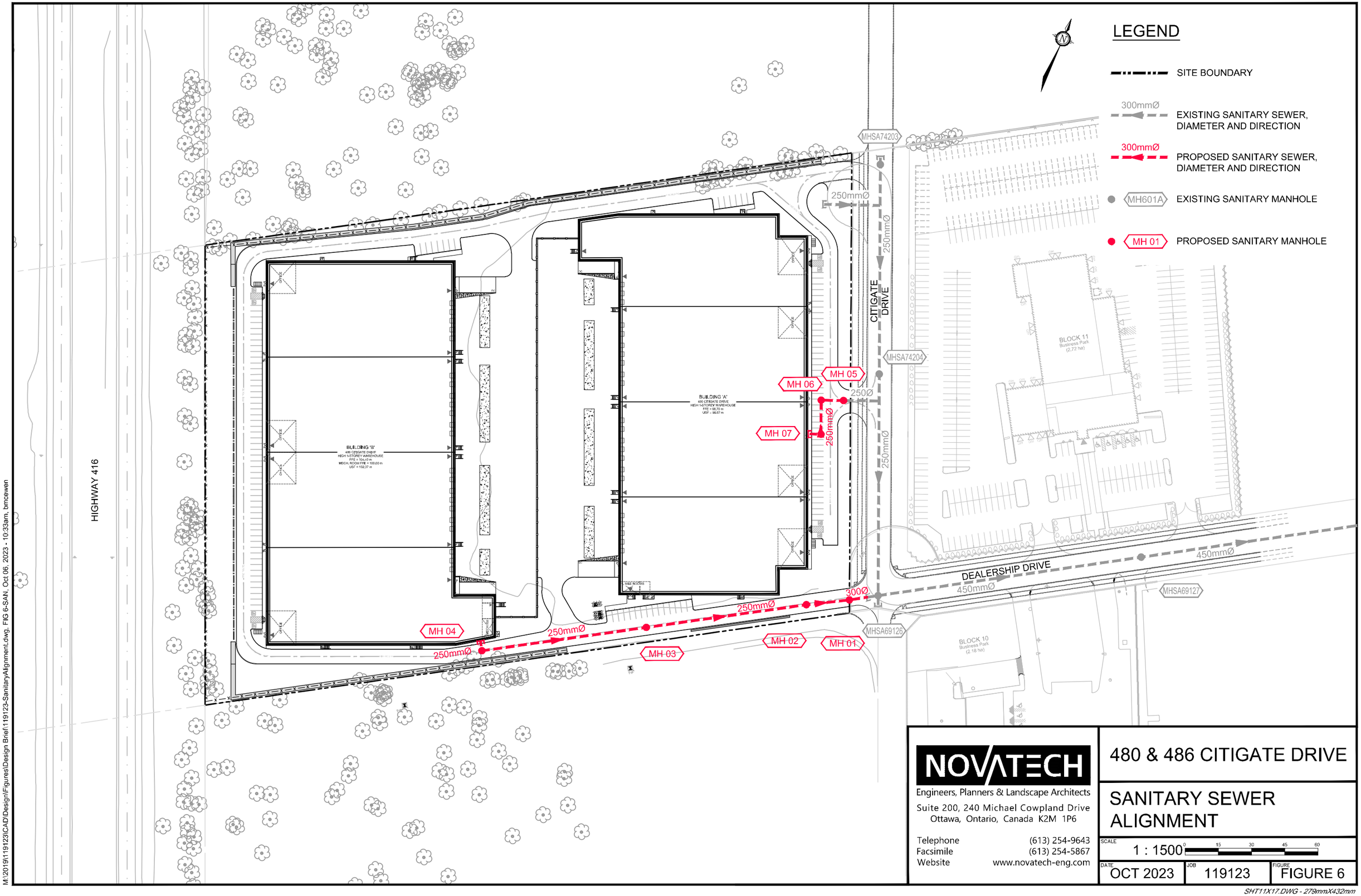
Sanitary Flows

The proposed sanitary peak flows are provided in **Table 3.1** below.

Table 3.1: Proposed Sanitary Peak Flow Summary

Proposed Use	Unit Count	Peaking Factor (1)	Peak Design Flow (L/s)
Building A			
No. Loading Docks/Washrooms	23 / 20	4.6	1.20
Office Space (m^2)	910	1.5	0.13
Infiltration (ha)	2.09	-	0.69
Building A Total	-	-	**2.01**
Building B			
No. Loading Docks/Washrooms	23 / 20	4.6	1.20
Office Space (m^2)	850	1.5	0.12
Infiltration (ha)	4.17	-	1.38
Building B Total	-	-	**2.69**

(1) Peaking Factor for industrial and commercial areas as per Section 3.2.1



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480 & 486 CITIGATE DRIVE

SANITARY SEWER ALIGNMENT

SCALE 1 : 1500 (0, 15, 30, 45, 60)

DATE OCT 2023 | JOB 119123 | FIGURE FIGURE 6

SHT11X17.DWG - 279mmX432mm

As shown in **Table 3.1**, Buildings A and B will produce peak design flows of 2.01 L/s and 2.69 L/s, respectively for a total design flow of **4.70 L/s**. The buildings' sanitary flows ultimately outlet to the existing maintenance hole MH501 on Dealership Drive. The light industrial peaking factor has been calculated to be 4.6 based on a total site area of 6.26 ha using the MOE/City of Ottawa Appendix 4-B.1 graph included in **Appendix C**.

Refer to **Appendix C** for sanitary sewer design sheets and the sanitary drainage area plan of the subject site.

3.3 CitiGate Sanitary Flow Allotment

In the report titled '*CitiGate 416 Corporate Campus – Detailed Servicing and Stormwater Management Report'* (January 9, 2015), sanitary peak flow allotments are outlined for future sites within the overall CitiGate development. The CitiGate drainage area plan and sanitary design sheets assigned the subject site to drainage area B-1 with a drainage area of 27.06 ha and an allowable peak design flow of 31.07 L/s.

The proposed sanitary peak flows in comparison to the allowable sanitary peak flows from the CitiGate 416 Corporate Campus are shown in **Table 3.2** below.

Table 3.2: Allowable and Proposed Peak Flow Summary

	Sanitary Outlet	Service	Drainage Area	Sanitary Peak Design Flow
Original Giti Gate Allowable Sanitary Flow	Dealership Drive MH501	Drainage Area B-1	27.06 ha	31.07 L/s
Proposed 480 & 486 Citigate Drive Sanitary Flow		Buildings A & B	6.26 ha	4.70 L/s
Allowable vs. Proposed Percentage			**23.1%**	**15.1%**

As indicated in the table above, the calculated proposed sanitary peak flows are significantly less than the CitiGate 416 Corporate Campus allowable peak flows. Since the proposed development is only 6.26 ha it is necessary to compare the allowable versus proposed percentages for the drainage areas and peak design flows. The drainage area and peak design flows for the proposed development are 23.1% and 15.1%, respectively, of the sanitary allotment from the CitiGate 416 Corporate Campus. The sanitary flow percentage is lower than the drainage area percentage, that indicates the proposed sanitary flow for this site is less than the allowable amount determined in the overall CitiGate Servicing Report (2015) and should have no net negative affect on the downstream sanitary sewer system.

As a result, a 250mm dia. sanitary sewer at a minimum slope of 0.24% has a full flow conveyance capacity of 30.4 L/s and will be able to service the proposed development.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

The 480 and 486 Citigate Drive development will be serviced by on-site gravity storm sewer system with pipe sizes ranging from 200mm dia. catchbasin leads up to 1200mm dia. storage pipes. Buildings A and B will have separate services with different outlets. The Building A 300mm dia. storm service will connect to the existing 525mm dia. storm service stub at the mid-point of the east property line which outlets to the existing City of Ottawa storm maintenance hole MHST81658 within CitiGate Drive. The 300mm dia. storm service for Building B will connect to the existing 1350mm dia. storm service stub at the south end of the east property line which outlets to the existing City of Ottawa storm maintenance hole MHST74434 in Dealership Drive located at the intersection with CitiGate Drive. The CitiGate storm sewer system flows east along Dealership Drive and discharges into the existing CitiGate SWM Facility (providing both water

quantity and quality control measures for the business park prior to discharging into the O'Keefe Drain) approximately 220m east of the subject site. The approach for the stormwater management design for the site is discussed in the subsequent sections of the report.

Refer to **Figure 7** – Storm Sewer Alignment for details.

4.1 Stormwater Management Criteria and Objectives

The proposed storm servicing and stormwater management for the 480 and 486 Citigate Drive development follows the design guidelines provided in the *'CitiGate 416 Corporate Campus – Detailed Servicing and Stormwater Management Report (Phase 1)'* dated January 9, 2015, prepared by Novatech and conforms to RVCA criteria as well as the City of *Ottawa Sewer Design Guidelines (October 2012)* and technical bulletins *ISTB-2018-01* (March 2018).

The stormwater management (SWM) criteria have been provided during pre-consultation meetings with the City of Ottawa and the RVCA. The SWM criteria and objectives are as follows:

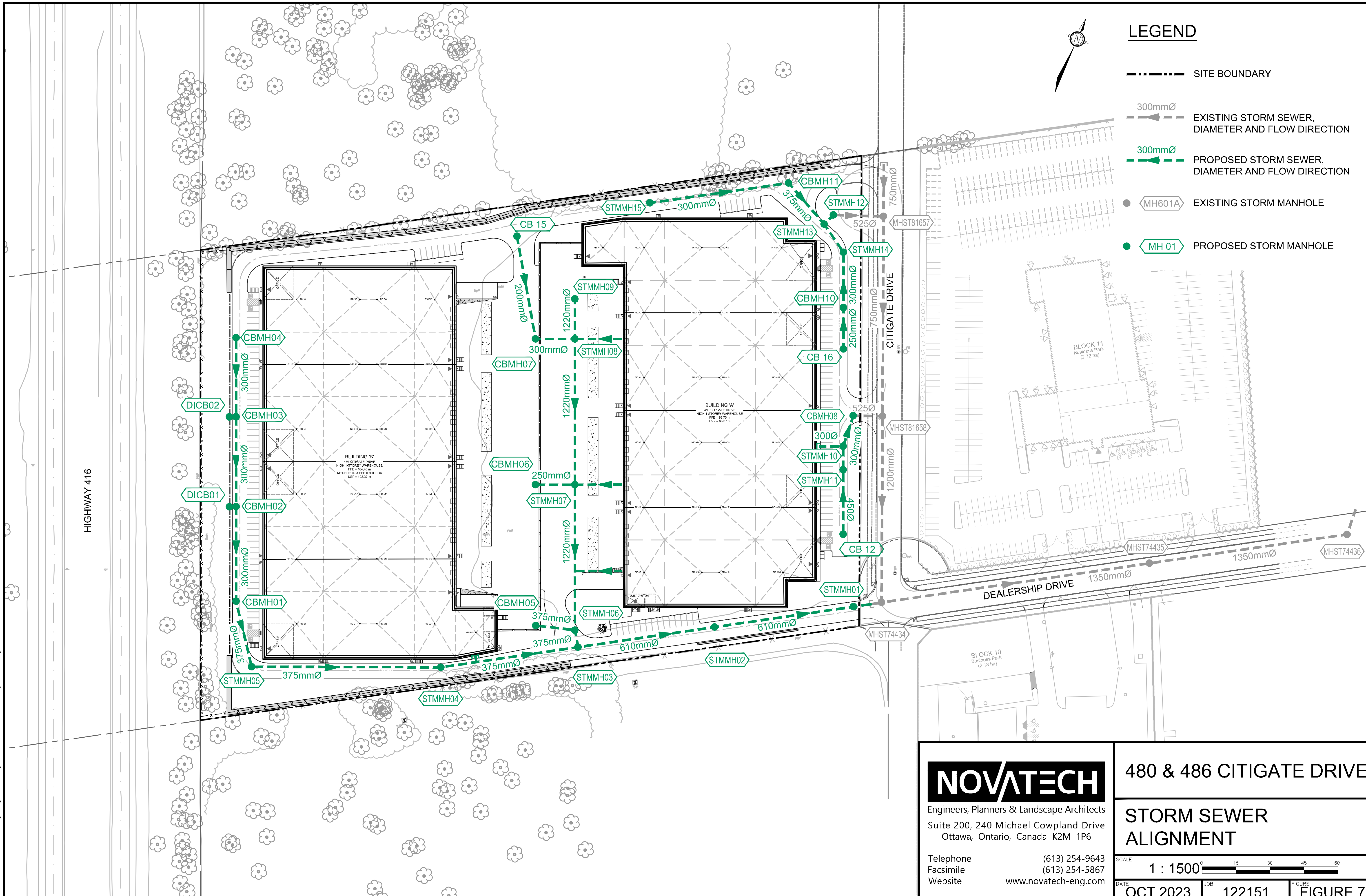
- Allowable release rates and storage requirements for individual sites are to be calculated based on a runoff coefficient of C = 0.80.
- The 5-year peak flow can be released uncontrolled.
- The maximum release rate is not to exceed 120% of the 5-year peak flow for all storms up to and including the 100-year event.
- Ensure no overland flow for all storms up to and including the 100-year event.
- Flows to the storm sewer in excess of the 5-year + 20% storm release rate, up to and including the 100-year storm event, must be detained on-site.
- The 2-year storm or 5-year storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
- A calculated time of concentration (Cannot be less than 10 minutes).
- Quality control objectives to be confirmed with the Rideau Valley Conservation Authority (RVCA).

Refer to **Appendix A** for correspondence from the City of Ottawa.

4.2 Pre-Development Conditions and Allowable Release Rates

In accordance with the CitiGate Detailed Servicing and SWM Report (Phase 1), allowable release rates and storage requirements for individual site developments are to be calculated as based on a runoff coefficient of C=0.80. The anticipated on-site storage should be approximately 100 m^3/ha to sufficiently prevent major system (overland) flows during the 100-year event.

There are currently no on-site stormwater quantity or stormwater quality control measures in place on the subject site. The uncontrolled pre-development flows from the 6.26 ha site have been calculated using the Rational Method to be approximately 257.9 L/s during the 2-year design event, 349.9 L/s during the 5-year design event and 749.7 L/s during the 100-year design event. The allowable release rate for the 6.04 ha site, as specified in the CitiGate Detailed Servicing and SWM Report (Phase 1), was calculated to be 1,399.6 L/s for the 5-year storm event, and 1,679.5 L/s for the 100-year storm event. There is an off-site tributary area west of the subject site that currently drains through the property (Area identified as OS-1). Stormwater flows from OS-1 will need to be captured and conveyed through the proposed on-site storm sewer system at rates not exceeding the existing flows of 12.7 L/s (5-yr) and 27.3 L/s (100-yr). These allowable release rates sum to a total allowable release rate of 1,412.4 L/s during the 1:5-year event and 1,706.8 L/s during the 1:100-year event. Refer to **Appendix D** for detailed calculations.



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480 & 486 CITIGATE DRIVE

STORM SEWER ALIGNMENT

SCALE 1 : 1500 (0 15 30 45 60)

DATE OCT 2023 | JOB 122151 | FIGURE FIGURE 7

SHT11X17.DWG - 279mmX432mm

4.3 Post-Development Conditions

The proposed development will be serviced by new on-site storm sewers connecting to the two existing 525mm dia. concrete service stubs off CitiGate Drive and extending the existing 1350mm dia. concrete service stub in Dealership Drive. Stormwater runoff from the site will be directed to various catchbasins located within the paved drive aisles and depressed loading docks. To mitigate the stormwater related impacts due to the increase in imperviousness of the site, stormwater runoff will be attenuated using control flow drains on the proposed building roofs as well as two separate inlet control devices (ICD) within the on-site storm sewer system servicing the loading dock areas and a portion of the parking lot area in front of Building A. Flows will be controlled for storms up to and including the 100-year design event. Due to the existing grades, runoff from a minor portion of the perimeter of the site along CitiGate Drive will sheet drain uncontrolled off the eastern side of the site to the CitiGate Drive right-of-way (ROW).

4.3.1 Area A-0: Un-controlled Direct Runoff

The uncontrolled post-development direct runoff flow from this sub-catchment area was calculated using the Rational Method to be approximately 10.9 L/s during the 2-year design event, 14.8 L/s during the 5-year design event and 29.8 L/s during the 100-year design event. Refer to **Appendix D** for detailed SWM calculations.

4.3.2 Area A-1: Un-controlled Flow from Building 'B' Parking + OS-1

The uncontrolled post-development flow from this sub-catchment area was calculated using the Rational Method to be approximately 63.6 L/s during the 2-year design event, 86.3 L/s during the 5-year design event and 171.3 L/s during the 100-year design event. The post-development site flows will be discharged from this area to the existing 1350mm dia. south site service stub off Dealership Drive. Refer to **Appendix D** for detailed SWM calculations.

4.3.3 Area A-2: Un-controlled Flow from the South Drive Aisle

The uncontrolled post-development flow from this sub-catchment area was calculated using the Rational Method to be approximately 69.4 L/s during the 2-year design event, 94.1 L/s during the 5-year design event and 182.4 L/s during the 100-year design event. The post-development site flows will similarly be discharged from this area to the existing 1350mm dia. south site service stub off Dealership Drive. Refer to **Appendix D** for detailed SWM calculations.

4.3.4 Area A-3: Un-controlled Flow from Building 'A' Parking Area

The uncontrolled post-development flow from this sub-catchment area was calculated using the Rational Method to be approximately 14.4 L/s during the 2-year design event, 19.6 L/s during the 5-year design event and 37.2 L/s during the 100-year design event. The post-development site flows will be discharged from this area to the existing 525mm dia. central site service stub in CitiGate Drive. Refer to **Appendix D** for detailed SWM calculations.

4.3.5 Area A-4: Un-controlled Flow from the North Drive Aisle

The uncontrolled post-development flow from this sub-catchment area was calculated using the Rational Method to be approximately 52.0 L/s during the 2-year design event, 70.5 L/s during the 5-year design event and 135.3 L/s during the 100-year design event. The post-development site flows will be discharged from this area to the existing 525mm dia. north site service stub in CitiGate Drive. Refer to **Appendix D** for detailed SWM calculations.

4.3.6 Area A-5: Controlled Flow from Loading Dock Areas

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of STM MH 06. Stormwater runoff from this sub-catchment area will be

temporarily stored underground within the on-site storm sewer system and on the surface of the depressed loading docks prior to being discharged into the downstream storm sewer system.

Table 4.1 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and the 100-year design events. Refer to **Appendix D** for detailed SWM calculations.

Table 4.1: Stormwater Flows, ICD & Surface Storage

Design Event	Controlled Site Flows from Area A-5					
	ICD	Peak Flow	Ponding Depth/Elev.	Average Flow (50% Q_{peak})	Storage Vol. Required	Storage Provided*
2-Year	plug type w/ 227mm dia. circular orifice centred on outlet pipe	110.7 L/s	0.00 m (95.96 m)	55.4 L/s	136.8 m³	> 680 m³
5-Year		141.1 L/s	0.00 m (96.58 m)	70.6 L/s	190.5 m³	
100-Year		182.4 L/s	0.29 m (97.66 m)	91.2 L/s	435.2 m³	
100-Year (+20%)		184.1 L/s	0.35 m (97.72m)	92.1 L/s	561.2 m³	

* *Storage available to a depth of 0.40m within the loading docks, and 0.60m in the overall system*

As indicated in the table above, this sub-catchment area will provide sufficient storage for the 2-year, 5-year and 100-year design events. The site has been designed to ensure that maximum surface ponding depths will be approximately 0.98m below the finished floor elevation of Building A and 2.28m to 6.68m below the finished floor elevations of Building B during the 100-year+20% stress test.

4.3.7 Area A-6: Controlled Flow from Building 'A' Parking Area

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of STM MH 11. Stormwater runoff from this sub-catchment area will be temporarily stored underground within the on-site storm sewer system and on the surface of the parking area prior to being discharged into the downstream storm sewer system.

Table 4.1 summarizes the post-development design flow from this sub-catchment area as well as the ICD specifications, the anticipated ponding elevations, storage volumes required and storage volume provided for the 2-year, 5-year and the 100-year design events. Refer to **Appendix D** for detailed SWM calculations.

Table 4.1: Stormwater Flows, ICD & Surface Storage

Design Event	Controlled Site Flows from Area A-6					
	ICD	Peak Flow	Ponding Depth/Elev.	Average Flow (50% Q_{peak})	Storage Vol. Required	Storage Provided
2-Year	IPEX Tempest Vortex LMF Model 60 plug type	3.6 L/s	0.00 m (95.80 m)	1.8 L/s	6.6 m³	38.6 m³
5-Year		4.7 L/s	0.00 m (96.75 m)	2.4 L/s	9.0 m³	
100-Year		5.9 L/s	0.20 m (98.00 m)	3.0 L/s	20.3 m³	
100-Year (+20%)		6.0 L/s	0.22 m (98.02m)	3.0 L/s	25.9 m³	

As indicated in the table above, this sub-catchment area will provide sufficient storage for the 2-year, 5-year and 100-year design events. The site has been designed to ensure that maximum

surface ponding depths will be approximately 0.68m below the finished floor elevation of Building A and 1.98m to 6.38m below the finished floor elevations of Building B during the 100-year+20% stress test. The system has been designed to ensure that no surface ponding will occur in the paved parking or drive aisles during the 2-year or the 5-year storm events.

4.3.8 Area R-1: Controlled Flow from Roof of Building A

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ: individual roof drains are to be set either ¼ exposed, ¾ exposed, or fully exposed as indicated in the tables below) prior to being directed to the proposed storm service.

Table 4.2 summarizes the post-development design flows from this sub-catchment area 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 4.2: Building A - Controlled Flow Roof Drains

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID RD-100-A-ADJ (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD A1	1	(3/4 Exposed)	1.26	1.34	0.11	0.13	7.2	15.9	19.5
RD A2 – A7	6	(3/4 Exposed)	1.26	1.34	0.11	0.14	69.0	149.3	163.9
RD A8 – A17	10	(1/4 Exposed)	0.79	0.95	0.11	0.14	149.2	308.8	325.8
RD A18 & A19	2	(1/4 Exposed)	0.79	0.95	0.11	0.15	31.9	65.8	67.9
RD A20	1	(Fully Exposed)	1.34	1.89	0.11	0.14	13.6	27.6	31.5
RD A21 – A24	4	(3/4 Exposed)	1.34	1.58	0.11	0.15	77.2	157.2	160.8
RD A25	1	(Fully Exposed)	1.34	1.89	0.11	0.14	14.8	29.9	33.4
Total Roof	**25**	**-**	**26.3***	**30.9***	**-**	**-**	**363***	**755***	**803***

** Totals represent rounded values*

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

4.3.9 Area R-2: Controlled Flow from Roof of Building B

The post-development flow from this sub-catchment area will be attenuated using Watts adjustable 'Accutrol' control flow roof drains (model number RD-100-A-ADJ: individual roof drains are to be set either, ¼ exposed, ¾ exposed, or fully exposed as indicated in the tables below) prior to being directed to the proposed storm service.

Table 4.3 summarizes the post-development design flows from this sub-catchment area 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 4.3: Building B - Controlled Flow Roof Drains

Roof Drain ID & Drainage Area (ha)	Number of Roof Drains	Watts Roof Drain Model ID RD-100-A-ADJ (Weir Opening)	Controlled Flow per Drain (L/s)		Approximate Ponding Depth Above Drains (m)		Storage Volume Required (m^3)		Max. Storage Available (m^3)
			1:5 Year	1:100 Year	1:5 Year	1:100 Year	1:5 Year	1:100 Year	
RD B1	1	(Fully Exposed)	1.34	1.89	0.11	0.14	18.8	37.9	40.9
RD B2 – B5	4	(3/4 Exposed)	1.34	1.58	0.11	0.15	77.2	157.2	160.8
RD B6	1	(Fully Exposed)	1.34	1.89	0.11	0.14	19.4	39.2	41.9
RD B7 – B16	10	(1/4 Exposed)	0.79	0.95	0.11	0.14	149.2	308.8	325.8
RD B17 & B18	2	(1/4 Exposed)	0.79	0.95	0.11	0.15	31.9	65.8	67.9
RD B19 & B24	2	(1/4 Exposed)	0.79	0.95	0.11	0.15	24.2	52.2	56.3
RD B20 – B23	4	(3/4 Exposed)	1.34	1.58	0.11	0.14	46.0	94.4	109.2
RD B25	1	(Fully Exposed)	1.34	1.58	0.11	0.13	7.7	16.1	20.6
Total Roof	**25**	**-**	**26.7***	**32.1***	**-**	**-**	**374***	**772***	**823***

* *Totals represent rounded values*

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

4.4 Stormwater Management Summary

A stormwater management summary is provided in the **Table 4.4** which outlines pre-development target release rates, post-development release rates, storage requirements and storage provided.

Table 4.4: Stormwater Management Summary

Drainage Area ID	Area (ha)	Pre-Development Allowable Release Rate	Post-Development				
			Release Rate L/s			Max. Storage Requirements (100-year)	Storage Provided
			2-year	5-year	100-year		
Un-Controlled Direct Runoff (A-0)	0.15	5-year 1412.4 L/s	10.9	14.8	29.8	-	-
Un-Controlled Development Flows (A-1, A-2, A-3, A-4)	1.66		199.5	270.5	526.1	-	-
Controlled Development Flows (A-5, A-6)	1.45	100-year 1706.8 L/s	114.3	145.9	188.3	455 m^3	716 m^3
Controlled Roof Flows (R-1, R-2)	3.0		46.2	53.0	63.0	1527 m^3	1626 m^3
Overall Development	**6.26**		**370.9**	**484.2**	**807.2**	**1982 m^3**	**2342 m^3**

The 2-year and 5-year storm event storage requirements are achieved below the lowest surface grade elevations of the stormwater storage areas which ensures there is no surface ponding within the site's paved parking lots, drive aisles and truck loading bays.

4.5 Stormwater Temperature Mitigation

The CitiGate 416 Corporate Campus Detailed Servicing and Stormwater Management Report (2015) states "*the O'Keefe Drain has been designated as "cool-water fish habitat" … To ensure that the O'Keefe Drain remains a hospitable fish environment, any increase in the water temperature in the drain should be kept to a minimum"*. As the ultimate stormwater outlet for the subject site, after the stormwater management pond, is the O'Keefe Drain, temperature mitigation practices should be implemented for the proposed development.

Surface ponding on the asphalt is susceptible to an increase in stormwater temperature which can be minimized by storing stormwater in the underground sewer system. To mitigate the stormwater temperature increase prior to leaving the subject site, the 2-year and 5-years storm events are captured underground in the proposed storm sewer system with no surface ponding.

The roofs of Buildings A and B are designed to be light-colored. Stormwater collected and stored on the buildings' roofs are exposed to sunlight warming and by providing a light-colored roof, there is reduced sunlight warming resulting in lower stormwater temperatures.

5.0 EROSION AND SEDIMENT CONTROL

Temporary erosion and sediment control measures will be implemented on-site during construction in accordance with the Best Management Practices for Erosion and Sediment Control. This includes the following temporary measures:

- Filter socks (catchbasin inserts) will be placed in existing and proposed catchbasins and catchbasin manholes, and will remain in place until vegetation has been established and construction is completed;
- Silt fencing will be placed along the surrounding construction limits;
- Mud mats will be installed at the site entrances;
- Strawbale or rock check dams will be installed in swales and ditches;
- The contractor will be required to perform regular street sweeping and cleaning as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site;

Erosion and sediment control measures should be inspected daily and after every rain event to determine maintenance, repair, or replacement requirements. Sediments or granulars that enter site sewers shall be removed immediately by the contractor. These measures will be implemented prior to the commencement of construction and maintained in good order until vegetation has been established. Refer to the Erosion and Sediment Control Plan (119123-ESC) for additional information.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This Site Servicing and Stormwater Management Report has evaluated the servicing (water, sanitary and storm servicing) and stormwater management for the proposed warehouse development at 480 and 486 Citigate Drive within the CitiGate 416 Corporate Campus.

The principal findings and conclusions of this report are as follows:

- The proposed warehouse development will be serviced by municipal watermain, sanitary and storm sewers located in Dealership Drive and CitiGate Drive.
- Buildings A and B will be sprinklered and supplied with fire department (Siamese) connections. The Siamese connections will be located within 45m of a nearby fire hydrant. The proposed development includes three (3) proposed on-site fire hydrants.
- Proposed 200mm and 250mm dia. on-site watermain will require two (2) connections to existing watermain servicing stubs on CitiGate Drive. An additional watermain is required to service building A connecting directly to an existing servicing stub on CitiGate Drive.
- The sanitary sewer design servicing the proposed warehouse buildings conforms to the allowable release rates outlined in the CitiGate 416 Corporate Campus sanitary design. Buildings A and B will both ultimately discharge to the existing sanitary sewers on Dealership Drive.
- The proposed development includes various methods of controlled and uncontrolled conveyance of stormwater.
    - Storm sewers (minor system) in the parking lots for the two (2) warehouses have been designed to convey the uncontrolled 5-year peak flow using the rational method.
    - The loading bays between the warehouses and the controlled portion of the Building A paved parking area will include controlled oversized storm sewers with adequate storage to prevent surface ponding during the 2-year and 5-year storm events.
    - Flows from the warehouse roofs will be attenuated by controlled flow roof drains outletting into the minor storm sewer system.
    - Release rates from the proposed development conform to the allowable release rates outlined in the CitiGate 416 Corporate Campus stormwater management design.
- Stormwater temperature mitigation measures will be implemented to protect the O'Keefe Drain fish environment.
- Temporary erosion and sediment control measures will be implemented on-site during construction.

7.0 CLOSURE

The preceding report is respectfully submitted for review and approval in support of the Site Plan Application for the Proposed Warehouse Development at 480 and 486 Citigate Drive. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:

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Land Development

Stephen Matthews, B.A.(Env)
Senior Design Technologist

Reviewed by:

Drew Blair, P.Eng.
Senior Project Manager

Appendix A
Correspondence

Pre-consultation Notes

Meeting: Tuesday July 12, 2022 @ 3pm

City Attendees:

Kelby Lodoen Unseth – Planner
Eric Harrold – Infrastructure Project Manager
Sami Rehman – Environmental Planner
Ann O'Connor – Urban Design
Jeannette Krabicka – Parks and Facilities Planning

Location:

575 Dealership Drive

Property Overview and Discussion:

The property is split zoned IP[1219] H(33)-h and IP[2545] H(33)-h, (Business Park Industrial Zone, Urban Exceptions 1219 and 2545, Maximum Hight 33m, with holding provision.

Purpose of the Zone The purpose of the IP – Business Park Industrial Zone is to:

1) accommodate mixed office, office-type uses and low impact, light industrial uses in a business park setting, in accordance with the Enterprise Area designations of the Official Plan or, the Employment Area or the General Urban Area designation where applicable;
2) allow in certain Enterprise or General Urban Areas, a variety of complementary uses such as recreational, health and fitness uses and service commercial (e.g. convenience store, personal service business, restaurant, automobile service station and gas bar), occupying small sites as individual occupancies or in groupings as part of a small plaza, to serve the employees of the Enterprise, Employment or General Urban Area, the general public in the immediate vicinity, and passing traffic;
3) prohibit retail uses in areas designated as Enterprise Area but allow limited sample and showroom space that is secondary and subordinate to the primary use of buildings for the manufacturing or warehousing of the product;
4) prohibit uses which are likely to generate noise, fumes, odours, or other similar obnoxious impacts, or are hazardous; and
5) provide development standards that would ensure compatibility between uses and would minimize the negative impact of the uses on adjacent non-industrial areas.

Pre-consultation Notes

Meeting: Tuesday July 12, 2022 @ 3pm

Urban Exceptions:

I Exception Number	II Applicable Zones	Exception Provisions		
		III Additional Land Uses Permitted	IV Land Uses Prohibited	V Provisions
1219 (By-law 2019-449) (By-law 2019-16) (By-law 2018-334) (By-law 2009-164) (By-law 2008-462)	IP[1219] IP[1219] H(11)	- snow disposal facility on lot 16, concession 4 the following uses limited to 4451 Fallowfield: - automobile service station - car wash - drive through facility - gas bar -place of worship	all uses in subsection 205(1) except: - day care - hotel - light industrial uses - medical office - office - place of assembly -research and development centre -technology industry all uses in subsection 205(2) except: - bank - bank machine - instructional facility - personal service business - recreational and athletic facility - restaurant, full service - restaurant, take out -place of worship -all permitted uses until the 'h' symbol has been removed	- minimum lot area of 10,000 m² and minimum lot width of 100 m -full-service restaurant, take-out restaurant, personal service business and recreational and athletic facility are permitted only within a large complex containing a research and development centre, technology industry, light industrial use, office, bank, instructional facility, hotel or place of assembly. -the 'h' symbol will not be removed until the following documents have been submitted to and approved by the City: i A transportation impact study ii A servicing study and associated funding agreement iii A master concept plan and a draft plan of subdivision. -a place of worship is subject to 203(2)(g) or 205(2)(g), as applicable.

Pre-consultation Notes

Meeting: Tuesday July 12, 2022 @ 3pm

I Exception Number	II Applicable Zones	Exception Provisions		
		III Additional Land Uses Permitted	IV Land Uses Prohibited	V Provisions
2545 (By-law 2019-449) (By-law 2019-16)	IP[2545] H(33)-h	- automobile body shop -place of worship	-All uses until such time as the 'h' symbol has been removed. -All uses except: -automobile	- minimum lot area: 10,000m^2 - minimum lot width: 94 m - All operations of an automobile body shop must be within an enclosed building. - No vehicle storage is permitted
			dealership -automobile rental establishment -bank - bank machine -day care -hotel -instructional facility -light industrial uses -medical facility -office -personal service business -place of assembly -place of worship -research and development centre -restaurant, full service -restaurant, take out -technology industry	within the front yard. - The following uses are only permitted within a large complex containing a research and development centre or technology industry: i. light industrial use ii. office iii. bank iv. payday loan establishment v. instructional facility vi. place of assembly. - The 'h' symbol will not be removed until the following have been submitted to and approved by the City: i. a transportation impact study ii. a servicing study and associated funding agreement iii. a master concept plan and a draft plan of subdivision. -a place of worship is subject to 203(2)(g) or 205(2)(g), as applicable.

From both Urban Exceptions, it is noted that the 'h' symbol will not be removed until the following have been submitted to and approved by the City:

- A Transportation Impact Study
- A Servicing Study and associated funding agreement
- A master concept plan and a draft plan of subdivision

It is noted however that a Plan of Subdivision is not part of this proposal/concept.

The current City of Ottawa Official Plan designates the property as Urban Employment, which identifies lands for a range of employment uses.

The new City of Ottawa Official Plan designates the property as Industrial and Logistics (Section 6.4) under Transect B6 (Southwest Suburban Transect). The Industrial and Logistics designation is characterized by traditional land uses such as warehousing, distribution, among other uses, requiring a range of parcel sizes.

Pre-consultation Notes

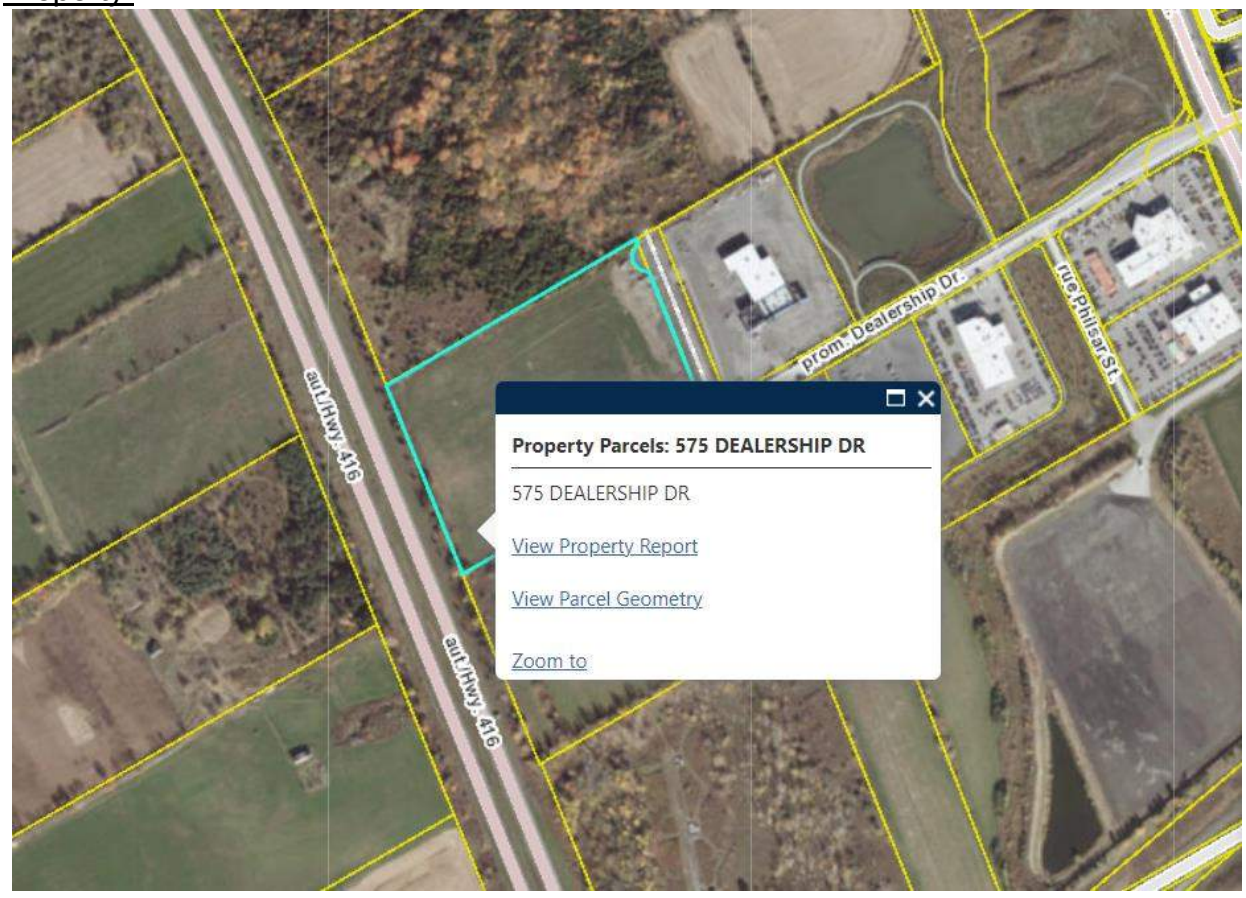
Meeting: Tuesday July 12, 2022 @ 3pm

The City's new Official Plan permits 'warehousing' on the subject property in its land-use policies, however the new OP has yet to be approved by the Ministry and thus is not in full force and effect. An application to rezone the property to permit warehousing can be circulated, with comments provided to the applicant, but will be put on hold until such time as the new OP is in full force and effect, thus allowing the rezoning application to advance to the City's Planning Committee.

South Nepean Secondary Plan (Area 10) will likely not be in effect when the new Official Plan is adopted, however the plan does outline Principles for Design and Development for properties in proximity to Highway 416 to enhance buildings that are visible from the highway (Section 3.0): https://ottawa.ca/en/planning-development-and-construction/official-plan-and-master-plans/official-plan/volume-2a-secondary-plans/former-nepean/south-nepean-urban-area/areas-9-and-10#section-3-0-urban-design-policies

There also appears to be a reserve along the eastern boundary of the property adjacent to Citigate Drive which would need to be removed with a Lifting of 30cm Reserve application with an associated Site Plan Control application prior to site plan registration.

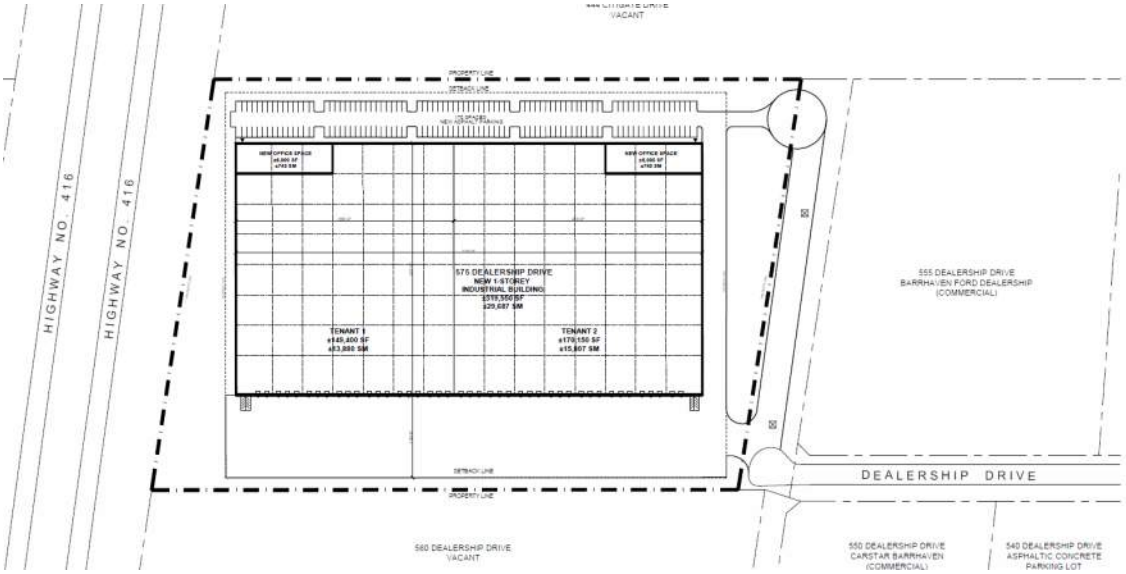
Property:



Pre-consultation Notes

Meeting: Tuesday July 12, 2022 @ 3pm

Site Plan Concept:



Transportation:

1. A TIA is warranted, please proceed to Step 2 (scoping).

2. The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package. Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.

3. Synchro files are required at Step 4.

4. An RMA and detailed design are required for any new road and intersection construction.

Parks

5. Parkland Dedication:

   a) The amount of parkland dedication that is required is to be calculated as per the City of Ottawa Parkland Dedication By-law No 2009-95 (as amended or superceded).

   b) Parkland requirement for commercial and industrial uses is calculated as 2% of the gross land area of the site being developed.

   c) Parks & Facilities Planning estimates the area of the property parcel to be approximately 60,188 square metres.

d) Therefore, the preliminary Parkland Dedication Requirement is calculated to be approximately 1,204 square metres:
   - 60,188 m2 x 2% = 1,204 m2

e) The actual parkland dedication requirement will be based on the exact gross land area of the property being developed. If the development application moves forward, please provide the City with a surveyor's area certificate/memo which specifies this area with the first submission.

f) Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application and the requested supporting documentation. Additionally, if the proposed commercial product or land use changes, then the parkland dedication requirement be re-evaluated accordingly.

g) Parks and Facilities Planning is currently undertaking a legislated replacement of the Parkland Dedication By-law, with the new by-law to be considered by City Council on August 31, 2022. The by-law recommended for approval by Council increases the required parkland conveyance for midrise and high-rise residential development, and includes one-year transition policies for in-stream development and building permit applications or those that will be submitted and meet the requirements for completeness by September 1, 2022.

   To ensure you are aware of parkland dedication requirements for your proposed development, we encourage you to familiarize yourself with the staff report and recommended by-law that were recommended for Council approval by Planning Committee on July 7, 2022. For any questions or information, please contact the project lead at Kersten.Nitsche@ottawa.ca

6. Form of Parkland Dedication: a. Parks & Facilities Planning will be requesting Cash-in-Lieu of Parkland for this proposal.

7. Planning Rationale / Design Brief: a. Please address parkland dedication in the planning rationale / design brief that will be submitted with the development application.

Forestry:

TCR requirements:

8. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
   a) an approved TCR is a requirement of Site Plan approval.
   b) The TCR may be combined with the LP provided all information is supplied

Pre-consultation Notes

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9. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.

10. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
    a) If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
    b) Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit

11. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition

12. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
13. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained

14. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at Tree Protection Specification or by searching Ottawa.ca
    a) the location of tree protection fencing must be shown on the plan
    b) show the critical root zone of the retained trees
    c) if excavation will occur within the critical root zone, please show the limits of excavation

15. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

16. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on City of Ottawa

LP tree planting requirements:

For additional information on the following please contact adam.palmer@Ottawa.ca

17. Minimum Setbacks
    a) Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
    b) Maintain 2.5m from curb
    c) Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.

d) Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

18. Tree specifications
    a) Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
    b) Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
    c) Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
    d) Plant native trees whenever possible
    e) No root barriers, dead-man anchor systems, or planters are permitted.
    f) No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)
19. Hard surface planting
    a) Curb style planter is highly recommended
    b) No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
    c) are to be planted at grade

20. Soil Volume
    a) Please document on the LP that adequate soil volumes can be met:

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

    b) Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

21. Sensitive Marine Clay
    a) Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines

Pre-consultation Notes

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22. **Tree Canopy Cover**
    a) The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40%
    b) At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
    c) Indicate on the plan the projected future canopy cover at 40 years for the site.

Engineering:

List of Reports and Plans (Site Plan Control and Re-zoning) :*

- Site Servicing Plan
- Grading Plan
- Erosion and Sediment Control Plan
- Storm Drainage / Ponding Plan
- Stormwater Management and Site Servicing Report
- Geotechnical Investigation Report

* Please note that the above submission requirements are based on the Site Plan Control and Re-zoning applications being submitted concurrently. A modified submission list can be provided if re-zoning will occur prior to Site Plan Control.

Please note the following information regarding the engineering design submissions for the above noted site:

23. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans

24. Servicing and site works shall be in accordance with the following documents:
    - Ottawa Sewer Design Guidelines (October 2012) and all the Technical Bulletins including ISDTB-2014-01, PIEDTB-2016-01, ISTB 2018-01, ISTB-2018-04, and ISTB-2019-02
    - Ottawa Design Guidelines – Water Distribution (2010) and Technical Bulletins ISD-2010-2, ISDTB-2014-02 and ISTB-2018-02, and ISTB-2021-03
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2008)
    - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
    - City of Ottawa Environmental Noise Control Guidelines (January, 2016)
    - City of Ottawa Hydrogeological and Terrain Analysis Guidelines (March 2021)

Pre-consultation Notes

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- City of Ottawa Park and Pathway Development Manual (2012)
- City of Ottawa Accessibility Design Standards (2012)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)

25. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at geoinformation@ottawa.ca or by phone at (613) 580-2424 x 44455

26. The Stormwater Management Criteria, for the subject site, is to be based on the following (as established in the Citigate Centre Site Servicing Report):
    a) Allowable release rates and storage requirements for individual sites are to be calculated based on a runoff coefficient of C=0.80:
    b) The maximum release rate is not to exceed 120% of the 5-year peak flow for all storms up to and including the 100-year event.
    c) The 5-year peak flow can be released uncontrolled.
    d) Ensure no overland flow for all storms up to and including the 100-year event.
    e) Flows to the storm sewer in excess of the 5-year + 20% storm release rate, up to and including the 100-year storm event, must be detained on site.
    f) The 2-yr storm or 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
    g) A calculated time of concentration (Cannot be less than 10 minutes).
    h) Quality control objectives to be confirmed with the Rideau Valley Conservation Authority (RVCA).

27. Deep Services:

Pre-consultation Notes

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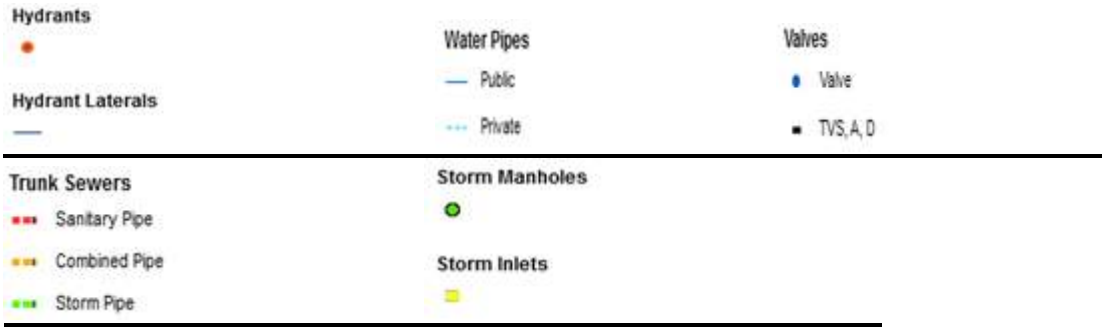

i. *A plan view of the approximate services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of available future services is:*
   a. Connections (Citigate Drive – Preferred)):
      i. Existing 1200 mm dia. STM (Conc.)
      ii. Existing 254 mm dia. Watermain (PVC)
      iii. Existing 250 mm dia. SAN (PVC)

ii. *Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.*

iii. *Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).*

iv. *Provide information on the type of connection permitted*
Sewer connections to be made above the springline of the sewermain as per:
   a) Std Dwg S11.1 for flexible main sewers – *connections made using approved tee or wye fittings.*
   b) Std Dwg S11 (For rigid main sewers) – *lateral must be less that 50% the diameter of the sewermain,*
   c) Std Dwg S11.2 (for rigid main sewers using bell end insert method) – *for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,*
   d) Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.
   e) *No submerged outlet connections.*

28. 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 and the expected loads required by the proposed development. Please provide the following information:

Pre-consultation Notes

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i. Location of service(s)
ii. Type of development and the amount of fire flow required (as per FUS, 2020).
iii. Average daily demand: ___ l/s.
iv. Maximum daily demand: ___l/s.
v. Maximum hourly daily demand: ___ l/s.
vi. Hydrant location and spacing to meet City's Water Design guidelines.
vii. Water supply redundancy will be required for more than 50 m3/day water demand.

29. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

30. If applicable, MECP ECA Requirements –
All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);
    a) Consultant determines if an approval for sewage works under Section 53 of OWRA is required. Consultant then determines what type of application is required and the City's project manager confirms. (If the consultant is not clear if an ECA is required, they will work with the City to determine what is required. If the consultant it is still unclear or there is a difference of opinion only then will the City PM approach the MECP.
    b) The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
    c) Pre-consultation is not required. d. Standard Works ToR Draft ECA's are sent to the local MECP office (moeccottawasewage@ontario.ca).for information only
    d) Additional ToR draft ECAs require a project summary/design brief and require a response from the local MECP (10 business day window)
    e) Site plan Approval, or Draft Approval, is required before an application is sent to the MECP

Urban Design:

31. A Design Brief that follows the provided Terms of Reference is required upon submission of the application.

32. Consider ways to enhance the relationship between the building and the public street by creating engagement. For example, consider including an entry way into the office in the north-east corner of the building that faces Dealership Dr and adding a pedestrian pathway from this entranceway to Citygate Drive.

33. Explore ways to integrate soft landscaping and trees onsite in areas not required for parking or driving aisles, particularly on the portion of the site fronting Dealership Drive.

34. As the design progresses, consider how the western façade, abutting hwy 416, will be viewed from the cars on the highway. There appears to be a grading change with trees along this western edge; please illustrate this on the Site Plan and explain whether the development will be visible from the highway.

35. Consider wayfinding measures, such as signage, to clearly demarcate where office parking vs. trucks should enter the site. Signage also can clearly identify both tenants from the street.

36. Consider the way the property will be seen as the view terminus from Dealership Dr. Explore the option of flipping the entrances for the trucks vs standard cars in order to allow for the view at the end of Dealership Dr to be screened surface parking, as opposed to the truck access.

37. It appears the directions identified on the elevations of the facades are incorrect. For example, the southern façade is shown on the Site Plan to have multiple garage doors; however, on the elevations this facade is labelled as the east facade. Please also ensure all plans also have English labels.

Planning:

38. Zoning By-law Amendment: https://ottawa.ca/en/planning-development-and-construction/development-information-residents/development-application-review-process/development-application-submission/development-applications/zoning-law-amendment

39. Stie Plan Control: https://ottawa.ca/en/planning-development-and-construction/development-information-residents/development-application-review-process/development-application-submission/development-applications/site-plan-control

40. Lifting 30 Centimetre Reserve: https://ottawa.ca/en/planning-development-and-construction/development-information-residents/development-application-review-process/development-application-submission/development-applications/lifting-30-centimetre-reserve

41. City of Ottawa Accessibility Design Standards: https://documents.ottawa.ca/sites/documents/files/documents/accessibility_design_standards_en.pdf

Pre-consultation Notes

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42. Please ensure that the Parking, Queuing and Loading Provisions are following and appropriate vehicle and bicycle parking is provided on-site (https://ottawa.ca/en/part-4-parking-queuing-and-loading-provisions-sections-100-114#bicycle-parking-space-rates-and-provisions-sec-111).

43. Please ensure that the Landscaping Provisions for Parking Lots is followed (https://ottawa.ca/en/part-4-parking-queuing-and-loading-provisions-sections-100-114#section-110-landscaping-provisions-parking-lots).

44. The Planning Rationale Terms of Reference may be found here.

45. For information on Applications, including fees, please visit: https://ottawa.ca/en/planning-development-and-construction/developing-property/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

46. The application processing timeline generally depends on the quality of the submission. For more information on standard processing timelines, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/development-application-forms#site-plan-control

47. Bird-safe design guidelines: https://documents.ottawa.ca/sites/documents/files/birdsafe_designguidelines_en.pdf

48. The local Ward 3 Councillor Jan Harder (jan.harder@ottawa.ca) should be consulted prior to an application submission

Environmental:

49. Full comments are outstanding at this time, however it was noted in the meeting discussion that an Environmental Impact Study will be required due to the proximity of the site to a neighbourhing woodlot and potential species at risk. Other considerations include enhancing the urban tree canopy and including Bird-safe design guidelines for buildings on the site. I will update this section will full comments once received.

Attachments:

- Plan and study list

Pre-consultation Notes

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For any questions, please feel free to contact me at the information below. Please provide all submission documents electronically as paper copies of plans and reports are not being requested at this time.

Best regards,

Kelby Lodoen Unseth MCIP, RPP
Planner II | Urbaniste II
Development Review (South Services) | Examen des projets d'aménagement (services sud)
Planning, Infrastructure and Economic Development | Services de planification, d'infrastructure et de développement économique

City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext./poste 12852
ottawa.ca/planning / ottawa.ca/urbanisme

Enc.

Appendix B
Water Servicing

Boundary Conditions
575 Dealership

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	26.4	0.44
Maximum Daily Demand	39.6	0.66
Peak Hour	71.4	1.19
Fire Flow Demand #1	9000	150
Fire Flow Demand #2	12000	200
Fire Flow Demand #3	16000	266.7

Location

Results

Connection 1 – Dealership Drive

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	154.2	82.4
Peak Hour	147.0	72.2
Max Day plus Fire #1	132.1	51.0
Max Day plus Fire #2	117.3	30.0
Max Day plus Fire #3	92.0	-6.1

Ground Elevation = 96.2 m

Notes

1. Headloss calculations downstream of the connection location are required.
2. A second feed to this location should be planned to avoid the creation of a vulnerable service area.

Disclaimer

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

Project No. 119123
Project Name: 575 Dealership Drive
Project Location: Ottawa

Date: November 2022

Domestic Water Demands

Daily Demands from OBC Table 8.2.1.3

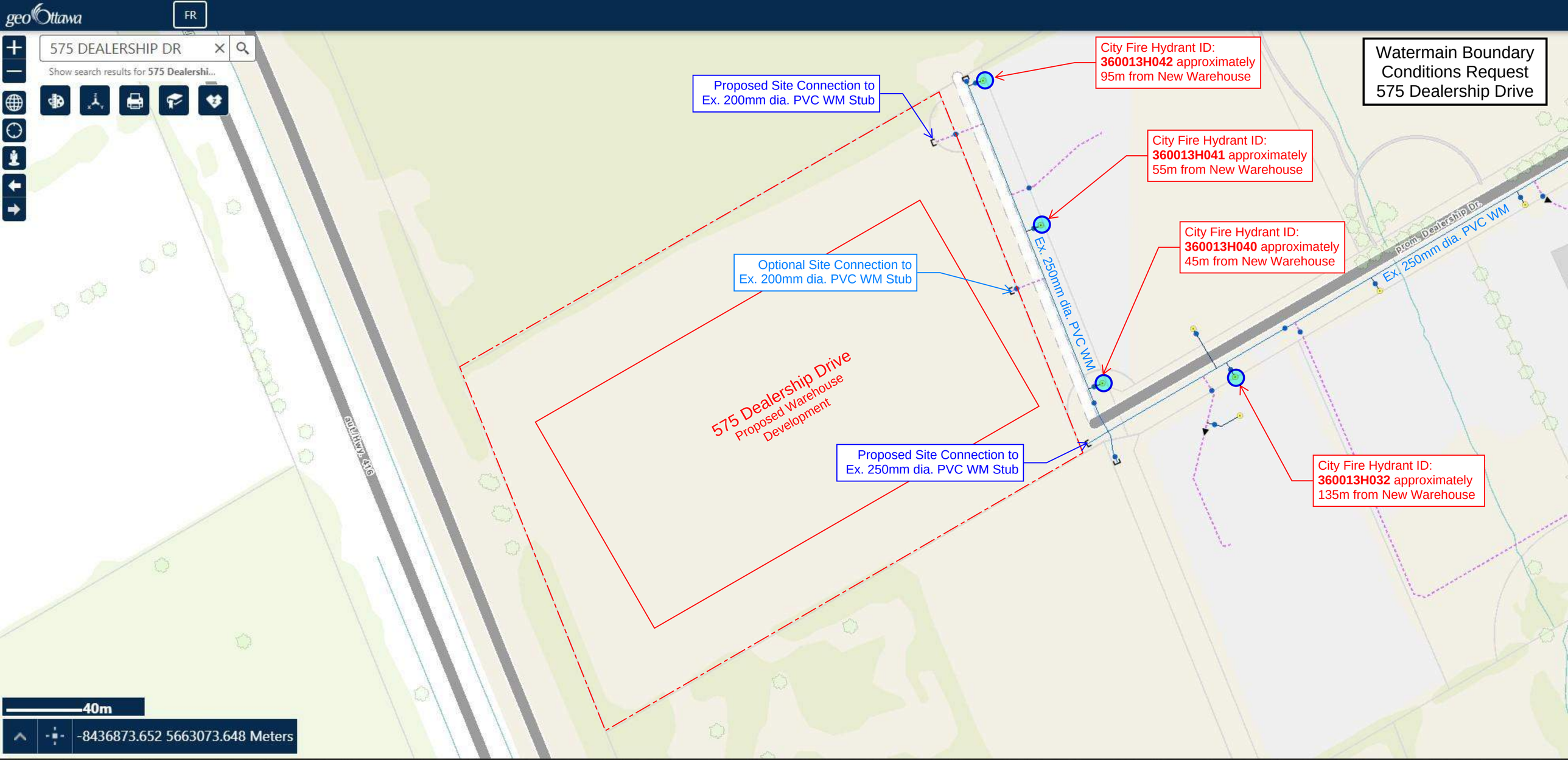
Establishment	Daily Demand Volume	
Industrial :	150	L/day/loading bay
	950	L/day/washroom
Office Space	75	L/day/9.3sq.m.

Industrial Peaking Factors City of Ottawa Water Distrubution Guidelines

Conditions	Peaking Factor	
Maximum Day	1.5	x Avg. Day
Peak Hour	1.8	x Max Day

Proposed Development Conditions

	Warehouse 1	Totals
No. Loading Bays	45	45
No. Washrooms	20	20
Office Space ~sq. m.	1530	1530
Total Daily Volume (Liters)	38,089	38,089
Avg Day Demand (L/s)	0.44	0.44
Max Day Demand (L/s)	0.66	0.66
Peak Hour Demand (L/s)	1.19	1.19


geoOttawa
FR
575 DEALERSHIP DR
Show search results for 575 Dealershi...
Watermain Boundary Conditions Request
575 Dealership Drive
City Fire Hydrant ID: 360013H042 approximately 95m from New Warehouse
Proposed Site Connection to Ex. 200mm dia. PVC WM Stub
City Fire Hydrant ID: 360013H041 approximately 55m from New Warehouse
Optional Site Connection to Ex. 200mm dia. PVC WM Stub
City Fire Hydrant ID: 360013H040 approximately 45m from New Warehouse
Ex. 250mm dia. PVC WM
From Dealership Dr.
Ex. 250mm dia. PVC WM
575 Dealership Drive
Proposed Warehouse Development
Proposed Site Connection to Ex. 250mm dia. PVC WM Stub
City Fire Hydrant ID: 360013H032 approximately 135m from New Warehouse
Hwy 416
40m
-8436873.652 5663073.648 Meters

FUS - Fire Flow Calculations

As per 2020 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 119123
Project Name: 575 Dealership Drive
Date: 11/10/2022
Input By: S. Matthews
Reviewed By: D. Blair

Legend: Input by User; No Information or Input Required

Building Description: 1-Storey Warehouse Building
Type II - Non-combustible construction

Step			Input		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)	30,435			
		Number of Floors/Storeys	1			
		Area of structure considered (m^2)			**30,435**	
	F	**Base fire flow without reductions**				**31,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	0%	**31,000**
		Limited combustible		-15%		
		Combustible	Yes	0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction (100% sprinkler coverage of building used)**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	Yes	-30%	-30%	**-15,500**
		Standard Water Supply	Yes	-10%	-10%	
		Fully Supervised System	Yes	-10%	-10%	
				Cumulative Total	**-50%**	
5	**Exposure Surcharge (cumulative %, Maximum Exposure Adjsutement Charge Used)**				**Surcharge**	
	(3)	North Side	> 45.1m		0%	**0**
		East Side	> 45.1m		0%	
		South Side	30.1- 45 m		0%	
		West Side	> 45.1m		0%	
				Cumulative Total	**0%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**16,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**267**
				or	USGPM	4,227
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	3.5
		Required Volume of Fire Flow (m^3)			m^3	3360

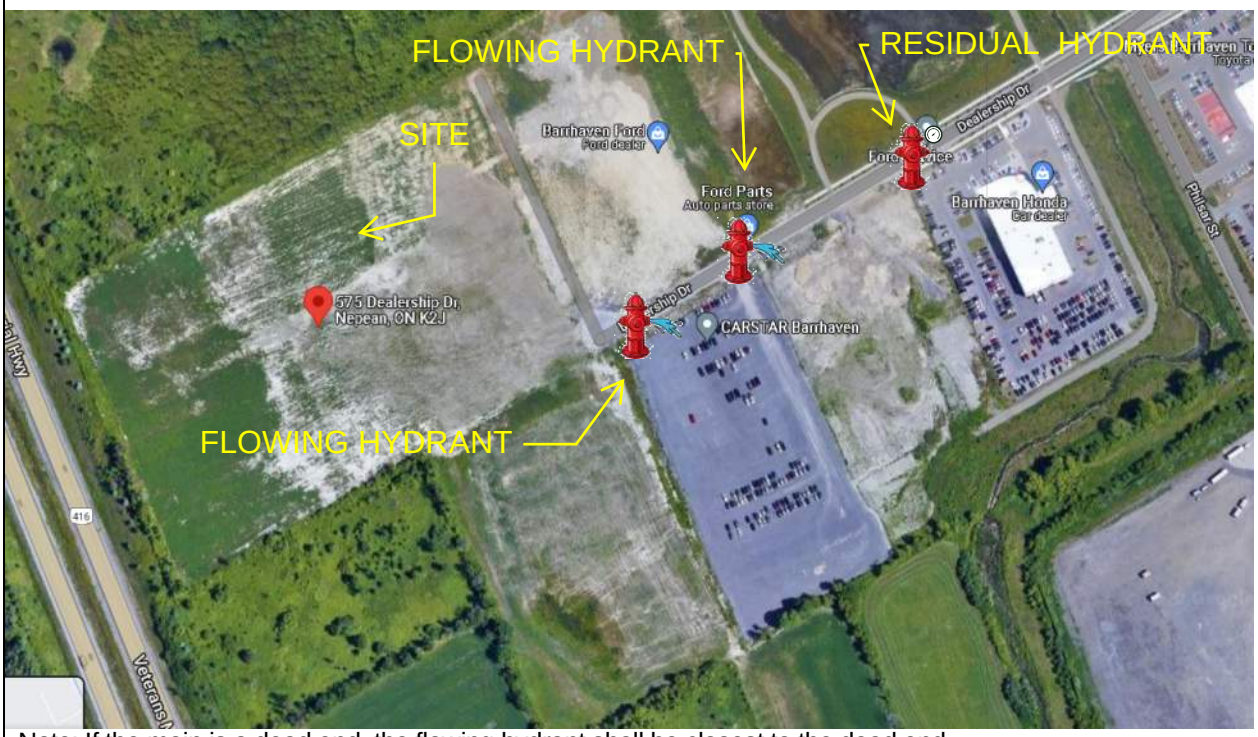
FLOW TEST REPORT

Form SD-003A RevDate: Dec 01, 2021

PROJECT INFORMATION			
Project Name:	575 Dealership Drive Flow Test	Design Project #:	2022-SSCL-162
Site Address:	575 Dealership Drive Nepean ON	Const. Project #:	NA
City Contact:	**City of Ottawa**	Phone #:	
Flow Tester:	Trevor Brownrigg	Phone #:	
Technical Contact:	**John Killeen**	Phone #:	**416 795-5799**

SITE INFORMATION

SITE MAP



Note: If the main is a dead end, the flowing hydrant shall be closest to the dead end

ITEMS TO LABEL ON MAP	HYDRANTS USED	MAIN SIZE
☑ Static / Residual & Flow Hydrants	☑ City Hydrant(s)	City: 6"
☐ Flow Direction (if the main is dead end)	☐ Site Hydrant(s)	Site:

SITE NOTES

445 Colborne St. London, ON N6B 2T2 northernsprinklerdesign.com 1-866-798-1154

FLOW TEST REPORT

Form SD-003A RevDate: Dec 01, 2021

TEST INFORMATION			
Minimum Required Flow:		Min Ports:	4
Personnel Present:	Trevor Brownrigg	Test Date:	Nov 07th 2022
City / External Company:	City of Ottawa	Test Time:	11:00am

TEST EQUIPMENT	
☑ Hose Monsters with built in Pitot	Hose length used: 20 ft
☐ Hand held pitot gauge	☐ Pollard diffuser elbow with built in Pitot
☐ Other:	

TEST RESULTS

Number of Ports	Outlet Size (IN)	Discharge Coefficient	Pitot Reading (PSI)				Total Flow (GPM)	Static / Residual Pressure (PSI)
0 Ports	STATIC							77
1 Port	2.5	0.9	38				1,035	75
2 Ports	2.5	0.9	34	33			1,943	74
3 Ports	2.5	0.9	31	29	29		2,742	68
4 Ports	2.5	0.9	27	25	26	25	3,407	52
0 Ports	STATIC RE-CHECK							77

TEST NOTES

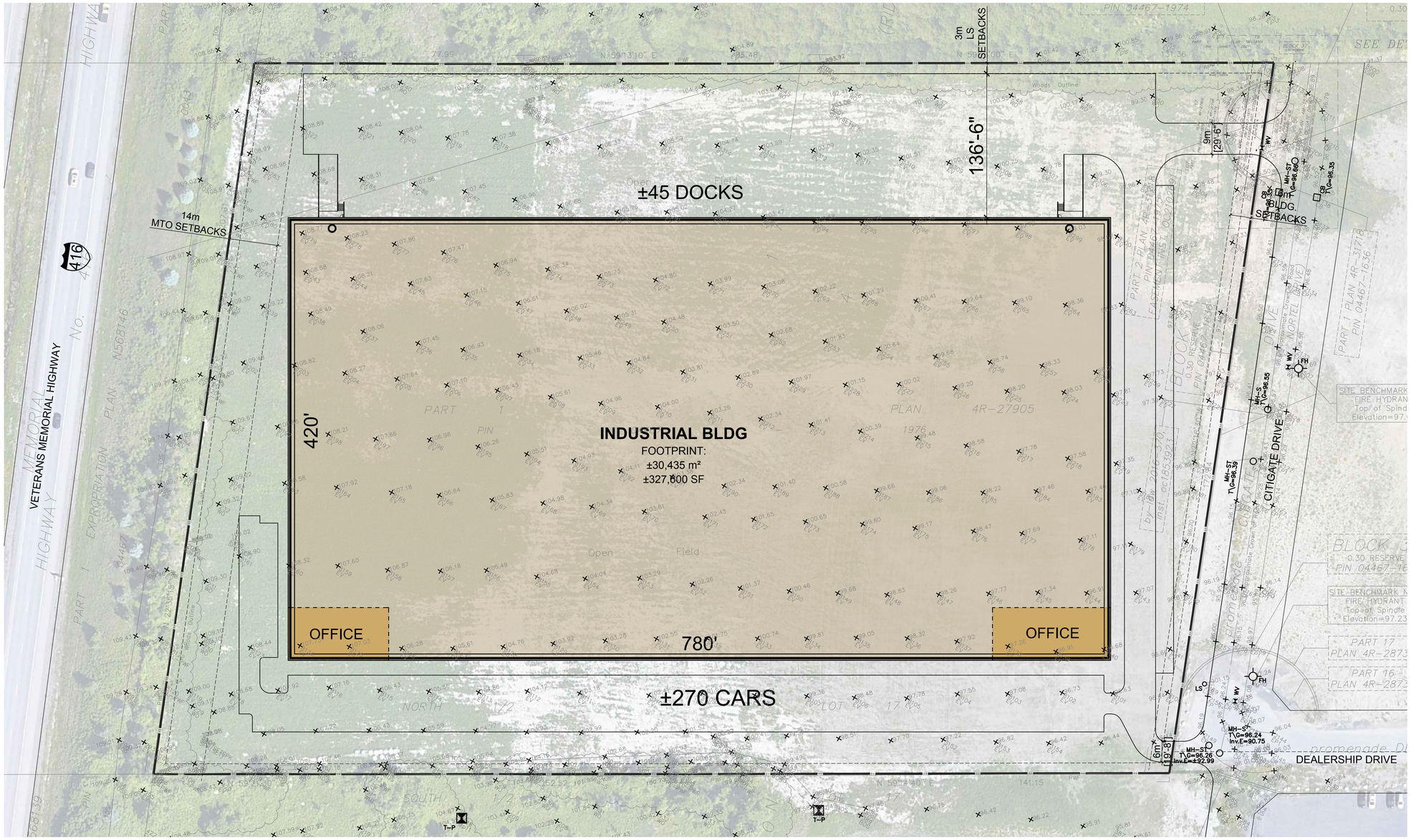
HYDRAULIC ADJUSTMENTS (FOR OFFICE USE ONLY)

ADJUSTMENTS FOR HYDRAULIC GRADE LINE (HGL)

Reservoir HGL (m):		Site Elevation (m):	
Theoretical Static Head (PSI):	0	PSI to subtract from test pressures:	0

OTHER HYDRAULIC ADJUSTMENTS

Other adjustment as required by the City / AHJ:	



PROJECT DATA:

SITE AREA:		
GROSS:	14.93 AC	6.04 HA
	650,523 SF	60,436 m²
DETENTION:	@ 0%	
NET:	14.93 AC	6.04 HA
	650,523 SF	60,436 m²
BUILDING FOOTPRINT:		
BUILDING 1	327,600 SF	30,435 m²
BUILDING USE:		
WAREHOUSE		28,913 SF
OFFICE	@ 5%	1,522 SF
FAR:		
GROSS:		0.50
NET:		0.50
COVERAGE:		
GROSS:		50%
NET:		50%
PARKING REQUIRED:		
WAREHOUSE	1/125 SF	231 STALLS
OFFICE	3/125 SF	37 STALLS
TOTAL		268 STALLS
PARKING PROVIDED:		
AUTO:		270 STALLS
	@0.82/1000 SF	@8.87/1000 SF
REQ. ACCESSIBLE		*To be confirmed by City*
TRAILER:		0 STALLS
TRUCK DOCKS:		
BUILDING 1		
DOCK-HIGH DOORS		45
GRADE-LEVEL DOORS		2

DEVELOPMENT STANDARDS:

ZONING:		IP
MAX. F.A.R.:		2.00
MAX. COVERAGE:		55%
MAX. BLDG. HT.:		22m [1]
BUILDING SETBACKS:		
FRONT:		6m
SIDE:		[2]
REAR:		6m
LANDSCAPE SETBACKS:		
FRONT:		[3]
SIDE:		[3]
REAR:		[3]
LANDSCAPE REQ.:		[3]
OFF-STREET PARKING:		
STANDARD:		2.6X5.2m
COMPACT:		2.4X4.6m
COMPACT %:		50% [7]
DRIVE AISLE:		6m [6]
FIRE LANE:		TBD
OVERHANG:		TBD
TREE WELL:		TBD
REQ. PARKING RATIO BY USE:		[4]
WAREHOUSE:		[5]
LIGHT IND.:		[5]
OFFICE:		2.4/100 m2

NOTES:

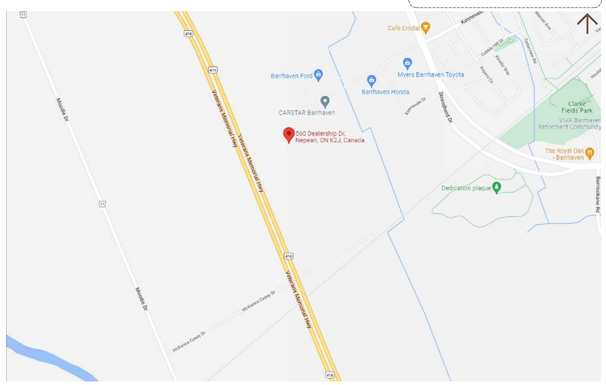
1 11 m within 20m from a residential or institutional zone.
2 Corner side yard: 6m
Interior side yard abutting a residential or institutional zone: 6m
Other interior side yards: 3m
3 Abutting a residential or institutional zone: 3 m (1m if 1.4m high opaque screen is provided)
Abutting a street: 3m
In all other cases: No minimum
No percentage required for Industrial.
4 All ratios per Area D on Schedule 1A
5 0.8 per 100 m2 for the first 5000 m2 of GFA.
0.4 per 100 m2 above 5000 m2 of GFA.
6 3m for a single traffic lane.
6.7m for perpendicular double lane parking.
7 Up to 5% of the parking spaces in a parking lot or parking garage may have a minimum width of 1.3m and a minimum length of 3m, identified as being for a motorcycle, cargo bicycle or similar vehicle.

A PORTION OF THE ZONING INFORMATION IS UNKNOWN AT THIS TIME AND REQUIREMENTS MAY DIFFER THAN WHAT IS SHOWN IN THE SITE PLAN.

This conceptual design is based upon a preliminary review of entitlement requirements and on unverified and possibly incomplete site and/or building information, and is intended merely to assist in exploring how the project might be developed.

Stormwater Management Design:
AVERAGE REGIONAL REQUIRED PROVIDED

Boundary Source:
CIVIL CAD FILE



1:500
0 5m 10m 25m 50m

NORTH

scheme: 01

Conceptual Site Plan

575 Dealership Dr
Ottawa, ON CAN

WARE MALCOMB

OTW22-0010-00
11.01.2022

SHEET
1

Main Office
2175 Teston Road
Maple Ontario L4W 2A6
Phone : 905-602-5798
www.superiorsprinkler.ca

Calgary Branch
Bay 4, 1826-25th Avenue NE
Calgary AB, T2M 7K1
Phone: 403-464-3486
www.superiorsprinkler.ca

MEMO

To: J. Fede ***Leeswood*** **From:** John Killeen

Re: Firefighting Water Analysis **Date:** November 4th 2022

Re: 575 Dealership Drive, Nepean ON

Required Fire Flow Calculations

The following report contains the required fire flows for firefighting based on the **Ontario Building Code** Section A-3.2.5.7 Water Supply (Reference NFPA #13(2013).

For sprinklered buildings, water supply additional to that required by the sprinkler system should be provided for firefighting using fire hoses in accordance with the hose stream demands and water supply durations for different hazard classifications as specified in NFPA #13 "Installation of Sprinkler Systems".

We are basing our calculations on the following information:

- No high hazardous materials such as aerosols, flammable or combustible liquids will be stored at this location.
- The most hazardous storage commodity will be Cartoned nonexpanded plastics, in a 30'-0"/ 32'-0" clear height building with no solid shelves or open top containers.

Based on Table 17.3.3.1 of NFPA#13 (2013) the minimum water supply is as follows:

Sprinkler Design: 12 K16.8 sprinklers flowing at 52 psi + 250 USgpm for hose streams.

Total Water: $Q = K\sqrt{P}$

$Q = 16.8\sqrt{52}$

Q = 121.1465228 USgpm x 12 = 1453.758273 USgpm

\+ 10% for system balancing 145.3758273 USgpm

\+ 250 USgpm for hose streams 250.0 USgpm

Total required firefighting water Based on the Ontario Building Code 1849.13 USgpm (6,999.73 Litres/min.)

Please note that based on NFPA #13, Table 12.8.6.1 (Hose Stream Allowance and Water Supply Duration) the above water supply must be available from the municipal water system for a duration of 60 min. (no monitoring).

If any additional information is required, please do not hesitate to contact us.

Should you require any further assistance in this matter, please contact the undersigned at your earliest convenience.

Yours truly,

John Killeen

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2175 Teston Road
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For sprinklered buildings, water supply additional to that required by the sprinkler system should be provided for firefighting using fire hoses in accordance with the hose stream demands and water supply durations for different hazard classifications as specified in NFPA #13 "Installation of Sprinkler Systems".

We are basing our calculations on the following information:

- No high hazardous materials such as aerosols, flammable or combustible liquids will be stored at this location.
- The most hazardous storage commodity will be Cartoned nonexpanded plastics, in a 40'-0" clear height building with no solid shelves or open top containers.

Based on Table 17.3.3.1 of NFPA#13 (2013) the minimum water supply is as follows:

Sprinkler Design: Twelve K=25.2 sprinklers flowing at 40 psi with 250 USgpm for hose Streams.

Total Water: $Q = K\sqrt{P}$
$Q = 25.2\sqrt{40}$
Q = 159.4 USgpm x 12 = 1912.8 USgpm
10% for system balancing 191.2 USgpm
250 USgpm for hose streams 250.0 USgpm

Total required firefighting water 2354 USgpm (8911 Litres/min.)

Please note that based on NFPA #13, Table 12.8.6.1 (Hose Stream Allowance and Water Supply Duration) the above water supply must be available from the municipal water system for a duration of 60 min. (no monitoring).

If any additional information is required, please do not hesitate to contact us.

Should you require any further assistance in this matter, please contact the undersigned at your earliest convenience.

Yours truly,

John Killeen

Project No. 119123
Project Name: 575 Dealership Drive
Project Location: Ottawa

Date: April 2023

Domestic Water Demands

Daily Demands from OBC Table 8.2.1.3

Establishment	Daily Demand Volume	
Industrial :	150	L/day/loading bay
	950	L/day/washroom
Office Space	75	L/day/9.3sq.m.

Industrial Peaking Factors City of Ottawa Water Distrubution Guidelines

Conditions	Peaking Factor	
Maximum Day	1.5	x Avg. Day
Peak Hour	1.8	x Max Day

Proposed Development Conditions

	Warehouse A	Warehouse B	Totals
No. Loading Bays	23	23	46
No. Washrooms	20	20	40
Office Space ~sq. m.	910	850	1420
Total Daily Volume (Liters)	29,789	29,305	59094
Avg Day Demand (L/s)	0.34	0.34	0.68
Max Day Demand (L/s)	0.52	0.51	1.03
Peak Hour Demand (L/s)	0.93	0.92	1.85

Population and Consumption Rate Calculations

Node	Light Industrial			Commercial		Consumption Rates (L/s)		
	No. Loading Bays	No. Washrooms	Light Industrial Daily Demand (L/d)	Office Space (m2)	Commercial Daily Demand (L/d)	Average Daily	Maximum Daily	Maximum Hourly
R1								
N1	0	0	0	0	0.00	0.00	0.00	0.00
N2	0	0	0	0	0.00	0.00	0.00	0.00
N3	0	0	0	0	0.00	0.00	0.00	0.00
N4	0	0	0	0	0.00	0.00	0.00	0.00
N5	0	0	0	0	0.00	0.00	0.00	0.00
N6	23	20	22450	850	6854.84	0.34	0.51	0.92
N7	23	20	22450	910	7338.71	0.34	0.52	0.93
N8	0	0	0	0	0.00	0.00	0.00	0.00
N9	0	0	0	0	0.00	0.00	0.00	0.00
N10	0	0	0	0	0.00	0.00	0.00	0.00
N11	0	0	0	0	0.00	0.00	0.00	0.00
Total	**46**	**40**	**44900**	**1760**	**14194**	**0.68**	**1.03**	**2.02**

Water Demand Parameters (Local Demand as per City of Ottawa Guidelines - Water Distribution Systems)

Light Industrial Demand (Loading Bays)	150	L / day / loading bay
Light Industrial Demand (Washrooms)	950	L / day / washroom
Commercial Demand (Office Space)	75	L / day / 9.3sq.m.
Commerical/Industrial Max Day	1.5	x Avg Day
Commerical/Industrial Peak Hour	1.8	x Max Day

AVERAGE DAY DEMAND / HIGH PRESSURE CHECK

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
R1	154.2	-0.68	154.20	0.00	0.00	0.00
N1	96.2	0.00	154.20	58.00	568.98	82.52
N2	98.1	0.00	154.20	56.10	550.34	79.82
N3	99.2	0.00	154.20	55.00	539.55	78.26
N4	102.2	0.00	154.20	52.00	510.12	73.99
N5	96.7	0.00	154.20	57.50	564.08	81.81
N6	96.4	0.34	154.20	57.80	567.02	82.24
N7	99.5	0.34	154.20	54.70	536.61	77.83
N8	98.1	0.00	154.20	56.10	550.34	79.82
N9	103.9	0.00	154.20	50.30	493.44	71.57
N10	104.1	0.00	154.20	50.10	491.48	71.28
N11	102.2	0.00	154.20	52.00	510.12	73.99

Maximum Pressure

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
P1	1.0	250	110	0.68	0.010	0.00	0.000
P2	143.8	250	110	0.30	0.010	0.00	0.061
P3	30.7	250	110	0.30	0.010	0.00	0.081
P4	188.1	200	110	0.04	0.000	0.00	0.105
P5	179.6	200	110	-0.04	0.000	0.00	0.109
P6	88.2	250	110	-0.04	0.000	0.00	0.000
P7	88.8	250	110	-0.38	0.010	0.00	0.059
P8	12.0	200	110	0.34	0.010	0.00	0.052
P9	2.0	150	100	0.00	0.000	0.00	0.000
P10	113.3	200	110	0.00	0.000	0.00	0.000
P11	5.0	150	100	0.00	0.000	0.00	0.000
P12	3.6	150	100	0.00	0.000	0.00	0.000

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
R1	147.0	-1.85	147.00	0.00	0.00	0.00
N1	96.2	0.00	147.00	50.80	498.35	72.28
N2	98.1	0.00	147.00	48.90	479.71	69.58
N3	99.2	0.00	147.00	47.80	468.92	68.01
N4	102.2	0.00	147.00	44.80	439.49	63.74
N5	96.7	0.00	147.00	50.30	493.44	71.57
N6	96.4	0.92	147.00	50.60	496.39	71.99
N7	99.5	0.93	147.00	47.50	465.98	67.58
N8	98.1	0.00	147.00	48.90	479.71	69.58
N9	103.9	0.00	147.00	43.10	422.81	61.32
N10	104.1	0.00	147.00	42.90	420.85	61.04
N11	102.2	0.00	147.00	44.80	439.49	63.74

Minimum Pressure

Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
P1	1.0	250	110	1.85	0.04	0.01	0.032
P2	143.8	250	110	0.81	0.02	0.00	0.052
P3	30.7	250	110	0.81	0.02	0.00	0.049
P4	188.1	200	110	0.12	0.00	0.00	0.067
P5	179.6	200	110	-0.12	0.00	0.00	0.071
P6	88.2	250	110	-0.12	0.00	0.00	0.000
P7	88.8	250	110	-1.04	0.02	0.00	0.050
P8	12.0	200	110	0.93	0.03	0.01	0.049
P9	2.0	150	100	0.00	0.00	0.00	0.000
P10	113.3	200	110	0.00	0.00	0.00	0.000
P11	5.0	150	100	0.00	0.00	0.00	0.000
P12	3.6	150	100	0.00	0.00	0.00	0.000

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
R1	132.1	-151.03	132.10	0.00	0.00	0.00
N1	96.2	0.00	132.05	35.85	351.69	51.01
N2	98.1	0.00	128.12	30.02	294.50	42.71
N3	99.2	0.00	128.00	28.80	282.53	40.98
N4	102.2	0.00	129.78	27.58	270.56	39.24
N5	96.7	0.00	131.48	34.78	341.19	49.49
N6	96.4	0.51	131.76	35.36	346.88	50.31
N7	99.5	0.52	128.00	28.50	279.59	40.55
N8	98.1	75.00	127.76	29.66	290.96	42.20
N9	103.9	0.00	123.80	19.90	195.22	28.31
N10	104.1	75.00	122.90	18.80	184.43	26.75
N11	102.2	0.00	129.78	27.58	270.56	39.24

Minimum Pressure
Applied Fire Flow

Pipe Report

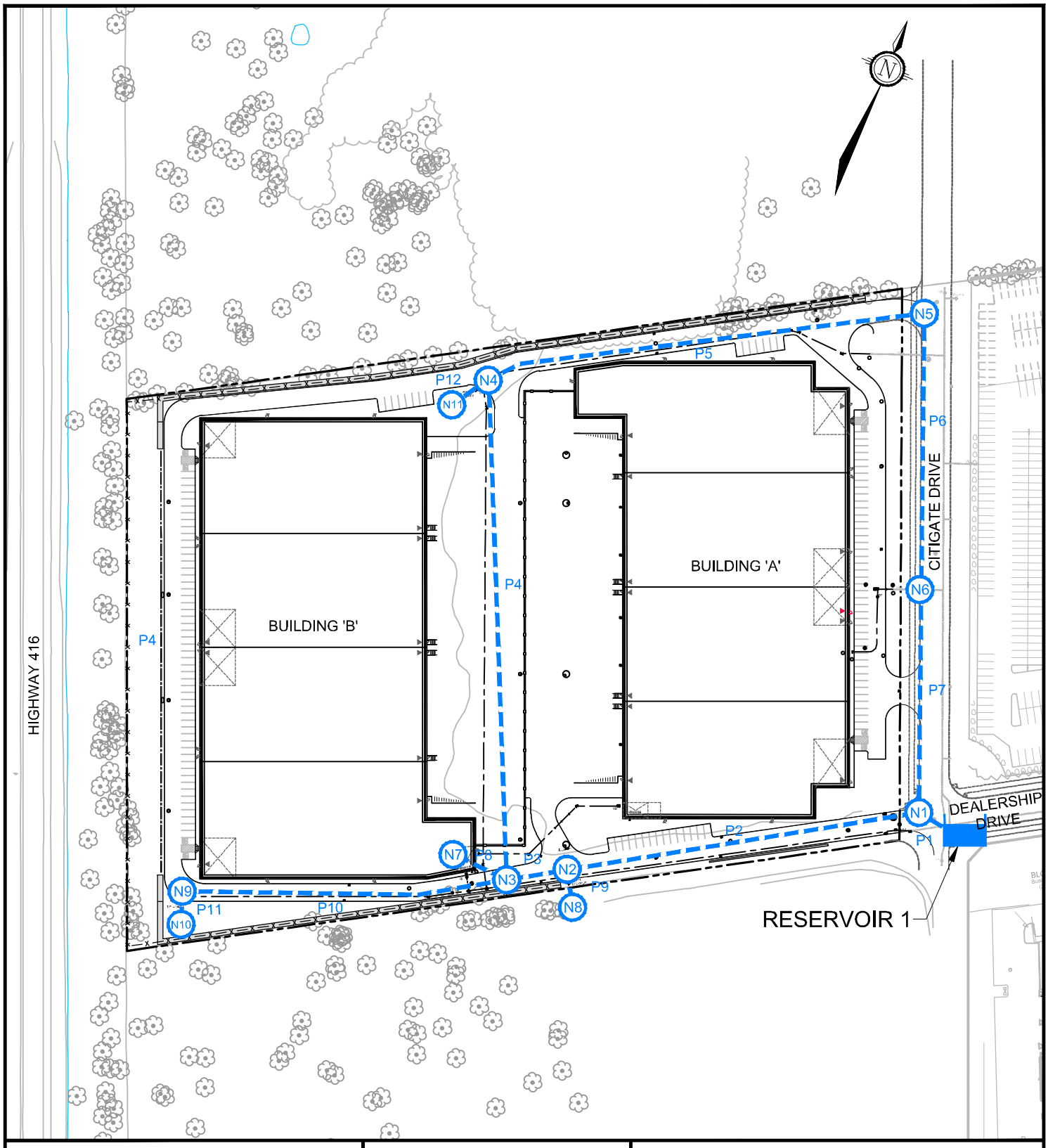
Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
P1	1.0	250	110	151.03	3.08	45.67	0.024
P2	143.8	250	110	114.60	2.33	27.39	0.025
P3	30.7	250	110	39.60	0.81	3.83	0.029
P4	188.1	200	110	35.92	1.14	9.47	0.028
P5	179.6	200	110	-35.92	1.14	9.47	0.028
P6	88.2	250	110	-35.92	0.73	3.19	0.029
P7	88.8	250	110	-36.43	0.74	3.28	0.029
P8	12.0	200	110	0.52	0.02	0.00	0.056
P9	2.0	150	100	75.00	4.24	179.44	0.029
P10	113.3	200	110	75.00	2.39	37.04	0.026
P11	5.0	150	100	75.00	4.24	179.43	0.029
P12	3.6	150	100	0.00	0.00	0.00	0.000

MAXIMUM DAY + FIREFLOW DEMAND SUMMARY

Maximum day plus fire flow demand was modeled for node N10 and the applied fire flow was split between N8 and N10.

The following is a summary of the minimum pressures that occurred for this operating condition.

	Demand (L/s)			Minimum Pressure			
Fire at Junction	Maximum Daily	Fire Flow	Max Day + Fire	(m)	kPa	psi	Node
N10	1.03	150.00	151.03	18.80	184.43	26.75	N10



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

LEGEND

- SITE BOUNDARY
- N8 WATERMAIN NODE ID
- RESERVOIR
- P1 WATERMAIN AND LINK ID

480 & 486 CITIGATE DRIVE

WATERMAIN NODE NETWORK SKETCH

SCALE 1 : 2000 (0, 20, 40, 60, 80)

DATE SEPT 2023 | JOB 119123 | FIGURE WM Nodes

SHT8X11.DWG - 216mmx279mm

M:\2019\119123\CAD\Design\Figures\Design Brief\119123-WM-Nodes.dwg, WM Node Network, Sep 22, 2023 - 3:04pm, bmcewen

Junction Report

Node ID	Elevation m	Demand LPS	Head m	Pressure m	Pressure kPa	Pressure psi
Resvr 26	142.3	-160.24	142.30	0.00	0.00	0.00
Junc 6	96.2	0.00	134.15	37.94	372.19	53.98
Junc 7	96.0	0.00	127.92	31.92	313.14	45.42
Junc 8	95.4	0.00	126.94	31.54	309.41	44.88
Junc 9	94.8	0.00	126.03	31.22	306.27	44.42
Junc 10	95.9	0.00	125.86	30.01	294.40	42.70
Junc 11	95.8	0.00	123.67	27.87	273.40	39.65
Junc 12	95.7	0.00	122.59	26.85	263.40	38.20
Junc 13	95.9	0.00	120.92	24.98	245.05	35.54
Junc 18	95.1	1.94	134.14	39.04	382.98	55.55
Junc 19	94.5	1.09	126.94	32.44	318.24	46.16
Junc 20	93.5	0.97	126.03	32.53	319.12	46.28
Junc 21	95.0	0.79	125.86	30.86	302.74	43.91
Junc 22	95.0	0.79	123.67	28.67	281.25	40.79
Junc 23	95.0	1.82	120.92	25.92	254.28	36.88
Junc 24	95.3	0.91	120.39	25.09	246.13	35.70
Junc 29	95.3	0.91	119.89	24.59	241.23	34.99
Junc 30	96.4	150.51	118.85	22.49	220.63	32.00
Junc 31	96.5	0.00	118.96	22.49	220.63	32.00
Junc 32	96.9	0.00	119.13	22.28	218.57	31.70
Junc 33	96.9	0.00	119.11	22.23	218.08	31.63
Junc 36	96.7	0.51	119.02	22.33	219.06	31.77

Minimum Pressure
Applied Fire Flow

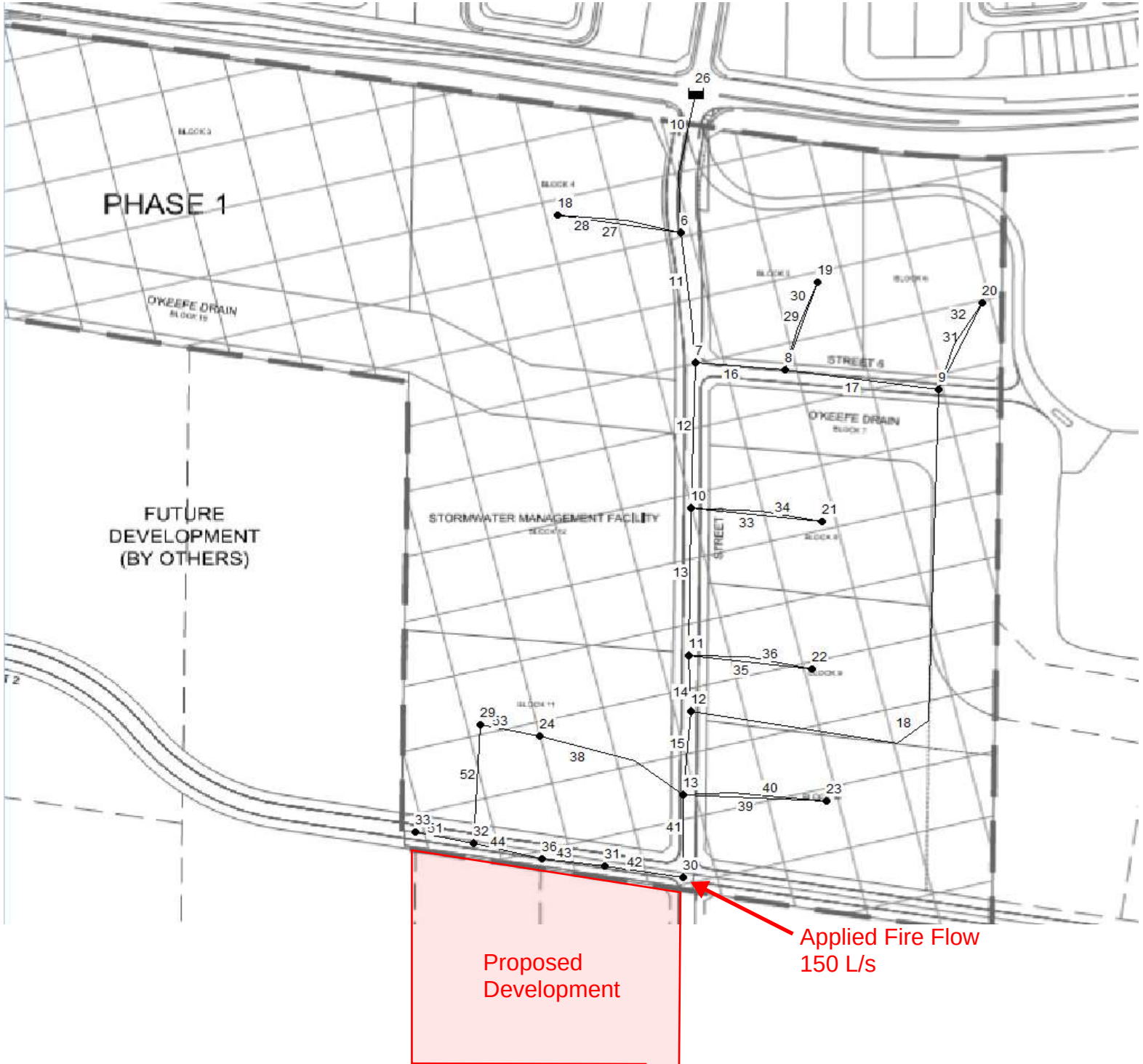
Pipe Report

Link ID	Length m	Diameter mm	Roughness	Flow LPS	Velocity m/s	Headloss m/km	Friction Factor
Pipe 10	160.0	250	110	160.24	3.26	50.96	0.023
Pipe 11	125.0	250	110	158.30	3.22	49.82	0.024
Pipe 12	102.0	250	110	97.26	1.98	20.21	0.025
Pipe 13	110.0	250	110	96.47	1.97	19.91	0.025
Pipe 14	55.0	250	110	95.68	1.95	19.61	0.025
Pipe 15	35.0	250	110	154.66	3.15	47.72	0.024
Pipe 16	115.0	250	110	61.04	1.24	8.53	0.027
Pipe 17	110.0	250	110	59.95	1.22	8.25	0.027
Pipe 18	430.0	250	110	58.98	1.20	8.00	0.027
Pipe 27	100.0	200	110	-0.97	0.03	0.01	0.049
Pipe 28	100.0	200	110	-0.97	0.03	0.01	0.049
Pipe 29	80.0	200	110	0.55	0.02	0.00	0.053
Pipe 30	80.0	200	110	-0.55	0.02	0.00	0.053
Pipe 31	80.0	200	110	0.49	0.02	0.00	0.054
Pipe 32	80.0	200	110	-0.49	0.02	0.00	0.054
Pipe 33	80.0	200	110	0.40	0.01	0.00	0.055
Pipe 34	80.0	200	110	-0.39	0.01	0.00	0.055
Pipe 35	80.0	200	110	0.40	0.01	0.00	0.058
Pipe 36	80.0	200	110	-0.39	0.01	0.00	0.058
Pipe 38	50.0	200	110	-37.95	1.21	10.49	0.028
Pipe 39	80.0	200	110	0.91	0.03	0.01	0.050
Pipe 40	80.0	200	110	-0.91	0.03	0.01	0.050
Pipe 41	75.0	250	110	114.89	2.34	27.52	0.025
Pipe 42	65.0	250	110	-24.94	0.51	1.63	0.031
Pipe 43	40.0	250	110	-24.94	0.51	1.63	0.031
Pipe 44	60.0	250	110	-25.45	0.52	1.69	0.031
Pipe 51	40.0	250	110	10.68	0.22	0.34	0.035
Pipe 52	80.0	200	110	-36.13	1.15	9.58	0.028
Pipe 53	50.0	200	110	37.04	1.18	10.03	0.028

Downstream Headloss to Strandheard Drive

MAXIMUM DAY + FIREFLOW DEMAND AT 575 DEALERSHIP DRIVE
Downstream Headloss Check To Strandherd Drive

File No.: 119123
575 Huntmar Drive



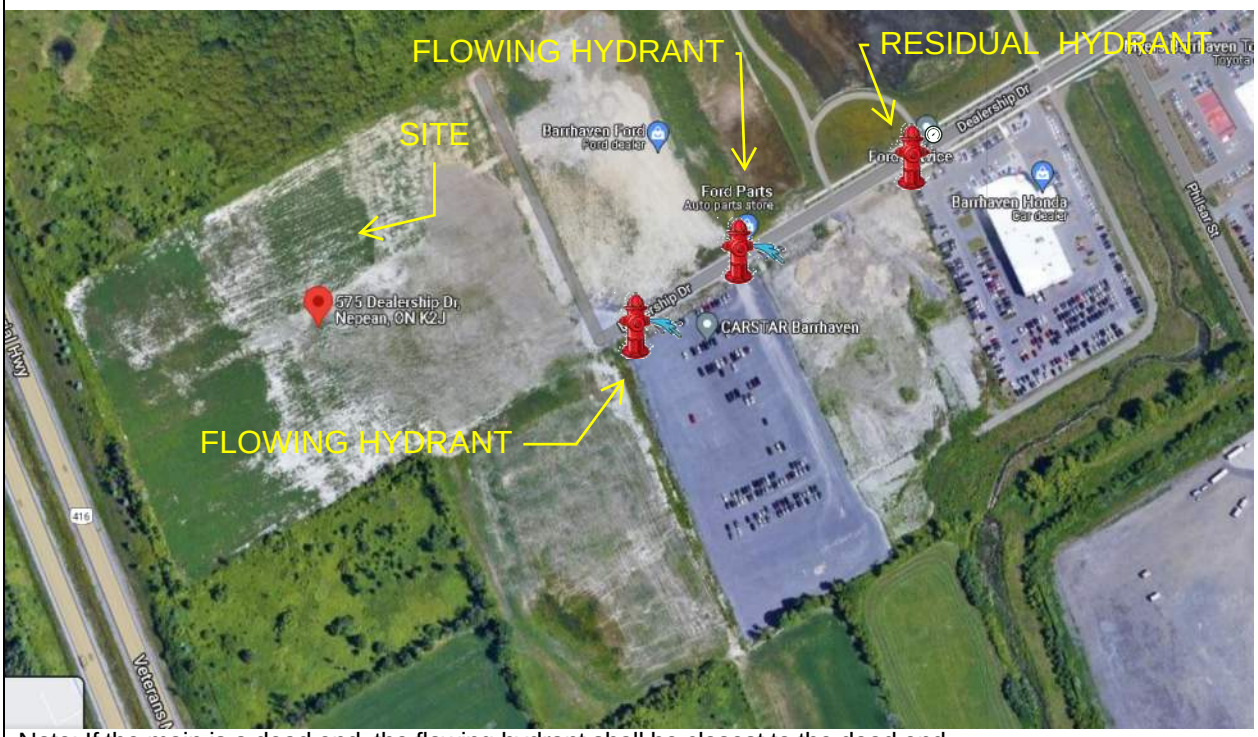
FLOW TEST REPORT

Form SD-003A RevDate: Dec 01, 2021

PROJECT INFORMATION			
Project Name:	575 Dealership Drive Flow Test	Design Project #:	2022-SSCL-162
Site Address:	575 Dealership Drive Nepean ON	Const. Project #:	NA
City Contact:	**City of Ottawa**	Phone #:	
Flow Tester:	Trevor Brownrigg	Phone #:	
Technical Contact:	**John Killeen**	Phone #:	**416 795-5799**

SITE INFORMATION

SITE MAP



Note: If the main is a dead end, the flowing hydrant shall be closest to the dead end

ITEMS TO LABEL ON MAP	HYDRANTS USED	MAIN SIZE
☑ Static / Residual & Flow Hydrants	☑ City Hydrant(s)	City: 6"
☐ Flow Direction (if the main is dead end)	☐ Site Hydrant(s)	Site:

SITE NOTES

445 Colborne St. London, ON N6B 2T2 northernsprinklerdesign.com 1-866-798-1154

FLOW TEST REPORT

Form SD-003A RevDate: Dec 01, 2021

TEST INFORMATION			
Minimum Required Flow:		Min Ports:	4
Personnel Present:	Trevor Brownrigg	Test Date:	Nov 07th 2022
City / External Company:	City of Ottawa	Test Time:	11:00am

TEST EQUIPMENT	
☑ Hose Monsters with built in Pitot	Hose length used: 20 ft
☐ Hand held pitot gauge	☐ Pollard diffuser elbow with built in Pitot
☐ Other:	

TEST RESULTS

Number of Ports	Outlet Size (IN)	Discharge Coefficient	Pitot Reading (PSI)				Total Flow (GPM)	Static / Residual Pressure (PSI)
0 Ports	STATIC							77
1 Port	2.5	0.9	38				1,035	75
2 Ports	2.5	0.9	34	33			1,943	74
3 Ports	2.5	0.9	31	29	29		2,742	68
4 Ports	2.5	0.9	27	25	26	25	3,407	52
0 Ports	STATIC RE-CHECK							77

TEST NOTES

HYDRAULIC ADJUSTMENTS (FOR OFFICE USE ONLY)

ADJUSTMENTS FOR HYDRAULIC GRADE LINE (HGL)

Reservoir HGL (m):		Site Elevation (m):	
Theoretical Static Head (PSI):	0	PSI to subtract from test pressures:	0

OTHER HYDRAULIC ADJUSTMENTS

Other adjustment as required by the City / AHJ:	

Appendix C
Sanitary Servicing

SANITARY SEWER DESIGN SHEET
480 & 486 Citigate Drive

NOVATECH
Engineers, Planners & Landscape Architects

PROJECT # : 119123
DESIGNED BY : BM
CHECKED BY : DDB
DATE PREPARED : 3-May-23
DATE REVISED : 2-Oct-23

LOCATION					LIGHT INDUSTRIAL					COMMERCIAL			INFILTRATION		FLOW	PROPOSED SEWER								
STREET	FROM MH	TO MH	Area ID	Total Area (ha.)	Loading Bays L	Washrooms W	AREA (ha.)	PEAK FACTOR Mi	PEAK LIGHT INDUSTRIAL FLOW Qind (L/s)	OFFFICE AREA (m2) Ao	PEAK FACTOR Mc	PEAK COMM/INST/PARK FLOW Qcom (L/s)	Total Area (ha.)	PEAK EXTRAN. FLOW Qinf (L/s)	PEAK DESIGN FLOW Q(d) (L/s)	LENGTH (m)	PIPE SIZE (mm)	PIPE ID (mm)	TYPE OF PIPE	GRADE %	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak/ Qcap	d/ D_{full}
Building A																							
CitiGate Dr	Building A	MH 07		1.58	23	20	1.48	4.6	**1.20**	910	1.5	**0.13**	1.58	**0.52**	**1.84**	4.7	250	254.00	DR 35	3.00	107.5	2.12	1.7%	
	MH 07	MH 06		0.46	0	0	0.00	4.6	**1.20**	0	1.5	**0.13**	0.46	**0.67**	**2.00**	15.3	250	254.00	DR 35	3.00	107.5	2.12	1.9%	
	MH 06	MH 05		0.05	0	0	0.00	4.6	**1.20**	0	1.5	**0.13**	0.05	**0.69**	**2.01**	10.1	250	254.00	DR 35	3.00	107.5	2.12	1.9%	
Building B																							
Dealership Dr	Building B	MH 04		2.44	23	20	1.52	4.6	**1.20**	850	1.5	**0.12**	2.44	**0.81**	**2.12**	4.1	250	254.00	DR 35	2.00	87.7	1.73	2.4%	
	MH 04	MH 03		1.56	0	0	0.00	4.6	**1.20**	0	1.5	**0.12**	1.56	**1.32**	**2.63**	70.0	250	254.00	DR 35	3.00	107.5	2.12	2.5%	
	MH 03	MH 02		0.12	0	0	0.00	4.6	**1.20**	0	1.5	**0.12**	0.12	**1.36**	**2.67**	73.0	250	254.00	DR 35	3.00	107.5	2.12	2.5%	
	MH 02	MH 01		0.04	0	0	0.00	4.6	**1.20**	0	1.5	**0.12**	0.04	**1.37**	**2.69**	19.6	250	254.00	DR 35	3.00	107.5	2.12	2.5%	
Total Flows																							

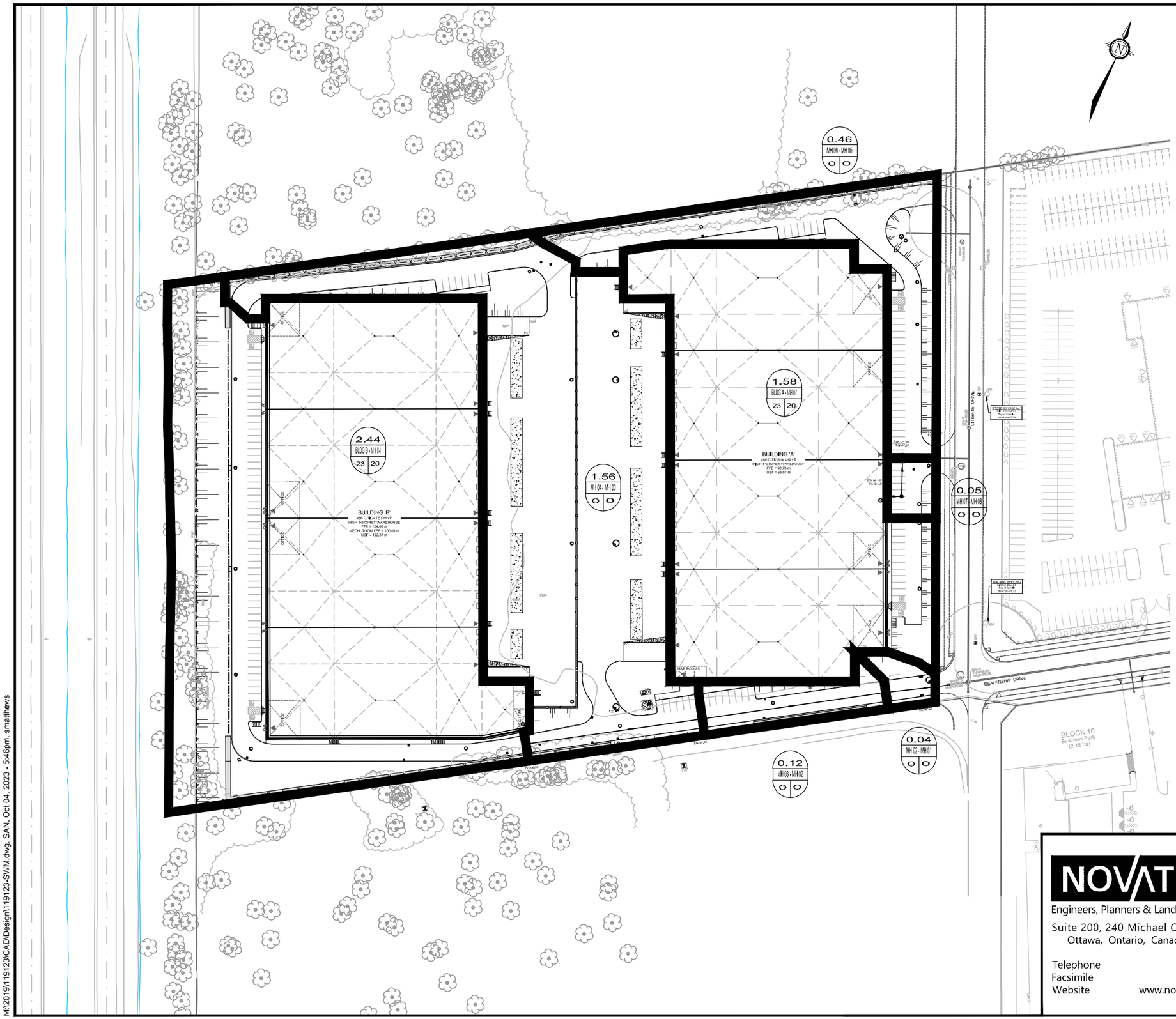
Notes:
1. Q(d) = Qind + Qcom + Qinf
2. Qind = (L*150 + W*950) * Mi / 86,400
3. Qcom = (Ao / 9.3) * 75 * Mc / 86,400
2. Qinf = 0.33 L/sec/ha

Min pipe size 250mm @ min. slope 0.4%
Mannings n = 0.013

Definitions:
Q(d) = Design Flow (L/sec)
Qind = Light Industrial Flow (L/sec)
Qcom = Commercial Flow (L/sec)
Qinf = Extraneous Flow (L/sec)

L = No. Loading Bay
W = No. Washroom
Mi = Light Industrial Peak Factor (as per Appendix 4-B.1 of the City of Ottawa Sewer Design Guidelines)
Qind = [(150 L / d / Loading Bay) + (950 L / d / Washroom)] * Mi

Ao = Office Area (m2)
Mc = Commercial Peak Factor = 1.5 (as per City of Ottawa Sewer Design Guidelines)
Qcom = (75 L / d) * (Ao / 9.3m2) * Mc



LEGEND

0.62 / MH 02 - MH 01 / 2 | 12 — DRAINAGE AREA I.D.; TRIBUTARY DRAINAGE AREA (ha); # LOADING BAYS / # WASHROOMS

SANITARY SEWER & FLOW DIRECTION

SANITARY DRAINAGE AREA BOUNDARY

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

480 & 486 CITIGATE DRIVE

ON-SITE SANITARY DRAINAGE AREAS

SCALE 1 : 1500 (0 15 30 45 60)

DATE OCT 2023 | JOB 119123 | FIGURE SAN-1

M:\2019\119123\CAD\Design\119123-SWM.dwg, SAN, Oct 04, 2023 - 5:46pm, smatthews

SHT11X17.DWG - 279mmX432mm

Project No. 119123
Project Name: 480 and 486 Citigate Dr
Project Location: Ottawa, ON

Date: September 2023

Proposed Peak Sanitary Flows

Daily Demands from OBC Table 8.2.1.3

Type of Use	Daily Demand Volume	
Industrial (warehouse)	150	L/day/loading bay
	950	L/day/washroom
Commercial (office Space)	75	L/ day/ 9.3 m2 of Office Space

Industrial & Commercial Sanitary Peaking Factors

Conditions	Peaking Factor
Office Space/Commercial	1.5
Light Industrial (warehouse)	4.6

Proposed Development Conditions

	Building A	Building B
No. Loading Bays	23	23
No. Washrooms	20	20
Peak Industrial Flows (L/s)	**1.20**	**1.20**
Office Space ~sq. m.	910	850
Peak Commercial Flows (L/s)	**0.13**	**0.12**
Site Area (ha)	2.09	4.16
Extraneuos Flows (0.33 L/s/ha)	**0.69**	**1.37**
Total Peak Sanitary Flows (L/s)	**2.01**	**2.69**


LEGEND
DRAINAGE AREA (hectares)
AREA ID
MANHOLE TO MANHOLE
SANITARY DRAINAGE AREA BOUNDARY
SANITARY SERVICE LOCATION
PROPOSED SANITARY MANHOLE AND PIPE (WITH FLOW DIRECTION)
REFER TO DRAWING 109203-CG-NTB FOR NOTES AND TABLES
SEE DRAWING No. 109203-CG-SAN1
FUTURE DEVELOPMENT (BY OTHERS)
BLOCK 3
O'KEEFE DRAIN BLOCK 19
NORTEL DRIVE
BLOCK 11
STORMWATER MANAGEMENT FACILITY
BLOCK 12
BLOCK 4
SANITARY OUTLET B
REFER TO 109203-CG-PS FOR SANITARY LIFT STATION DETAILS
STRANDHERD DRIVE
CROSSKEY PLACE
DEALERSHIP STREET
KENNEVALE DRIVE
FUTURE DEVELOPMENT (BY OTHERS)
BLOCK 10
BLOCK 9
BLOCK 8
BLOCK 5
BLOCK 6
PHILSAR STREET
O'KEEFE DRAIN BLOCK 7
120.0m-450mmØ SAN @ 0.14%
84.9m-450mmØ SAN @ 0.14%
98.7m-450mmØ SAN @ 0.20%
76.3m-450mmØ SAN @ 0.24%
56.4m-450mmØ SAN @ 0.14%
17.3m-200mmØ SAN @ 1.00%
14.9m-200mmØ SAN @ 1.00%
32.4m-450mmØ SAN @ 0.60%
19.2m-525mmØ SAN @ 0.40%
6.0m-250mmØ SAN @ 0.24%
4.5m-300mmØ SAN @ 0.20%
4.0m-300mmØ SAN @ 0.20%
27.06 B-1 501-503
2.72 B-2 501-503
3.20 B-7 505-507
2.51 B-10 507-509
3.39 B-16 509-511
0.04 B-19 513-515
0.20 B-18 511-513
0.24 B-17 509-511
0.28 B-4 501-503
0.29 B-6 503-505
0.20 B-9 505-507
0.13 B-11 507-509
0.19 B-15 601-509
2.14 B-14 511-513
2.14 B-3 501-503
1.84 B-5 503-505
1.64 B-8 505-507
22.68 C-1 FUT-501
0.23 B-13 603-601
1.62 B-12 603-601

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 ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

CITI GATE 416 CORPORATE CAMPUS
REGIONAL THE REGIONAL GROUP

No.	REVISION	DATE	BY
4.	ISSUED FOR SWM APPROVAL	AUG 10/14	MER
3.	ISSUED FOR APPROVAL	JUL 23/14	MER
2.	REV. PER CITY COMMENTS / ISS. FOR MOE APPROVAL	JUNE 27/14	MER
1.	ISSUED FOR CITY REVIEW	MAR 31/14	MER

SCALE 1:1000

DESIGN LAB
CHECKED MER
DRAWN MTM/BET
CHECKED MER
APPROVED JGR

LICENSED PROFESSIONAL ENGINEER M.E. RIDDELL 100040125 PROVINCE OF ONTARIO
REGISTERED PROFESSIONAL ENGINEER J.G. RIDDELL PROVINCE OF ONTARIO

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
CITI GATE 416 CORPORATE CAMPUS

DRAWING NAME
SANITARY DRAINAGE AREA PLAN (OUTLET B)

PROJECT No. 109203-00
REV # 4
DRAWING No. 109203-CG-SAN2

PLANB1.DWG - 1000mmx707mm

NOVATECH FILE NO.: 109203-0
CITY FILE NO.: D07-16-12-0023
DESIGNED BY: LAB
CHECKED BY: MER/MSP
PREPARED March 31, 2014
REVISED: August 10, 2014
REVISED: September 25, 2015 **AS-BUILT**

SANITARY SEWER DESIGN SHEET

Citi Gate 416 Corporate Campus
Phase 1 - As-Built

CITI GATE 416 CORPORATE CAMPUS

NOVATECH Engineers, Planners & Landscape Architects

Location						Wastewater Flow Q(w)		Extraneous Flow Q(i)		Design Flow Q(d)	Proposed Sanitary Sewer						
Area I.D.	Street	Block Number	From MH	To MH	Area (ha)	Individual Peak Flow Rate 50,000 L/ha/d (L/s)	Cumulative Peak Flow Rate (L/s)	Individual Infiltration Rate 0.28 L/s/ha (L/s)	Cumulative Infiltration Rate (L/s)	Peak Design Flow (L/s)	Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (L/s)	Full Flow Velocity (m/s)	Percentage of Capacity
Sanitary Outlet A to Strandherd Drive at Maravista Drive **Plan Reference: Sanitary Drainage Area Plan (109203-CG-SAN1)**																	
A-1	Nortel Drive		201	203	0.40	0.35	0.35	0.11	0.11	0.46							
A-2	Nortel Drive	Block 1	201	203	3.49	3.03	3.38	0.98	1.09	4.47							
A-3	Nortel Drive	Block 16	201	203	2.50	2.17	5.55	0.70	1.79	7.34							
A-4	Nortel Drive		201	203	0.09	0.08	5.63	0.03	1.81	7.44	***36.0***	250	PVC	***0.53***	45.16	0.89	16%
A-5	Nortel Drive		203	205	0.13	0.11	5.74	0.04	1.85	7.59	***57.5***	250	PVC	***0.28***	32.83	0.65	23%
A-6	Nortel Drive	Block 17	205	101	1.17	1.02	6.75	0.33	2.18	8.93							
A-7	Nortel Drive		205	101	0.20	0.17	6.93	0.06	2.23	9.16	***37.3***	250	PVC	***0.21***	28.43	0.56	32%
A-9	Crosskey Place		101	207	0.92	0.80	7.73	0.26	7.54	15.27							
A-8	Crosskey Place	Block 14	101	207	18.03	15.65	23.38	5.05	5.05	28.43	***29.0***	300	PVC	***0.17***	41.59	0.57	68%
A-10	Nortel Drive	Block 15	207	209	7.98	6.93	30.30	2.23	9.77	40.08							
A-11	Nortel Drive		207	209	0.30	0.26	30.56	0.08	9.86	40.42	***106.5***	300	PVC	***0.27***	52.42	0.72	77%
A-12	Nortel Drive		209	211	0.31	0.27	30.83	0.09	9.95	40.78	***118.8***	300	PVC	***0.29***	54.33	0.74	75%
A-13	Nortel Drive		211	213	0.31	0.27	31.10	0.09	10.03	41.13	***114.6***	300	PVC	***0.22***	47.32	0.65	87%
A-14	Systemhouse Street		213	401	0.07	0.06	31.16	0.02	10.05	41.22	***26.4***	300	PVC	***0.23***	48.38	0.66	85%
A-15	Systemhouse Street		401	403	0.21	0.18	31.35	0.06	10.11	41.46	***86.8***	300	PVC	***0.28***	53.38	0.73	78%
A-16	Systemhouse Street		403	405	0.29	0.25	31.60	0.08	10.19	41.79	***118.8***	300	PVC	***0.32***	57.07	0.78	73%
A-17	Systemhouse Street	Block 18	405	407	2.29	1.99	33.59	0.64	10.83	44.42							
A-18	Systemhouse Street		405	407	0.20	0.17	33.76	0.06	10.89	44.65	***80.4***	375	PVC	***0.14***	68.44	0.60	65%
A-19	Systemhouse Street	Block 2	407	409	11.95	10.37	44.13	3.35	14.24	58.37							
A-20	Systemhouse Street	Block 3	407	409	5.28	4.58	48.72	1.48	15.71	64.43							
A-21	Systemhouse Street		407	409	0.30	0.26	48.98	0.08	15.80	64.77	***117.2***	375	PVC	***0.25***	91.46	0.80	71%
A-22	Systemhouse Street		409	101	0.16	0.14	49.11	0.04	15.84	64.96	***54.8***	375	PVC	***0.24***	89.61	0.79	72%
										64.96							
					56.58												

Notes:
1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

Legend
0.20 As-built pipe grade (%) or length (m)

REGISTERED PROFESSIONAL ENGINEER
J.G. RIDDELL
25/9/15
PROVINCE OF ONTARIO

NOVATECH FILE NO.: 109203-0
CITY FILE NO.: D07-16-12-0023
DESIGNED BY: LAB
CHECKED BY: MER/MSP
DATE (Issued with report): March 31, 2014
REVISED : August 10, 2014
REVISED : September 25, 2015 **AS-BUILT**

SANITARY SEWER DESIGN SHEET

Citi Gate 416 Corporate Campus
Phase 1 - As-Built

Location						Wastewater Flow Q(w)		Extraneous Flow Q(i)		Design Flow Q(d)	Proposed Sanitary Sewer						
Area I.D.	Street	Block Number	From MH	To MH	Area (ha)	Individual Peak Flow Rate 50,000 L/ha/d (L/s)	Cumulative Peak Flow Rate (L/s)	Individual Infiltration Rate 0.28 L/s/ha (L/s)	Cumulative Infiltration Rate (L/s)	Peak Design Flow (L/s)	Length (m)	Pipe Size (mm)	Type of Pipe	Grade %	Capacity (L/s)	Full Flow Velocity (m/s)	Percentage of Capacity
Sanitary Outlet B to Strandherd Drive at Kennevale Drive **Plan** **Reference: Sanitary Drainage Area Plan (109203-CG-SAN2)**																	
C-1	Nortel Drive	Lands Owned by Others	Fut	501	22.68	19.69	19.69	6.35	6.35	26.04	***4.0***	300	PVC	***0.20***	45.12	0.62	58%
B-1	Dealership Street	Lands Owned by Others	Fut	501	27.06	23.49	23.49	7.58	7.58	31.07	***12.5***	300	PVC	***0.20***	45.12	0.62	69%
B-2	Dealership Street	Block 11	501	503	2.72	2.36	45.54	0.76	14.69	60.23							
B-3	Dealership Street	Block 10	501	503	2.14	1.86	47.40	0.60	15.29	62.68							
B-4	Dealership Street		501	503	0.28	0.24	47.64	0.08	15.37	63.01	***119.5***	450	PVC	***0.14***	111.29	0.68	57%
B-5	Dealership Street	Block 9	503	505	1.84	1.60	49.24	0.52	15.88	65.12							
B-6	Dealership Street		503	505	0.29	0.25	49.49	0.08	15.96	65.45	***119.2***	450	PVC	***0.16***	118.97	0.72	55%
B-7	Dealership Street	Block 12 (SWM)	505	507	3.20	2.78	52.27	0.90	16.86	69.12							
B-8	Dealership Street	Block 8	505	507	1.64	1.42	53.69	0.46	17.32	71.01							
B-9	Dealership Street		505	507	0.20	0.17	53.86	0.06	17.37	71.24	***85.7***	450	PVC	***0.12***	103.03	0.63	69%
B-10	Dealership Street	Block 19	507	509	2.51	2.18	56.04	0.70	18.08	74.12							
B-11	Dealership Street		507	509	0.13	0.11	56.15	0.04	18.11	74.27	***55.9***	450	PVC	***0.16***	118.97	0.72	62%
B-12	Philsar Street	Block 6	603	601	1.62	1.41	1.41	0.45	0.45	1.86							
B-13	Philsar Street		603	601	0.23	0.20	1.61	0.06	0.52	2.12	***41.2***	250	PVC	***0.19***	27.04	0.53	8%
B-15	Philsar Street		601	509	0.19	0.16	1.77	0.05	0.57	2.34	***101.2***	250	PVC	***0.25***	31.02	0.61	8%
B-16	Dealership Street	Block 4	509	511	3.39	2.94	60.87	0.95	19.63	80.50							
B-17	Dealership Street		509	511	0.24	0.21	61.08	0.07	19.70	80.78	***99.5***	450	PVC	***0.17***	122.63	0.75	66%
B-14	Dealership Street	Block 5	511	513	2.14	1.86	62.93	0.60	20.30	83.23							
B-18	Dealership Street		511	513	0.20	0.17	63.11	0.06	20.36	83.46	***75.9***	450	PVC	***0.20***	133.02	0.81	63%
B-19	Outlet to Lift Station		513	515	0.04	0.03	63.14	0.01	20.37	**83.51**	***35.5***	450	PVC	***0.42***	192.76	1.17	43%
					72.74												

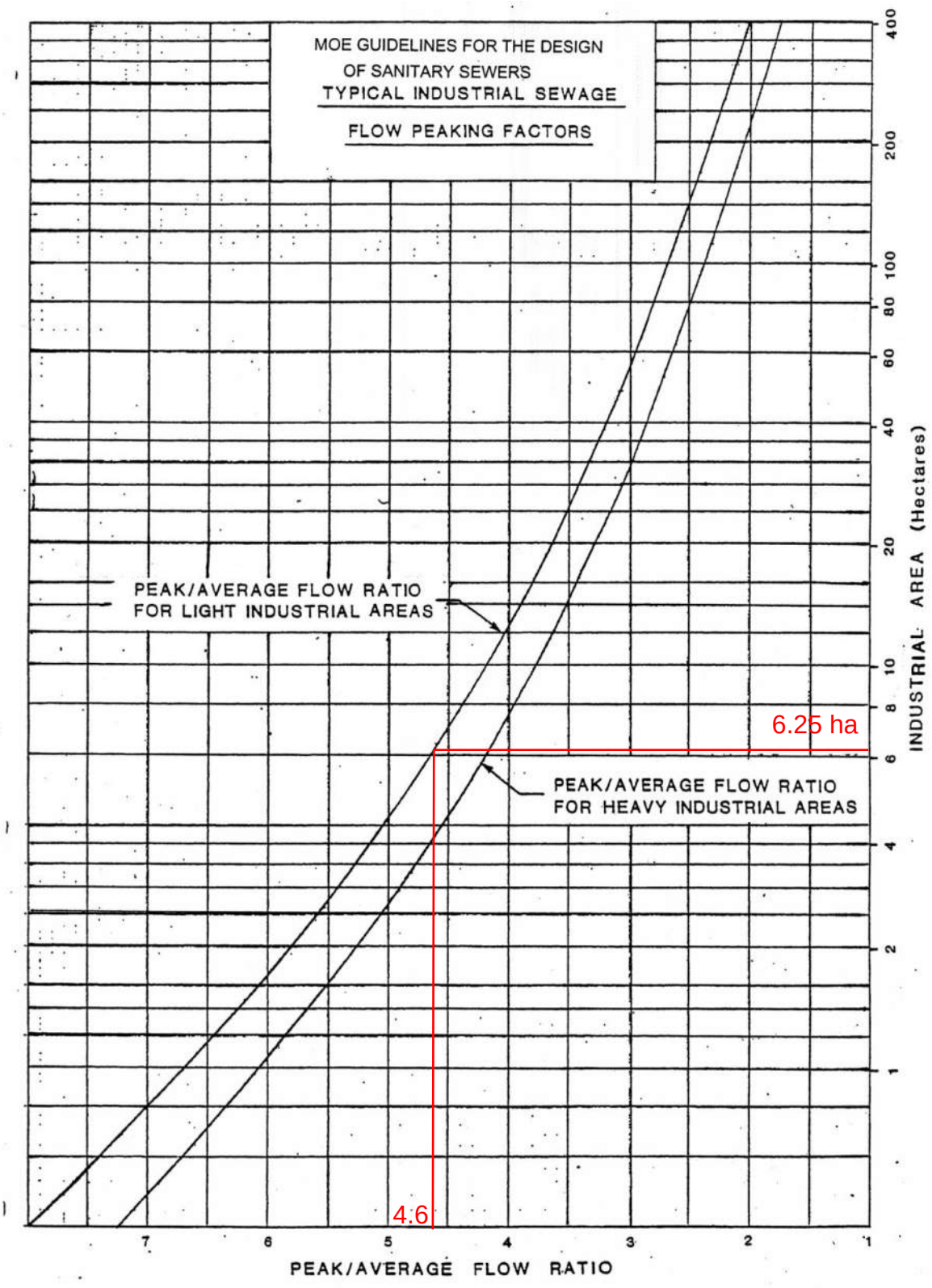
Notes:
1. Q(d) = Q(w) + Q(i) , where
2. Q(i) = 0.28 L/s/ha
3. Peaking Factor = 1.5

Q(d) = Design Flow (L/s)
Q(w) = Peak Wastewater Flow (L/s)
Q(i) = Extraneous Flow (L/s)

Legend:
0.20 As-built pipe grade (%) or length (m)

REGISTERED PROFESSIONAL ENGINEER
J.G. RIDDELL
25/9/15
PROVINCE OF ONTARIO

APPENDIX 4-B PEAKING FACTOR FOR INDUSTRIAL AREAS



Appendix D
Storm Servicing and Stormwater Management

480 & 486 Citigate Drive

Project No.: 119123

STORM SEWER DESIGN SHEET
480 & 486 Citigate Drive Servicing Strategy
FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
NORTH CORNER OF SUBJECT SITE TO CITIGATE DRIVE																							
					0.00	0.000	0.000	10.00															
AREA 4-1	CB 16	CBMH 10	0.01	0.90	0.01	0.035	0.035	10.00		104.19			4	4	0.254	250	PVC	1.10	23.1	65.0	1.28	0.30	6%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.30															
AREA 4-2	CBMH 10	MH 14	0.05	0.90	0.05	0.125	0.160	10.30		102.63			16.4	16	0.305	300	PVC	1.40	16.6	119.3	1.63	0.17	14%
					0.00	0.000	0.000	10.30															
					0.00	0.000	0.000	10.30															
					0.00	0.000	0.000	10.47															
	MH 14	MH 13			0.00	0.000	0.160	10.47		101.78			16	16	0.381	375	PVC	3.00	15.1	316.6	2.78	0.09	5%
					0.00	0.000	0.000	10.47															
					0.00	0.000	0.000	10.47															
								10.56															
					0.00	0.000	0.000	10.00															
AREA 4-3	MH 15	CBMH 11	0.09	0.70	0.06	0.175	0.175	10.00		104.19			18.2	18	0.305	300	PVC	3.00	61.4	174.6	2.39	0.43	10%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.43															
AREA 4-4	CBMH 11	MH 13	0.18	0.72	0.13	0.360	0.535	10.43		101.99			54.6	55	0.381	375	PVC	2.00	24.0	258.5	2.27	0.18	21%
					0.00	0.000	0.000	10.43															
					0.00	0.000	0.000	10.43															
								10.60															
					0.00	0.000	0.000	10.60															
	MH 13	MH 12			0.00	0.000	0.696	10.60		101.11			70	70	0.457	450	Conc	2.00	5.6	420.3	2.56	0.04	17%
					0.00	0.000	0.000	10.60															
					0.00	0.000	0.000	10.60															
					0.00	0.000	0.000	10.64															
	MH 12	EX STM MH			0.00	0.000	0.696	10.64		100.93			70.2	70	0.533	525	Conc	0.60	20.5	347.3	1.55	0.22	20%
					0.00	0.000	0.000	10.64															
					0.00	0.000	0.000	10.64															
								10.86															

480 & 486 Citigate Drive

Project No.: 119123

STORM SEWER DESIGN SHEET
480 & 486 Citigate Drive Servicing Strategy
FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
BUILDING A ROOF, BUILDING A PARKING LOT TO CITIGATE DRIVE																							
					0.00	0.000	0.000	10.00															
** AREA 3-RA **	BUILDING A	MH 10	1.48	0.90	1.33	3.703	3.703	10.00		104.19			386	26.3	0.305	300	PVC	2.00	11.7	142.5	1.95	0.10	18%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
								10.10															
					0.00	0.000	0.000	10.00															
AREA 6-1	CBMH 09	MH 11	0.06	0.88	0.05	0.137	0.137	10.00		104.19			14	14	0.457	450	Conc	0.20	26.0	132.9	0.81	0.54	11%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.54															
** AREA 6-1 **	MH 11	MH 10			0.00	0.000	0.137	10.54		101.45			14	4.7	0.305	300	PVC	0.35	6.8	59.6	0.82	0.14	8%
					0.00	0.000	0.000	10.54															
					0.00	0.000	0.000	10.54															
								10.67															
					0.00	0.000	0.000	10.67															
AREA 3-1	MH 10	CBMH 08			0.00	0.000	0.137	10.67		100.76			14	45	0.305	300	PVC	0.50	15.5	71.3	0.98	0.26	63%
					0.00	0.000	0.000	10.67															
					0.00	0.000	0.000	10.67															
					0.00	0.000	0.000	10.94															
	CBMH 08	EX STM MHST81658	0.08	0.90	0.07	0.188	0.325	10.94		99.48			32	63	0.533	525	Conc	0.60	12.9	347.3	1.55	0.14	18%
					0.00	0.000	0.000	10.94															
					0.00	0.000	0.000	10.94															
								11.08															

STORM SEWER DESIGN SHEET
480 & 486 Citigate Drive Servicing Strategy
FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
BUILDING B PARKING LOT, BUILDING B ROOF, LOADING DOCK TO DEALERSHIP DRIVE																							
					0.00	0.000	0.000	10.00															
AREA 1-1	CBMH 04	CBMH 03	0.17	0.41	0.07	0.194	0.194	10.00		104.19			20	20	0.305	300	PVC	1.00	34.5	100.8	1.38	0.42	20%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.42															
AREA 1-2	CBMH 03	CBMH 02	0.16	0.45	0.07	0.200	0.394	10.42		102.04			40	40	0.305	300	PVC	1.00	39.6	100.8	1.38	0.48	40%
					0.00	0.000	0.000	10.42															
					0.00	0.000	0.000	10.42															
					0.00	0.000	0.000	10.89															
AREA 1-3	CBMH 02	CBMH 01	0.16	0.45	0.07	0.200	0.594	10.89		99.70			59	59	0.305	300	PVC	1.00	41.7	100.8	1.38	0.50	59%
					0.00	0.000	0.000	10.89															
					0.00	0.000	0.000	10.89															
					0.00	0.000	0.000	11.40															
AREA 1-4	CBMH 01	MH 05	0.22	0.37	0.08	0.226	0.820	11.40		97.35			80	80	0.381	375	PVC	1.60	29.8	231.2	2.03	0.24	35%
					0.00	0.000	0.000	11.40															
					0.00	0.000	0.000	11.40															
					0.00	0.000	0.000	11.64															
AREA 2-1	MH 05	MH 04	0.15	0.54	0.08	0.225	1.046	11.64		96.25			101	101	0.381	375	PVC	3.00	84.5	316.6	2.78	0.51	32%
					0.00	0.000	0.000	11.64															
					0.00	0.000	0.000	11.64															
					0.00	0.000	0.000	10.00															
**** AREA 2-RB ****	MH 04	MH 03	1.52	0.90	1.37	3.803	3.803	10.00		104.19			396	26.7	0.381	375	PVC	3.00	61.2	316.6	2.78	0.37	55%
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	10.00															
					0.00	0.000	0.000	12.15															
AREA 2-2			0.13	0.67	0.09	0.242	1.288	12.15		94.06			121	148									
					0.00	0.000	0.000	12.15															
					0.00	0.000	0.000	12.15															
								12.52															

STORM SEWER DESIGN SHEET
480 & 486 Citigate Drive Servicing Strategy
FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA							
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
					0.00	0.000	0.000	10.00														
AREA 5-1	CB 11	CBMH 07	0.27	0.61	0.16	0.458	0.458	10.00		104.19			47.7	48	0.203	200	PVC	3.00	45.8	59.2	1.83	0.42	81%
					0.00	0.000	0.000	10.00														
					0.00	0.000	0.000	10.00														
					0.00	0.000	0.000	10.42														
AREA 5-2	CBMH 07	MH 08	0.22	0.90	0.20	0.550	1.008	10.42		102.03			102.9	103	0.305	300	PVC	3.00	16.2	174.6	2.39	0.11	59%
					0.00	0.000	0.000	10.42														
					0.00	0.000	0.000	10.42														
								10.53														
					0.00	0.000	0.000	10.00														
AREA 5-3	MH 09	MH 08	0.14	0.90	0.13	0.350	0.350	10.00		104.19			36.5	36	1.245	1220	Conc	0.20	16.0	1,921.0	1.58	0.17	2%
					0.00	0.000	0.000	10.00														
					0.00	0.000	0.000	10.00														
								10.17														
					0.00	0.000	0.000	10.53														
AREA 5-4	MH 08	MH 07	0.24	0.90	0.22	0.600	1.959	10.53		101.47			198.8	199	1.245	1220	Conc	0.20	62.3	1,921.0	1.58	0.66	10%
					0.00	0.000	0.000	10.53														
					0.00	0.000	0.000	10.53														
								11.19														
					0.00	0.000	0.000	10.00														
AREA 5-5	CBMH 06	MH 07	0.23	0.90	0.21	0.575	0.575	10.00		104.19			60.0	60	0.254	250	PVC	3.00	15.9	107.4	2.12	0.13	56%
					0.00	0.000	0.000	10.00														
					0.00	0.000	0.000	10.00														
								10.13														
					0.00	0.000	0.000	11.19														
AREA 5-6	MH 07	MH 06	0.19	0.86	0.16	0.454	2.989	11.19		98.31			293.8	294	1.245	1220	Conc	0.20	62.2	1,921.0	1.58	0.66	15%
					0.00	0.000	0.000	11.19														
					0.00	0.000	0.000	11.19														
								11.85														
					0.00	0.000	0.000	10.00														
AREA 5-7	CBMH 05	MH 06	0.11	0.90	0.10	0.275	0.275	10.00		104.19			28.7	29	0.254	250	PVC	3.00	16.0	107.4	2.12	0.13	27%
					0.00	0.000	0.000	10.00														
					0.00	0.000	0.000	10.00														
								10.13														
					0.00	0.000	0.000	11.85														
**** AREA 2-3 ****	MH 06	MH 03			0.00	0.000	3.264	11.85		95.36			311.3	141.1	0.381	375	PVC	1.00	7.6	182.8	1.60	0.08	77%
					0.00	0.000	0.000	11.85														
					0.00	0.000	0.000	11.85														
								11.92														

Project No.: 119123

STORM SEWER DESIGN SHEET
480 & 486 Citigate Drive Servicing Strategy
FLOW RATES BASED ON RATIONAL METHOD

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			AREA (ha)			FLOW								TOTAL FLOW	SEWER DATA								
Catchment ID	From Manhole	To Manhole	Area (ha)	C	AC (ha)	Indiv 2.78 AC	Accum 2.78 AC	Time of Concentration	Rainfall Intensity 2 Year (mm/hr)	Rainfall Intensity 5 Year (mm/hr)	Rainfall Intensity 10 Year (mm/hr)	Rainfall Intensity 100 Year (mm/hr)	Peak Flow (L/s)	Total Peak Flow, Q (L/s)	Dia. (m) Actual	Dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Flow Time (min)	Ratio Q/Q full
					0.00	0.000	0.000	12.52															
AREA 2-3	MH 03	MH 02	0.15	0.66	0.10	0.275	1.563	12.52		92.55			144.6	312	0.635	610	Conc	0.50	60.9	504.7	1.59	0.64	62%
					0.00	0.000	0.000	12.52															
					0.00	0.000	0.000	12.52															
					0.00	0.000	0.000	13.15															
AREA 2-4	MH 02	MH 01	0.12	0.55	0.07	0.183	1.746	13.15		90.04			157.2	325	0.635	610	Conc	0.50	60.9	504.7	1.59	0.64	64%
					0.00	0.000	0.000	13.15															
					0.00	0.000	0.000	13.15															
					0.00	0.000	0.000	13.79															
	MH 01	CAP			0.00	0.000	1.746	13.79		87.68			153.1	321	1.372	1350	Conc	0.10	7.0	1,760.2	1.19	0.10	18%
					0.00	0.000	0.000	13.79															
					0.00	0.000	0.000	13.79															
					0.00	0.000	0.000	13.89															
	CAP	EX STM MHSTM74434			0.00	0.000	1.746	13.89		87.33			152.5	320	1.372	1350	Conc	0.10	4.5	1,760.2	1.19	0.06	18%
					0.00	0.000	0.000	13.89															
					0.00	0.000	0.000	13.89															
								13.95															

Q = 2.78 AIC, where

Q = Peak Flow in Litres per Second (L/s)

A = Area in hectares (ha)

I = Rainfall Intensity (mm/hr), 5 year storm

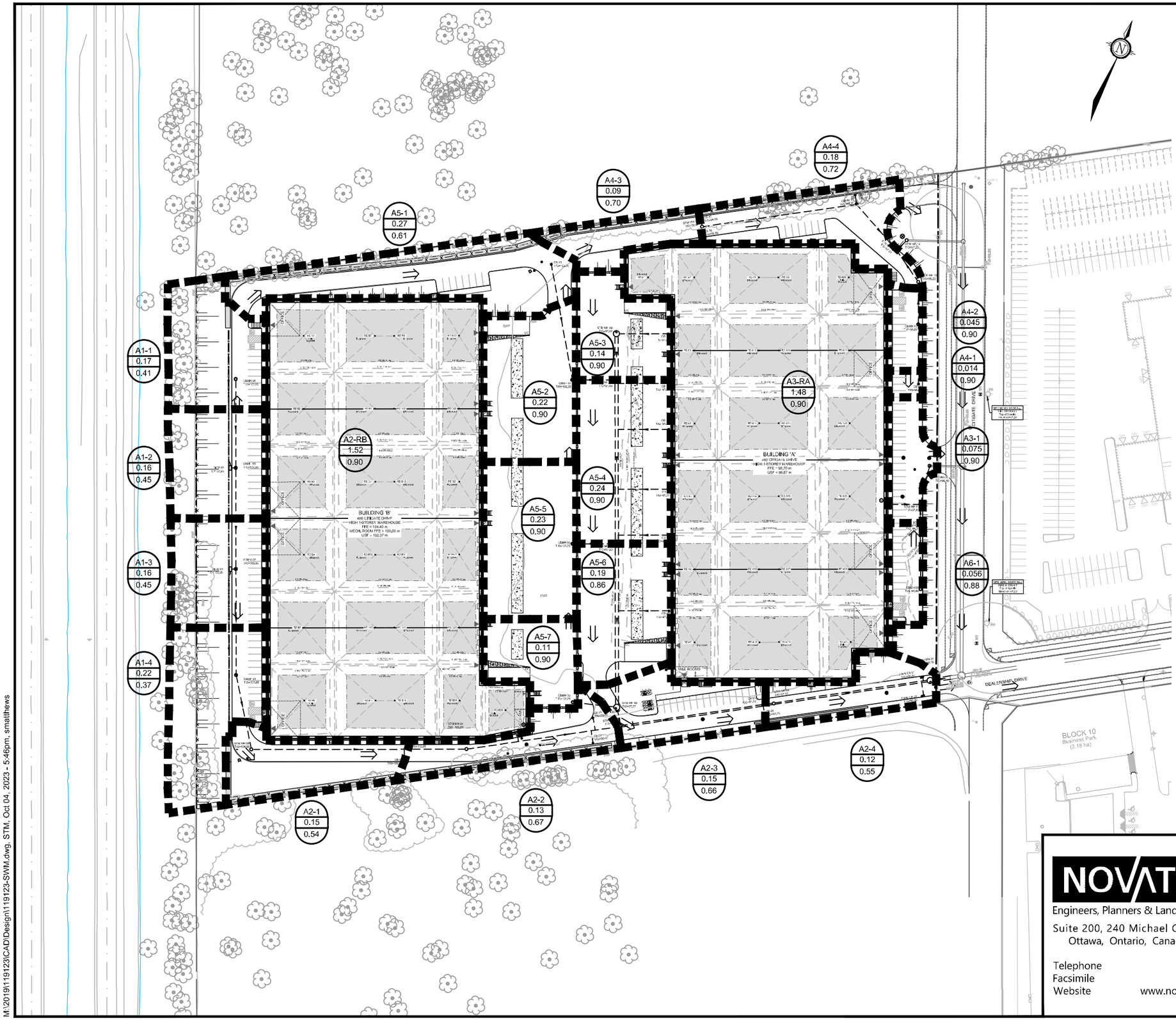
C = Runoff Coefficient

** AREA R-A ** = Controlled Flow Release Rate

Consultant:	**Novatech**	
Issued Date:	May 3, 2023	
Revised Date:	October 2, 2023	
Design By:	BM	
Client:	**Dwg. Reference:**	**Checked By:**
ROSEFELLOW	119123-STM	DDB

Legend:

10.00	Storm sewers designed to the 2 year event (without ponding) for local roads
10.00	Storm sewers designed to the 5 year event (without ponding) for collector roads
10.00	Storm sewers designed to the 10 year event (without ponding) for arterial roads
10.00	Storm sewers designed to the 100 year event (without ponding)



LEGEND

A5-3
0.38
0.90

DRAINAGE AREA I.D.

TRIBUTARY DRAINAGE AREA (ha)

1:5 YEAR WEIGHTED RUNOFF COEFFICIENT

STORM SEWER & FLOW DIRECTION

STORM DRAINAGE AREA BOUNDARY

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

480 & 486 CITIGATE DRIVE

ON-SITE STORM DRAINAGE AREAS

SCALE 1 : 1500 (0 15 30 45 60)

DATE OCT 2023 | JOB 119123 | FIGURE STM-1

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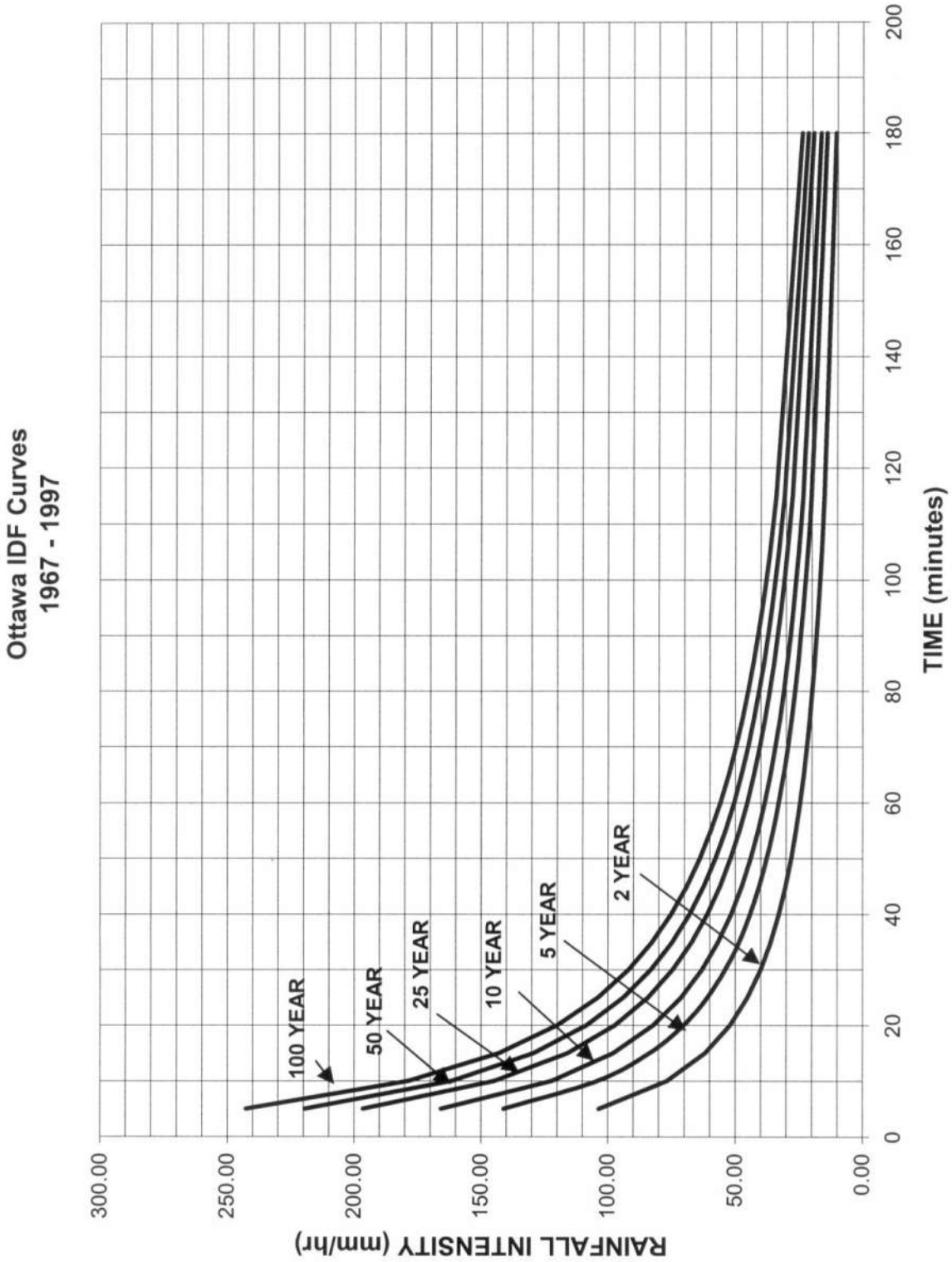
SHT11X17.DWG - 279mmX432mm

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



Project #: 119123
Project Name: 480 486 Citigate
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 9/29/2023

Proposed Industrial Development
480 & 486 Citigate Drive - Warehouses 'A' and 'B'

Pre - Development Site Flows

Description	Area (ha)	$A_{impervious}$ (ha) C=0.9	A_{gravel} (ha) C=0.6	$A_{pervious}$ (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_w	Allowable Flow 5-year (L/s)	Allowable Flow 100-year (L/s)
Total Site Area to be Developed	6.04	0.00	0.00	6.04	0.20	0.25	257.9	349.9	749.7	**0.8**	**1399.6**	**1679.5**
Off-Site Tributary Area (OS-1)	0.22	0.00	0.00	0.22	0.20	0.25	9.4	12.7	27.3	**-**	**12.7**	**27.3**
	6.26								* Allowable Site Flow + Off-Site Flows conveyeyed to Citigate Drive =		**1412.4**	**1706.8**

* Allowable Site Flows are based on design criteria provided in the CitiGate Campus SWM Report.

Post - Development Site Flows

Area	Description	Area (ha)	A_{imp} (ha) C=0.9	A_{perv} (ha) C=0.2	C_5	C_{100}	Uncontrolled Flow (L/s) 2-year	Uncontrolled Flow (L/s) 5-year	Uncontrolled Flow (L/s) 100-year	Controlled Flow (L/s) 2-year	Controlled Flow (L/s) 5-year	Controlled Flow (L/s) 100-year	Storage Required (m^3) 2-year	Storage Required (m^3) 5-year	Storage Required (m^3) 100-year	Storage Provided (m^3)
A-0	Un-Controlled Direct Runoff	0.15	0.03	0.12	0.34	0.40	10.9	14.8	29.8	-	-	-	-	-	-	-
A-1	Un-Controlled Bldg 'B' Parking + OS1	0.72	0.22	0.50	0.41	0.48	63.6	86.3	171.3	-	-	-	-	-	-	-
A-2	Un-Controlled South Drive Aisle	0.54	0.31	0.23	0.60	0.68	69.4	94.1	182.4	-	-	-	-	-	-	-
A-3	Un-Controlled Bldg 'A' Parking	0.075	0.075	0.000	0.90	1.00	14.4	19.6	37.2	-	-	-	-	-	-	-
A-4	Un-Controlled North Drive Aisle	0.325	0.255	0.070	0.75	0.84	52.0	70.5	135.3	-	-	-	-	-	-	-
A-5	Controlled Loading Docks	1.39	1.27	0.12	0.84	0.94	-	-	-	110.7	141.1	182.4	137	191	435	678
A-6	Controlled Bldg 'A' Parking	0.056	0.054	0.002	0.88	0.97	-	-	-	3.6	4.7	5.9	7	9	20	39
R-1	Controlled Flow Roof - Building 'A'	1.48	1.48	0.00	0.90	1.00	-	-	-	23.1	26.3	30.9	246	363	755	803
R-2	Controlled Flow Roof - Building 'B'	1.52	1.52	0.00	0.90	1.00	-	-	-	23.1	26.7	32.1	254	374	772	823
Totals :		6.26	-	-	-	-	**210.3**	**285.3**	**556.0**	**160.6**	**198.9**	**251.3**	**643**	**937**	**1982**	**2342**
									Total Stormwater Flows :	**370.9**	**484.2**	**807.2**				

T_c = 10mins

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-0 **Un-Controlled Direct Runoff**

OTTAWA IDF CURVE

Area =	0.15	ha	Qallow =	10.9	L/s
C =	0.34		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	14.68	3.79	1.14
10	76.81	10.89	0.00	0.00
15	61.77	8.76	-2.13	-1.92
20	52.03	7.38	-3.51	-4.21
25	45.17	6.40	-4.49	-6.73
30	40.04	5.68	-5.21	-9.38
35	36.06	5.11	-5.78	-12.13
40	32.86	4.66	-6.23	-14.95
45	30.24	4.29	-6.60	-17.83
50	28.04	3.98	-6.91	-20.74
55	26.17	3.71	-7.18	-23.69
60	24.56	3.48	-7.41	-26.67
75	20.81	2.95	-7.94	-35.72
90	18.14	2.57	-8.32	-44.91
120	14.56	2.06	-8.82	-63.54
150	12.25	1.74	-9.15	-82.37
180	10.63	1.51	-9.38	-101.33
210	9.42	1.33	-9.55	-120.39

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-0 **Un-Controlled Direct Runoff**

OTTAWA IDF CURVE

Area =	0.15	ha	Qallow =	14.8	L/s
C =	0.34		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	20.02	5.24	1.57
10	104.19	14.77	0.00	0.00
15	83.56	11.85	-2.93	-2.63
20	70.25	9.96	-4.81	-5.77
25	60.90	8.63	-6.14	-9.21
30	53.93	7.65	-7.13	-12.83
35	48.52	6.88	-7.89	-16.58
40	44.18	6.26	-8.51	-20.42
45	40.63	5.76	-9.01	-24.33
50	37.65	5.34	-9.43	-28.30
55	35.12	4.98	-9.79	-32.32
60	32.94	4.67	-10.10	-36.37
75	27.89	3.95	-10.82	-48.68
90	24.29	3.44	-11.33	-61.18
120	19.47	2.76	-12.01	-86.49
150	16.36	2.32	-12.45	-112.07
180	14.18	2.01	-12.76	-137.83
210	12.56	1.78	-12.99	-163.70

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-0 **Un-Controlled Direct Runoff**

OTTAWA IDF CURVE

Area =	0.15	ha	Qallow =	29.8	L/s
C =	0.40		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	40.48	10.70	3.21
10	178.56	29.78	0.00	0.00
15	142.89	23.83	-5.95	-5.35
20	119.95	20.01	-9.78	-11.73
25	103.85	17.32	-12.46	-18.69
30	91.87	15.32	-14.46	-26.03
35	82.58	13.77	-16.01	-33.62
40	75.15	12.53	-17.25	-41.40
45	69.05	11.52	-18.27	-49.32
50	63.95	10.67	-19.12	-57.35
55	59.62	9.95	-19.84	-65.47
60	55.89	9.32	-20.46	-73.66
75	47.26	7.88	-21.90	-98.56
90	41.11	6.86	-22.93	-123.80
120	32.89	5.49	-24.30	-174.94
150	27.61	4.61	-25.18	-226.60
180	23.90	3.99	-25.80	-278.60
210	21.14	3.53	-26.26	-330.84

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-0 **Un-Controlled Direct Runoff**

OTTAWA IDF CURVE

Area =	0.15	ha	Qallow =	35.7	L/s
C =	0.40		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	48.58	12.84	3.85
10	214.27	35.74	0.00	0.00
15	171.47	28.60	-7.14	-6.42
20	143.94	24.01	-11.73	-14.08
25	124.62	20.79	-14.95	-22.43
30	110.24	18.39	-17.35	-31.23
35	99.09	16.53	-19.21	-40.34
40	90.17	15.04	-20.70	-49.68
45	82.86	13.82	-21.92	-59.18
50	76.74	12.80	-22.94	-68.82
55	71.55	11.93	-23.81	-78.56
60	67.07	11.19	-24.55	-88.39
75	56.71	9.46	-26.28	-118.27
90	49.33	8.23	-27.51	-148.56
120	39.47	6.58	-29.16	-209.92
150	33.13	5.53	-30.21	-271.92
180	28.68	4.78	-30.96	-334.33
210	25.37	4.23	-31.51	-397.00

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-1 Un-Controlled Parking + Area OS1

OTTAWA IDF CURVE

Area =	0.72	ha	Qallow =	63.6	L/s
C =	0.41		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	85.80	22.17	6.65
10	76.81	63.63	0.00	0.00
15	61.77	51.17	-12.46	-11.21
20	52.03	43.10	-20.52	-24.63
25	45.17	37.42	-26.21	-39.32
30	40.04	33.17	-30.45	-54.82
35	36.06	29.87	-33.76	-70.89
40	32.86	27.23	-36.40	-87.37
45	30.24	25.05	-38.58	-104.16
50	28.04	23.23	-40.40	-121.19
55	26.17	21.68	-41.95	-138.43
60	24.56	20.34	-43.28	-155.82
75	20.81	17.24	-46.39	-208.74
90	18.14	15.03	-48.60	-262.43
120	14.56	12.06	-51.56	-371.27
150	12.25	10.15	-53.48	-481.31
180	10.63	8.80	-54.82	-592.11
210	9.42	7.80	-55.83	-703.43

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-1 Un-Controlled Parking + Area OS1

OTTAWA IDF CURVE

Area =	0.72	ha	Qallow =	86.3	L/s
C =	0.41		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	116.96	30.64	9.19
10	104.19	86.32	0.00	0.00
15	83.56	69.22	-17.10	-15.39
20	70.25	58.20	-28.12	-33.74
25	60.90	50.45	-35.87	-53.80
30	53.93	44.68	-41.64	-74.96
35	48.52	40.19	-46.12	-96.86
40	44.18	36.60	-49.71	-119.31
45	40.63	33.66	-52.66	-142.18
50	37.65	31.19	-55.12	-165.37
55	35.12	29.10	-57.22	-188.83
60	32.94	27.29	-59.03	-212.49
75	27.89	23.10	-63.21	-284.46
90	24.29	20.12	-66.20	-357.46
120	19.47	16.13	-70.19	-505.37
150	16.36	13.55	-72.76	-654.86
180	14.18	11.75	-74.57	-805.36
210	12.56	10.40	-75.92	-956.55

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-1 Un-Controlled Parking + Area OS1

OTTAWA IDF CURVE

Area =	0.72	ha	Qallow =	171.3	L/s
C =	0.48		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	232.78	61.52	18.46
10	178.56	171.26	0.00	0.00
15	142.89	137.05	-34.21	-30.79
20	119.95	115.04	-56.21	-67.45
25	103.85	99.60	-71.66	-107.48
30	91.87	88.11	-83.15	-149.66
35	82.58	79.20	-92.05	-193.32
40	75.15	72.07	-99.18	-238.04
45	69.05	66.23	-105.03	-283.58
50	63.95	61.34	-109.92	-329.75
55	59.62	57.19	-114.07	-376.43
60	55.89	53.61	-117.65	-423.53
75	47.26	45.32	-125.93	-566.70
90	41.11	39.43	-131.83	-711.86
120	32.89	31.55	-139.71	-1005.89
150	27.61	26.48	-144.77	-1302.97
180	23.90	22.92	-148.33	-1601.98
210	21.14	20.28	-150.98	-1902.30

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-1 Un-Controlled Parking + Area OS1

OTTAWA IDF CURVE

Area =	0.72	ha	Qallow =	205.5	L/s
C =	0.48		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	279.33	73.83	22.15
10	214.27	205.51	0.00	0.00
15	171.47	164.46	-41.05	-36.94
20	143.94	138.05	-67.45	-80.94
25	124.62	119.52	-85.99	-128.98
30	110.24	105.73	-99.77	-179.59
35	99.09	95.04	-110.47	-231.98
40	90.17	86.49	-119.02	-285.65
45	82.86	79.47	-126.04	-340.30
50	76.74	73.61	-131.90	-395.70
55	71.55	68.62	-136.88	-451.72
60	67.07	64.33	-141.18	-508.24
75	56.71	54.39	-151.12	-680.04
90	49.33	47.32	-158.19	-854.24
120	39.47	37.86	-167.65	-1207.06
150	33.13	31.78	-173.73	-1563.56
180	28.68	27.51	-178.00	-1922.37
210	25.37	24.34	-181.17	-2282.76

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-2 **Un-Controlled South Drive Aisle**

OTTAWA IDF CURVE

Area =	0.54	ha	Qallow =	69.4	L/s
C =	0.60		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	93.58	24.18	7.26
10	76.81	69.39	0.00	0.00
15	61.77	55.81	-13.59	-12.23
20	52.03	47.01	-22.38	-26.86
25	45.17	40.81	-28.58	-42.88
30	40.04	36.18	-33.21	-59.79
35	36.06	32.58	-36.81	-77.31
40	32.86	29.69	-39.70	-95.28
45	30.24	27.32	-42.07	-113.59
50	28.04	25.34	-44.06	-132.17
55	26.17	23.65	-45.75	-150.97
60	24.56	22.19	-47.21	-169.94
75	20.81	18.80	-50.59	-227.65
90	18.14	16.39	-53.00	-286.21
120	14.56	13.16	-56.24	-404.90
150	12.25	11.07	-58.32	-524.92
180	10.63	9.60	-59.79	-645.76
210	9.42	8.51	-60.89	-767.17

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-2 **Un-Controlled South Drive Aisle**

OTTAWA IDF CURVE

Area =	0.54	ha	Qallow =	94.1	L/s
C =	0.60		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	127.55	33.42	10.02
10	104.19	94.14	0.00	0.00
15	83.56	75.49	-18.64	-16.78
20	70.25	63.47	-30.67	-36.80
25	60.90	55.02	-39.12	-58.68
30	53.93	48.72	-45.41	-81.75
35	48.52	43.84	-50.30	-105.64
40	44.18	39.92	-54.22	-130.12
45	40.63	36.71	-57.43	-155.06
50	37.65	34.02	-60.12	-180.36
55	35.12	31.73	-62.40	-205.93
60	32.94	29.76	-64.37	-231.75
75	27.89	25.20	-68.94	-310.24
90	24.29	21.94	-72.19	-389.85
120	19.47	17.59	-76.55	-551.16
150	16.36	14.78	-79.36	-714.20
180	14.18	12.81	-81.33	-878.33
210	12.56	11.34	-82.79	-1043.21

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-2 **Un-Controlled South Drive Aisle**

OTTAWA IDF CURVE

Area =	0.54	ha	Qallow =	182.4	L/s
C =	0.68		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	247.96	65.53	19.66
10	178.56	182.42	0.00	0.00
15	142.89	145.99	-36.44	-32.79
20	119.95	122.55	-59.88	-71.85
25	103.85	106.10	-76.33	-114.49
30	91.87	93.86	-88.57	-159.42
35	82.58	84.37	-98.06	-205.92
40	75.15	76.77	-105.65	-253.57
45	69.05	70.55	-111.88	-302.07
50	63.95	65.34	-117.09	-351.26
55	59.62	60.91	-121.51	-400.98
60	55.89	57.10	-125.32	-451.15
75	47.26	48.28	-134.15	-603.66
90	41.11	42.00	-140.42	-758.29
120	32.89	33.61	-148.82	-1071.49
150	27.61	28.21	-154.22	-1387.95
180	23.90	24.42	-158.00	-1706.45
210	21.14	21.60	-160.82	-2026.36

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-2 **Un-Controlled South Drive Aisle**

OTTAWA IDF CURVE

Area =	0.54	ha	Qallow =	218.9	L/s
C =	0.68		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	297.55	78.64	23.59
10	214.27	218.91	0.00	0.00
15	171.47	175.19	-43.72	-39.35
20	143.94	147.06	-71.85	-86.22
25	124.62	127.31	-91.60	-137.39
30	110.24	112.63	-106.28	-191.31
35	99.09	101.24	-117.67	-247.11
40	90.17	92.13	-126.78	-304.28
45	82.86	84.65	-134.26	-362.49
50	76.74	78.41	-140.50	-421.51
55	71.55	73.10	-145.81	-481.18
60	67.07	68.53	-150.38	-541.38
75	56.71	57.93	-160.98	-724.39
90	49.33	50.40	-168.51	-909.95
120	39.47	40.33	-178.58	-1285.79
150	33.13	33.85	-185.06	-1665.54
180	28.68	29.30	-189.61	-2047.74
210	25.37	25.92	-192.99	-2431.64

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-3 Un-Controlled Parking & Drive Aisles

OTTAWA IDF CURVE

Area =	0.08	ha	Qallow =	14.4	L/s
C =	0.90		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	19.44	5.02	1.51
10	76.81	14.41	0.00	0.00
15	61.77	11.59	-2.82	-2.54
20	52.03	9.76	-4.65	-5.58
25	45.17	8.48	-5.94	-8.91
30	40.04	7.51	-6.90	-12.42
35	36.06	6.77	-7.65	-16.06
40	32.86	6.17	-8.25	-19.79
45	30.24	5.67	-8.74	-23.59
50	28.04	5.26	-9.15	-27.45
55	26.17	4.91	-9.50	-31.36
60	24.56	4.61	-9.80	-35.30
75	20.81	3.91	-10.51	-47.28
90	18.14	3.40	-11.01	-59.44
120	14.56	2.73	-11.68	-84.10
150	12.25	2.30	-12.11	-109.02
180	10.63	1.99	-12.42	-134.12
210	9.42	1.77	-12.65	-159.34

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-3 Un-Controlled Parking & Drive Aisles

OTTAWA IDF CURVE

Area =	0.08	ha	Qallow =	19.6	L/s
C =	0.90		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	26.49	6.94	2.08
10	104.19	19.55	0.00	0.00
15	83.56	15.68	-3.87	-3.49
20	70.25	13.18	-6.37	-7.64
25	60.90	11.43	-8.12	-12.19
30	53.93	10.12	-9.43	-16.98
35	48.52	9.10	-10.45	-21.94
40	44.18	8.29	-11.26	-27.03
45	40.63	7.62	-11.93	-32.21
50	37.65	7.07	-12.49	-37.46
55	35.12	6.59	-12.96	-42.77
60	32.94	6.18	-13.37	-48.13
75	27.89	5.23	-14.32	-64.43
90	24.29	4.56	-14.99	-80.97
120	19.47	3.65	-15.90	-114.47
150	16.36	3.07	-16.48	-148.33
180	14.18	2.66	-16.89	-182.42
210	12.56	2.36	-17.20	-216.67

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-3 Un-Controlled Parking & Drive Aisles

OTTAWA IDF CURVE

Area =	0.08	ha	Qallow =	37.2	L/s
C =	1.00		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	50.60	13.37	4.01
10	178.56	37.23	0.00	0.00
15	142.89	29.79	-7.44	-6.69
20	119.95	25.01	-12.22	-14.66
25	103.85	21.65	-15.58	-23.37
30	91.87	19.15	-18.08	-32.54
35	82.58	17.22	-20.01	-42.03
40	75.15	15.67	-21.56	-51.75
45	69.05	14.40	-22.83	-61.65
50	63.95	13.33	-23.90	-71.69
55	59.62	12.43	-24.80	-81.83
60	55.89	11.65	-25.58	-92.07
75	47.26	9.85	-27.38	-123.20
90	41.11	8.57	-28.66	-154.75
120	32.89	6.86	-30.37	-218.67
150	27.61	5.76	-31.47	-283.25
180	23.90	4.98	-32.25	-348.26
210	21.14	4.41	-32.82	-413.54

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-3 Un-Controlled Parking & Drive Aisles

OTTAWA IDF CURVE

Area =	0.08	ha	Qallow =	44.7	L/s
C =	1.00		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	60.72	16.05	4.81
10	214.27	44.68	0.00	0.00
15	171.47	35.75	-8.92	-8.03
20	143.94	30.01	-14.66	-17.60
25	124.62	25.98	-18.69	-28.04
30	110.24	22.99	-21.69	-39.04
35	99.09	20.66	-24.01	-50.43
40	90.17	18.80	-25.87	-62.10
45	82.86	17.28	-27.40	-73.98
50	76.74	16.00	-28.67	-86.02
55	71.55	14.92	-29.76	-98.20
60	67.07	13.98	-30.69	-110.49
75	56.71	11.82	-32.85	-147.83
90	49.33	10.29	-34.39	-185.70
120	39.47	8.23	-36.45	-262.41
150	33.13	6.91	-37.77	-339.91
180	28.68	5.98	-38.70	-417.91
210	25.37	5.29	-39.39	-496.25

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-4 Un-Controlled Northh Drive Aisle

OTTAWA IDF CURVE

Area =	0.33	ha	Qallow =	52.0	L/s
C =	0.75		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	70.11	18.12	5.44
10	76.81	51.99	0.00	0.00
15	61.77	41.81	-10.18	-9.16
20	52.03	35.22	-16.77	-20.12
25	45.17	30.57	-21.42	-32.13
30	40.04	27.11	-24.89	-44.79
35	36.06	24.41	-27.58	-57.92
40	32.86	22.25	-29.74	-71.39
45	30.24	20.47	-31.52	-85.11
50	28.04	18.98	-33.01	-99.03
55	26.17	17.72	-34.28	-113.11
60	24.56	16.62	-35.37	-127.32
75	20.81	14.09	-37.90	-170.56
90	18.14	12.28	-39.71	-214.43
120	14.56	9.86	-42.13	-303.37
150	12.25	8.29	-43.70	-393.28
180	10.63	7.19	-44.80	-483.82
210	9.42	6.37	-45.62	-574.79

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-4 Un-Controlled Northh Drive Aisle

OTTAWA IDF CURVE

Area =	0.33	ha	Qallow =	70.5	L/s
C =	0.75		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	95.57	25.04	7.51
10	104.19	70.53	0.00	0.00
15	83.56	56.56	-13.97	-12.57
20	70.25	47.56	-22.98	-27.57
25	60.90	41.22	-29.31	-43.96
30	53.93	36.51	-34.03	-61.25
35	48.52	32.84	-37.69	-79.15
40	44.18	29.91	-40.62	-97.49
45	40.63	27.50	-43.03	-116.18
50	37.65	25.49	-45.04	-135.13
55	35.12	23.78	-46.76	-154.29
60	32.94	22.30	-48.23	-173.63
75	27.89	18.88	-51.65	-232.44
90	24.29	16.44	-54.09	-292.09
120	19.47	13.18	-57.35	-412.94
150	16.36	11.08	-59.46	-535.10
180	14.18	9.60	-60.93	-658.07
210	12.56	8.50	-62.03	-781.61

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-4 Un-Controlled Northh Drive Aisle

OTTAWA IDF CURVE

Area =	0.33	ha	Qallow =	135.3	L/s
C =	0.84		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	183.86	48.59	14.58
10	178.56	135.27	0.00	0.00
15	142.89	108.25	-27.02	-24.32
20	119.95	90.87	-44.40	-53.28
25	103.85	78.67	-56.60	-84.90
30	91.87	69.59	-65.67	-118.21
35	82.58	62.56	-72.71	-152.69
40	75.15	56.93	-78.34	-188.02
45	69.05	52.31	-82.96	-223.99
50	63.95	48.45	-86.82	-260.46
55	59.62	45.17	-90.10	-297.33
60	55.89	42.34	-92.92	-334.53
75	47.26	35.80	-99.47	-447.61
90	41.11	31.14	-104.12	-562.27
120	32.89	24.92	-110.35	-794.50
150	27.61	20.92	-114.35	-1029.16
180	23.90	18.11	-117.16	-1265.33
210	21.14	16.02	-119.25	-1502.54

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA A-4 Un-Controlled Northh Drive Aisle

OTTAWA IDF CURVE

Area =	0.33	ha	Qallow =	162.3	L/s
C =	0.84		Vol(max) =	0.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	220.63	58.31	17.49
10	214.27	162.32	0.00	0.00
15	171.47	129.90	-32.42	-29.18
20	143.94	109.04	-53.28	-63.93
25	124.62	94.40	-67.92	-101.88
30	110.24	83.51	-78.81	-141.85
35	99.09	75.07	-87.25	-183.23
40	90.17	68.31	-94.01	-225.62
45	82.86	62.77	-99.55	-268.78
50	76.74	58.14	-104.18	-312.55
55	71.55	54.20	-108.12	-356.79
60	67.07	50.81	-111.51	-401.43
75	56.71	42.96	-119.36	-537.13
90	49.33	37.37	-124.95	-674.72
120	39.47	29.90	-132.42	-953.41
150	33.13	25.10	-137.22	-1234.99
180	28.68	21.73	-140.59	-1518.39
210	25.37	19.22	-143.10	-1803.05

Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-5 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE — Qpeak = 110.7 L/s
Area = 1.39 ha — Qavg = 55.4 L/s
C = 0.84 — Vol(max) = 136.8 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	336.01	280.66	84.20
10	76.81	249.18	193.83	116.30
15	61.77	200.39	145.04	130.54
20	52.03	168.80	113.45	136.14
25	45.17	146.53	91.18	136.78
30	40.04	129.91	74.56	134.21
35	36.06	116.99	61.64	129.43
40	32.86	106.62	51.27	123.05
45	30.24	98.10	42.75	115.44
50	28.04	90.97	35.62	106.87
55	26.17	84.90	29.55	97.53
60	24.56	79.67	24.32	87.56
65	23.15	75.11	19.76	77.06
70	21.91	71.09	15.74	66.11
75	20.81	67.52	12.17	54.78
90	18.14	58.86	3.51	18.96
105	16.13	52.34	-3.01	-18.95
120	14.56	47.24	-8.11	-58.37
135	13.30	43.13	-12.22	-98.94
150	12.25	39.75	-15.60	-140.42

Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-5 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE — Qpeak = 141.1 L/s
Area = 1.39 ha — Qavg = 70.6 L/s
C = 0.84 — Vol(max) = 190.5 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	458.02	387.47	116.24
10	104.19	338.03	267.48	160.49
15	83.56	271.08	200.53	180.48
20	70.25	227.91	157.36	188.84
25	60.90	197.56	127.01	190.52
30	53.93	174.96	104.41	187.93
35	48.52	157.40	86.85	182.39
40	44.18	143.35	72.80	174.71
45	40.63	131.81	61.26	165.40
50	37.65	122.16	51.61	154.82
55	35.12	113.95	43.40	143.22
60	32.94	106.88	36.33	130.78
65	31.04	100.71	30.16	117.64
70	29.37	95.29	24.74	103.91
75	27.89	90.48	19.93	89.67
90	24.29	78.80	8.25	44.54
105	21.58	70.02	-0.53	-3.35
120	19.47	63.16	-7.39	-53.22
135	17.76	57.63	-12.92	-104.62
150	16.36	53.08	-17.47	-157.21

Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-5 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE — Qpeak = 182.4 L/s
Area = 1.39 ha — Qavg = 91.2 L/s
C = 0.94 — Vol(max) = 435.2 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	877.13	785.93	235.78
10	178.56	645.31	554.11	332.47
15	142.89	516.42	425.22	382.70
20	119.95	433.50	342.30	410.76
25	103.85	375.30	284.10	426.16
30	91.87	332.01	240.81	433.46
35	82.58	298.44	207.24	435.20
40	75.15	271.58	180.38	432.90
45	69.05	249.55	158.35	427.54
50	63.95	231.13	139.93	419.79
55	59.62	215.48	124.28	410.13
60	55.89	202.00	110.80	398.89
65	52.65	190.26	99.06	386.35
70	49.79	179.94	88.74	372.71
75	47.26	170.78	79.58	358.12
90	41.11	148.57	57.37	309.82
105	36.50	131.90	40.70	256.42
120	32.89	118.88	27.68	199.31
135	30.00	108.41	17.21	139.39
150	27.61	99.79	8.59	77.27

Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA A-5 Controlled Site Flows + Underground Storage

OTTAWA IDF CURVE — Qpeak = 184.1 L/s
Area = 1.39 ha — Qavg = 92.1 L/s
C = 0.94 — Vol(max) = 561.2 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	1052.56	960.51	288.15
10	214.27	774.37	682.32	409.39
15	171.47	619.70	527.65	474.89
20	143.94	520.20	428.15	513.78
25	124.62	450.36	358.31	537.47
30	110.24	398.41	306.36	551.46
35	99.09	358.13	266.08	558.76
40	90.17	325.89	233.84	561.22
45	82.86	299.46	207.41	560.00
50	76.74	277.36	185.31	555.92
55	71.55	258.58	166.53	549.54
60	67.07	242.40	150.35	541.27
65	63.18	228.32	136.27	531.44
70	59.75	215.93	123.88	520.29
75	56.71	204.94	112.89	507.99
90	49.33	178.29	86.24	465.70
105	43.80	158.28	66.23	417.26
120	39.47	142.66	50.61	364.38
135	36.00	130.09	38.04	308.13
150	33.13	119.74	27.69	249.23

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
STM MH 06	2438	4.67	97.77	94.97	94.78
STM MH 07	2438	4.67	97.80	95.10	95.09
STM MH 08	2438	4.67	97.85	95.23	95.22
STM MH 09	2438	4.67	97.87	-	95.26

PI = 3.141592654
pipe I.D.= 1220 (conc pipe)
U/G Storage Pipe Volume 06 to 07
End Area 1.169 (m^2)
Pipe Length 62.2 (m)
Pipe Volume 72.7 (m^3)

PI = 3.141592654
pipe I.D.= 1220 (conc pipe)
U/G Storage Pipe Volume 07 to 08
End Area 1.169 (m^2)
Pipe Length 62.3 (m)
Pipe Volume 72.8 (m^3)

PI = 3.141592654
pipe I.D.= 1220 (conc pipe)
U/G Storage Pipe Volume 08 to 09
End Area 1.169 (m^2)
Pipe Length 16.0 (m)
Pipe Volume 18.7 (m^3)

Area A-5: Storage Table

Elevation (m)	System Depth (m)	STM MH 06 Volume (m^3)	STM MH 07 Volume (m^3)	STM MH 08 Volume (m^3)	STM MH 09 Volume (m^3)	Underground Storage Combined Volume (m^3)	Surface Storage Building 'A' Loading Dock Area (m^2)	Surface Storage Building 'A' Loading Dock Volume (m^3)	Total Storage Ponding Volume (m^3)	Total Storage **Total Volume (m^3)**	Design Head
94.78	0.00	-	-	-	-	-	-	-	-	**0**	-
94.97	0.19	0.89	-	-	-	0.89	-	-	-	**0.9**	0.00
95.58	0.80	3.73	2.29	1.68	1.49	79.38	-	-	-	**79.4**	0.61
96.19	1.41	6.58	5.14	4.53	4.34	172.89	-	-	-	**172.9**	1.22
96.44	1.66	7.75	6.30	5.70	5.51	189.50	-	-	-	**189.5**	1.47
96.61	1.83	8.54	7.10	6.49	6.30	192.67	-	-	-	**192.7**	1.64
97.27	2.49	11.62	10.18	9.57	9.38	205.00	0.0	0.0	0.0	**205.0**	2.30
97.37	2.59	12.09	10.64	10.04	9.85	206.86	0.00	0.00	0.0	**206.9**	2.40
97.42	2.64	12.32	10.88	10.27	10.08	207.80	92.62	2.32	2.3	**210.1**	2.45
97.47	2.69	12.56	11.11	10.50	10.32	208.73	369.90	13.88	13.9	**222.6**	2.50
97.52	2.74	-	-	10.74	10.55	209.20	866.57	44.79	44.8	**254.0**	2.55
97.57	2.79	-	-	-	10.78	209.43	1197.95	96.40	96.4	**305.8**	2.60
97.62	2.84	-	-	-	-	209.43	1530.58	164.62	164.6	**374.0**	2.65
97.67	2.89	-	-	-	-	209.43	1860.81	249.40	249.4	**458.8**	2.70
97.72	2.94	-	-	-	-	209.43	2187.89	350.62	350.6	**560.1**	2.75
97.77	2.99	-	-	-	-	209.43	2521.51	468.35	468.4	**677.8**	2.80

Maximum Ponding Depths (cm)	
1:100 Yr	29
1:5 Yr	-79
1:2 Yr	-141

227mm Circular Plug Type ICD

1:100 Yr
Flow (L/s) = 182.4
Head (m) = 2.69
Elevation (m) = **97.66**
Outlet Pipe Dia.(mm) = 375
Volume (m3) = 435.2

1:5 Yr
Flow (L/s) = 141.1
Head (m) = 1.61
Elevation (m) = **96.58**
Outlet Pipe Dia.(mm) = 375
Volume (m3) = 190.5

1:2 Yr
Flow (L/s) = 110.7
Head (m) = 0.99
Elevation (m) = **95.96**
Outlet Pipe Dia.(mm) = 375
Volume (m3) = 136.8

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

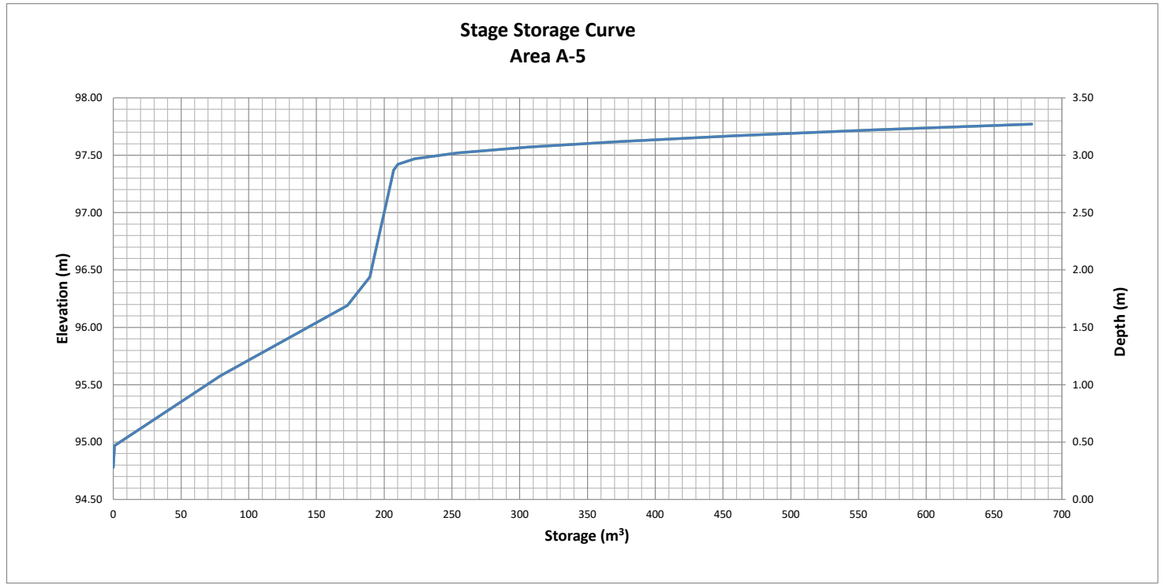
	1:100 yr	Flow Check
Q (m^3/s) =	0.1824	**0.1824**
g (m/s^2) =	9.81	9.81
h (m) =	**2.69**	2.69
A (m^2) =	**0.040476764**	**0.04047**
D (m) =	**0.227016777**	**0.22700**
D (mm) =	**227**	227.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.1411
g (m/s^2) =	9.81
h (m) =	**1.61**
A (m^2) =	**0.04047**
D (m) =	**0.227**
D (mm) =	**227**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.1107
g (m/s^2) =	9.81
h (m) =	**0.99**
A (m^2) =	**0.04047**
D (m) =	**0.227**
D (mm) =	**227**



Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA A-6 Controlled Building 'A' Parking Lot Flows

OTTAWA IDF CURVE — Qpeak = 3.6 L/s
Area = 0.056 ha — Qavg = 1.8 L/s
C = 0.88 — Vol(max) = 6.6 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	14.11	12.31	3.69
10	76.81	10.46	8.66	5.20
15	61.77	8.41	6.61	5.95
20	52.03	7.09	5.29	6.35
25	45.17	6.15	4.35	6.53
30	40.04	5.45	3.65	6.58
35	36.06	4.91	3.11	6.54
40	32.86	4.48	2.68	6.42
45	30.24	4.12	2.32	6.26
50	28.04	3.82	2.02	6.06
55	26.17	3.56	1.76	5.82
60	24.56	3.35	1.55	5.56
65	23.15	3.15	1.35	5.28
70	21.91	2.98	1.18	4.98
75	20.81	2.84	1.04	4.66
90	18.14	2.47	0.67	3.63
105	16.13	2.20	0.40	2.51
120	14.56	1.98	0.18	1.32
135	13.30	1.81	0.01	0.09
150	12.25	1.67	-0.13	-1.18

Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA A-6 Controlled Building 'A' Parking Lot Flows

OTTAWA IDF CURVE — Qpeak = 4.7 L/s
Area = 0.056 ha — Qavg = 2.4 L/s
C = 0.88 — Vol(max) = 9.0 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	19.23	16.88	5.06
10	104.19	14.19	11.84	7.11
15	83.56	11.38	9.03	8.13
20	70.25	9.57	7.22	8.66
25	60.90	8.30	5.95	8.92
30	53.93	7.35	5.00	8.99
35	48.52	6.61	4.26	8.94
40	44.18	6.02	3.67	8.81
45	40.63	5.53	3.18	8.60
50	37.65	5.13	2.78	8.34
55	35.12	4.78	2.43	8.03
60	32.94	4.49	2.14	7.70
65	31.04	4.23	1.88	7.33
70	29.37	4.00	1.65	6.93
75	27.89	3.80	1.45	6.52
90	24.29	3.31	0.96	5.18
105	21.58	2.94	0.59	3.72
120	19.47	2.65	0.30	2.17
135	17.76	2.42	0.07	0.57
150	16.36	2.23	-0.12	-1.09

Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA A-6 Controlled Building 'A' Parking Lot Flows

OTTAWA IDF CURVE — Qpeak = 5.9 L/s
Area = 0.056 ha — Qavg = 3.0 L/s
C = 0.97 — Vol(max) = 20.3 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	36.77	33.82	10.15
10	178.56	27.05	24.10	14.46
15	142.89	21.65	18.70	16.83
20	119.95	18.17	15.22	18.27
25	103.85	15.73	12.78	19.18
30	91.87	13.92	10.97	19.74
35	82.58	12.51	9.56	20.08
40	75.15	11.39	8.44	20.24
45	69.05	10.46	7.51	20.28
50	63.95	9.69	6.74	20.22
55	59.62	9.03	6.08	20.08
60	55.89	8.47	5.52	19.87
65	52.65	7.98	5.03	19.60
70	49.79	7.54	4.59	19.29
75	47.26	7.16	4.21	18.94
90	41.11	6.23	3.28	17.71
105	36.50	5.53	2.58	16.25
120	32.89	4.98	2.03	14.64
135	30.00	4.54	1.59	12.92
150	27.61	4.18	1.23	11.10

Proposed Industrial Development Storage Calculations Using Average
Novatech Project No. 119123 Release Rate Equal to 50% of the Qpeak
REQUIRED STORAGE - 1:100 YR + 20% IDF Increase
AREA A-6 Controlled Building 'A' Parking Lot Flows

OTTAWA IDF CURVE — Qpeak = 6.0 L/s
Area = 0.056 ha — Qavg = 3.0 L/s
C = 0.97 — Vol(max) = 25.9 m3
(Vol calculated for Qallow-avg)

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	44.13	41.13	12.34
10	214.27	32.46	29.46	17.68
15	171.47	25.98	22.98	20.68
20	143.94	21.81	18.81	22.57
25	124.62	18.88	15.88	23.82
30	110.24	16.70	13.70	24.66
35	99.09	15.01	12.01	25.23
40	90.17	13.66	10.66	25.59
45	82.86	12.55	9.55	25.80
50	76.74	11.63	8.63	25.88
55	71.55	10.84	7.84	25.87
60	67.07	10.16	7.16	25.78
65	63.18	9.57	6.57	25.63
70	59.75	9.05	6.05	25.42
75	56.71	8.59	5.59	25.16
90	49.33	7.47	4.47	24.16
105	43.80	6.64	3.64	22.90
120	39.47	5.98	2.98	21.46
135	36.00	5.45	2.45	19.88
150	33.13	5.02	2.02	18.18

Structures	Size (mm)	Area (m^2)	T/G	Inv IN	Inv OUT
STM MH 11	1219	1.17	98.11	94.60	94.45
CBMH 09	1219	1.17	97.80	-	94.65

Area A-6: Storage Table

Elevation (m)	System Depth (m)	STM MH 11 Volume (m^3)	CBMH 09 Volume (m^3)	Underground Storage: Combined Volume (m^3)	Surface Storage: STM MH 11 Area (m^2)	STM MH 11 Volume (m^3)	CBMH 09 Area (m^2)	CBMH 09 Volume (m^3)	Total Storage: Ponding Volume (m^3)	**Total Volume (m^3)**	Design Head
94.45	0.00	-	-	-	-	-	-	-	-	**0**	-
95.30	0.85	0.99	0.76	5.66	-	-	-	-	-	**5.7**	0.70
96.50	2.05	2.39	2.16	8.46	-	-	-	-	-	**8.5**	1.90
97.30	2.85	3.33	3.09	10.33	-	-	-	-	-	**10.3**	2.70
97.80	3.35	3.91	-	10.91	-	-	0.0	0.0	0.0	**10.9**	3.20
97.85	3.40	-	-	10.91	-	-	10.06	0.25	0.3	**11.2**	3.25
97.90	3.45	-	-	10.91	-	-	34.86	1.37	1.4	**12.3**	3.30
97.95	3.50	-	-	10.91	-	-	74.42	4.11	4.1	**15.0**	3.35
98.00	3.55	-	-	10.91	-	-	126.32	9.12	9.1	**20.0**	3.40
98.05	3.60	-	-	10.91	0.00	0.00	184.70	16.90	16.9	**27.8**	3.45
98.10	3.65	-	-	10.91	0.00	0.00	247.74	27.71	27.7	**38.6**	3.50

Tempest Vortex LMF Model 60

1:100 Yr
Flow (L/s) = 5.9
Head (m) = 3.40
Elevation (m) = **98.00**
Outlet Pipe Dia.(mm) = 300
Volume (m3) = 20.3

1:5 Yr
Flow (L/s) = 4.7
Head (m) = 2.15
Elevation (m) = **96.75**
Outlet Pipe Dia.(mm) = 300
Volume (m3) = 9.0

1:2 Yr
Flow (L/s) = 3.6
Head (m) = 1.20
Elevation (m) = **95.80**
Outlet Pipe Dia.(mm) = 300
Volume (m3) = 6.6

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

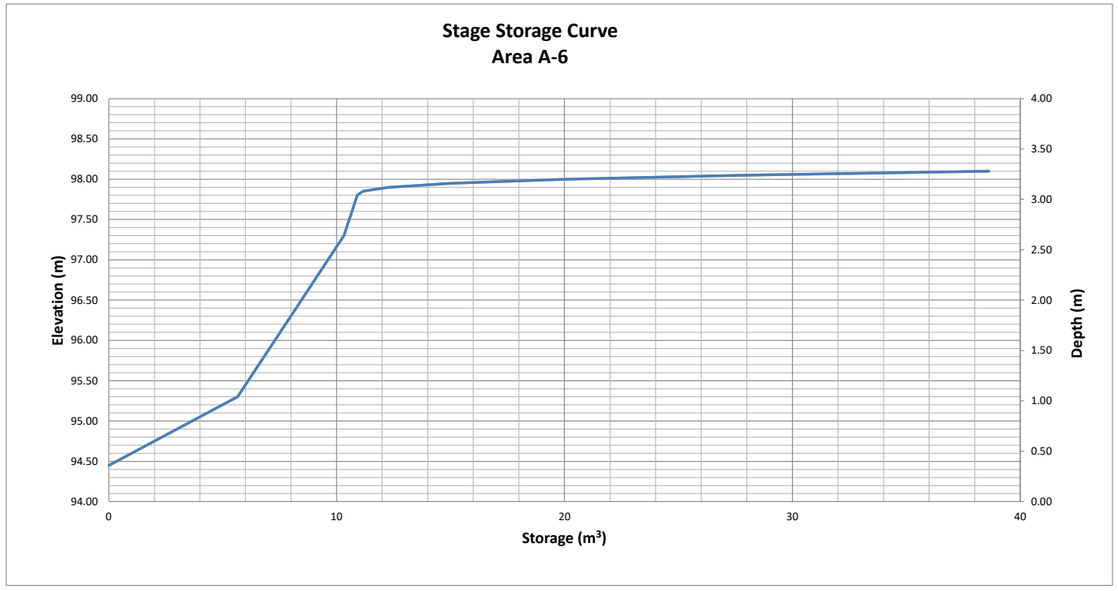
	1:100 yr	Flow Check
Q (m^3/s) =	0.0059	**0.0060**
g (m/s^2) =	9.81	9.81
h (m) =	**3.40**	3.40
A (m^2) =	**0.001165122**	**0.00119**
D (m) =	**0.038515961**	**0.03900**
D (mm) =	**39**	39.0

1:5 yr Flow Check

	1:5 yr
Q (m^3/s) =	0.0048
g (m/s^2) =	9.81
h (m) =	**2.15**
A (m^2) =	**0.00119**
D (m) =	**0.039**
D (mm) =	**39**

1:2 yr Flow Check

	1:2 yr
Q (m^3/s) =	0.0036
g (m/s^2) =	9.81
h (m) =	**1.20**
A (m^2) =	**0.00119**
D (m) =	**0.039**
D (mm) =	**39**



PI = 3.141592654
pipe I.D.= 448 (pvc pipe)
U/G Storage Pipe Volume
End Area 0.158 (m^2)
Total Length 24.8 (m)
Pipe Volume 3.9 (m^3)

U/G Pipe Size	450mm dia.
Pipe Segment	STMMH 11 - CBMH 09
Centre-Centre Length	26.0
Inside Structure	1.2
U/G Storage Length	24.8

Maximum Ponding Depths (cm)	
1:100 Yr	**20**
1:5 Yr	**-105**
1:2 Yr	**-200**

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A1

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	4.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	9.59	8.49	2.55
10	76.81	7.11	6.01	3.61
15	61.77	5.72	4.62	4.16
20	52.03	4.82	3.72	4.46
25	45.17	4.18	3.08	4.62
30	40.04	3.71	2.61	4.69
35	36.06	3.34	2.24	4.70
40	32.86	3.04	1.94	4.66
45	30.24	2.80	1.70	4.59
50	28.04	2.60	1.50	4.49
55	26.17	2.42	1.32	4.36
60	24.56	2.27	1.17	4.22
75	20.81	1.93	0.83	3.72
90	18.14	1.68	0.58	3.13
120	14.56	1.35	0.25	1.79
150	12.25	1.13	0.03	0.31
180	10.63	0.98	-0.12	-1.26
210	9.42	0.87	-0.23	-2.88

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A1

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	7.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	13.07	11.97	3.59
10	104.19	9.65	8.55	5.13
15	83.56	7.74	6.64	5.97
20	70.25	6.50	5.40	6.48
25	60.90	5.64	4.54	6.81
30	53.93	4.99	3.89	7.01
35	48.52	4.49	3.39	7.12
40	44.18	4.09	2.99	7.18
45	40.63	3.76	2.66	7.19
50	37.65	3.49	2.39	7.16
55	35.12	3.25	2.15	7.10
60	32.94	3.05	1.95	7.02
75	27.89	2.58	1.48	6.67
90	24.29	2.25	1.15	6.20
120	19.47	1.80	0.70	5.06
150	16.36	1.51	0.41	3.73
180	14.18	1.31	0.21	2.30
210	12.56	1.16	0.06	0.78

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A1

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	15.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	24.96	23.62	7.09
10	178.56	18.37	17.03	10.22
15	142.89	14.70	13.36	12.02
20	119.95	12.34	11.00	13.20
25	103.85	10.68	9.34	14.01
30	91.87	9.45	8.11	14.60
35	82.58	8.49	7.15	15.02
40	75.15	7.73	6.39	15.33
45	69.05	7.10	5.76	15.56
50	63.95	6.58	5.24	15.71
55	59.62	6.13	4.79	15.82
60	55.89	5.75	4.41	15.87
75	47.26	4.86	3.52	15.84
90	41.11	4.23	2.89	15.60
120	32.89	3.38	2.04	14.71
150	27.61	2.84	1.50	13.50
180	23.90	2.46	1.12	12.08
210	21.14	2.17	0.83	10.52

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drain A1

OTTAWA IDF CURVE

Area =	0.037	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	20.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	29.96	28.62	8.59
10	214.27	22.04	20.70	12.42
15	171.47	17.64	16.30	14.67
20	143.94	14.81	13.47	16.16
25	124.62	12.82	11.48	17.22
30	110.24	11.34	10.00	18.00
35	99.09	10.19	8.85	18.59
40	90.17	9.28	7.94	19.04
45	82.86	8.52	7.18	19.39
50	76.74	7.89	6.55	19.66
55	71.55	7.36	6.02	19.86
60	67.07	6.90	5.56	20.01
75	56.71	5.83	4.49	20.22
90	49.33	5.07	3.73	20.17
120	39.47	4.06	2.72	19.59
150	33.13	3.41	2.07	18.61
180	28.68	2.95	1.61	17.39
210	25.37	2.61	1.27	16.00

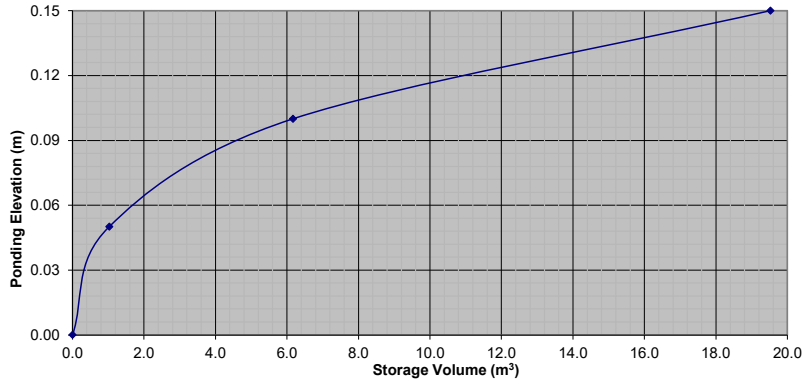
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	1.10	9	4.7	19.5
1:5 Year	1.26	1.26	11	7.2	19.5
1:100 Year	1.34	1.34	13	15.9	19.5

Roof Drain Storage Table for Area RD A1

Elevation	Area RD A1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	41.11	1.0
0.10	164.45	6.2
0.15	369.86	19.5

Stage Storage Curve: Area R-1
Controlled Roof Drain # A1



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A2

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	7.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	12.96	11.86	3.56
10	76.81	9.61	8.51	5.10
15	61.77	7.73	6.63	5.96
20	52.03	6.51	5.41	6.49
25	45.17	5.65	4.55	6.83
30	40.04	5.01	3.91	7.04
35	36.06	4.51	3.41	7.16
40	32.86	4.11	3.01	7.23
45	30.24	3.78	2.68	7.24
50	28.04	3.51	2.41	7.22
55	26.17	3.27	2.17	7.17
60	24.56	3.07	1.97	7.10
75	20.81	2.60	1.50	6.77
90	18.14	2.27	1.17	6.32
120	14.56	1.82	0.72	5.20
150	12.25	1.53	0.43	3.89
180	10.63	1.33	0.23	2.48
210	9.42	1.18	0.08	0.98

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A2

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	10.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	17.66	16.56	4.97
10	104.19	13.03	11.93	7.16
15	83.56	10.45	9.35	8.42
20	70.25	8.79	7.69	9.23
25	60.90	7.62	6.52	9.78
30	53.93	6.75	5.65	10.16
35	48.52	6.07	4.97	10.44
40	44.18	5.53	4.43	10.63
45	40.63	5.08	3.98	10.75
50	37.65	4.71	3.61	10.83
55	35.12	4.39	3.29	10.87
60	32.94	4.12	3.02	10.88
75	27.89	3.49	2.39	10.75
90	24.29	3.04	1.94	10.47
120	19.47	2.44	1.34	9.61
150	16.36	2.05	0.95	8.52
180	14.18	1.77	0.67	7.28
210	12.56	1.57	0.47	5.93

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A2

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	23.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	33.74	32.40	9.72
10	178.56	24.82	23.48	14.09
15	142.89	19.86	18.52	16.67
20	119.95	16.67	15.33	18.40
25	103.85	14.43	13.09	19.64
30	91.87	12.77	11.43	20.57
35	82.58	11.48	10.14	21.29
40	75.15	10.45	9.11	21.85
45	69.05	9.60	8.26	22.30
50	63.95	8.89	7.55	22.65
55	59.62	8.29	6.95	22.93
60	55.89	7.77	6.43	23.15
75	47.26	6.57	5.23	23.53
90	41.11	5.71	4.37	23.62
120	32.89	4.57	3.23	23.27
150	27.61	3.84	2.50	22.48
180	23.90	3.32	1.98	21.41
210	21.14	2.94	1.60	20.15

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drain A2

OTTAWA IDF CURVE

Area =	0.050	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	29.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	40.48	39.14	11.74
10	214.27	29.78	28.44	17.07
15	171.47	23.83	22.49	20.25
20	143.94	20.01	18.67	22.40
25	124.62	17.32	15.98	23.97
30	110.24	15.32	13.98	25.17
35	99.09	13.77	12.43	26.11
40	90.17	12.53	11.19	26.87
45	82.86	11.52	10.18	27.48
50	76.74	10.67	9.33	27.98
55	71.55	9.95	8.61	28.40
60	67.07	9.32	7.98	28.74
75	56.71	7.88	6.54	29.44
90	49.33	6.86	5.52	29.79
120	39.47	5.49	4.15	29.86
150	33.13	4.61	3.27	29.39
180	28.68	3.99	2.65	28.59
210	25.37	3.53	2.19	27.55

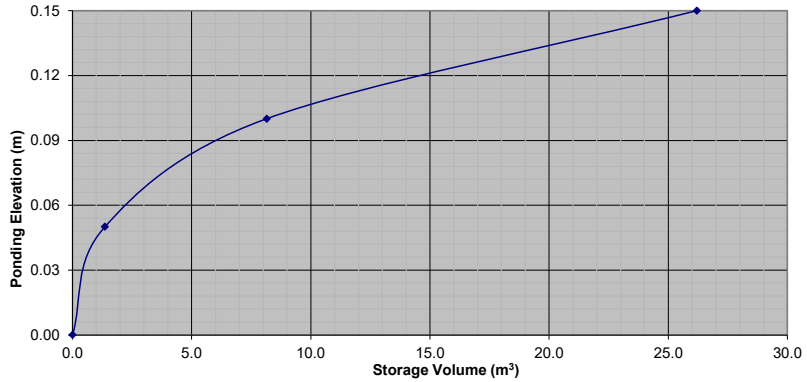
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	1.10	10	7.2	26.2
1:5 Year	1.26	1.26	11	10.9	26.2
1:100 Year	1.34	1.34	14	23.6	26.2

Roof Drain Storage Table for Area RD A2

Elevation	Area RD A2	Total Volume
m	m^2	m^3
0.00	0	0
0.05	54.31	1.4
0.10	217.24	8.1
0.15	504.72	26.2

Stage Storage Curve: Area R-1
Controlled Roof Drain # A2



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Roof Drains A3 to A6

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	7.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	13.48	12.38	3.71
10	76.81	9.99	8.89	5.34
15	61.77	8.04	6.94	6.24
20	52.03	6.77	5.67	6.80
25	45.17	5.88	4.78	7.16
30	40.04	5.21	4.11	7.40
35	36.06	4.69	3.59	7.54
40	32.86	4.28	3.18	7.62
45	30.24	3.93	2.83	7.65
50	28.04	3.65	2.55	7.64
55	26.17	3.40	2.30	7.61
60	24.56	3.20	2.10	7.54
75	20.81	2.71	1.61	7.24
90	18.14	2.36	1.26	6.81
120	14.56	1.89	0.79	5.72
150	12.25	1.59	0.49	4.45
180	10.63	1.38	0.28	3.05
210	9.42	1.22	0.12	1.57

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Roof Drains A3 to A6

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	11.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	18.37	17.27	5.18
10	104.19	13.56	12.46	7.47
15	83.56	10.87	9.77	8.79
20	70.25	9.14	8.04	9.65
25	60.90	7.92	6.82	10.23
30	53.93	7.02	5.92	10.65
35	48.52	6.31	5.21	10.95
40	44.18	5.75	4.65	11.16
45	40.63	5.29	4.19	11.30
50	37.65	4.90	3.80	11.40
55	35.12	4.57	3.47	11.45
60	32.94	4.29	3.19	11.47
75	27.89	3.63	2.53	11.38
90	24.29	3.16	2.06	11.12
120	19.47	2.53	1.43	10.32
150	16.36	2.13	1.03	9.26
180	14.18	1.84	0.74	8.04
210	12.56	1.63	0.53	6.72

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Roof Drains A3 to A6

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	24.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	35.09	33.75	10.12
10	178.56	25.81	24.47	14.68
15	142.89	20.66	19.32	17.39
20	119.95	17.34	16.00	19.20
25	103.85	15.01	13.67	20.51
30	91.87	13.28	11.94	21.49
35	82.58	11.94	10.60	22.25
40	75.15	10.86	9.52	22.86
45	69.05	9.98	8.64	23.33
50	63.95	9.25	7.91	23.72
55	59.62	8.62	7.28	24.02
60	55.89	8.08	6.74	24.26
75	47.26	6.83	5.49	24.71
90	41.11	5.94	4.60	24.86
120	32.89	4.76	3.42	24.59
150	27.61	3.99	2.65	23.86
180	23.90	3.46	2.12	22.85
210	21.14	3.06	1.72	21.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Roof Drains A3 to A6

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	31.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	42.10	40.76	12.23
10	214.27	30.97	29.63	17.78
15	171.47	24.79	23.45	21.10
20	143.94	20.81	19.47	23.36
25	124.62	18.01	16.67	25.01
30	110.24	15.94	14.60	26.27
35	99.09	14.33	12.99	27.27
40	90.17	13.04	11.70	28.07
45	82.86	11.98	10.64	28.72
50	76.74	11.09	9.75	29.26
55	71.55	10.34	9.00	29.71
60	67.07	9.70	8.36	30.08
75	56.71	8.20	6.86	30.86
90	49.33	7.13	5.79	31.27
120	39.47	5.71	4.37	31.44
150	33.13	4.79	3.45	31.05
180	28.68	4.15	2.81	30.31
210	25.37	3.67	2.33	29.33

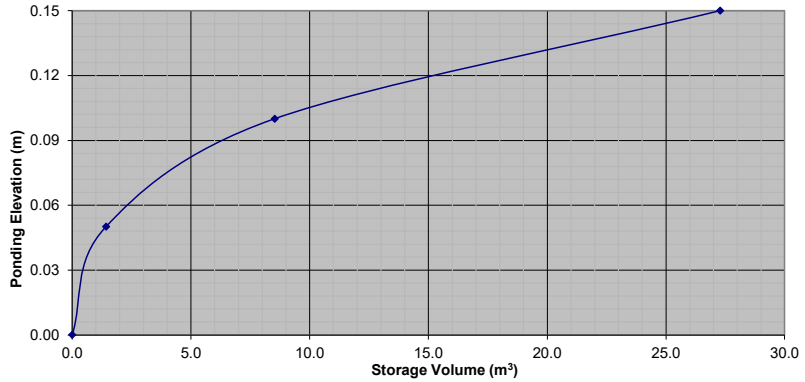
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	4.40	10	7.7	27.3
1:5 Year	1.26	5.04	11	11.5	27.3
1:100 Year	1.34	5.36	14	24.9	27.3

Roof Drain Storage Table for Area RDs

Elevation	Area Roof Drains	Total Volume
m	m^2	m^3
0.00	0	0
0.05	56.79	1.4
0.10	227.14	8.5
0.15	523.39	27.3

Stage Storage Curve: Area R-1
Controlled Roof Drains #A3 to A6



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A7

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	8.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	13.99	12.89	3.87
10	76.81	10.38	9.28	5.57
15	61.77	8.35	7.25	6.52
20	52.03	7.03	5.93	7.12
25	45.17	6.10	5.00	7.50
30	40.04	5.41	4.31	7.76
35	36.06	4.87	3.77	7.92
40	32.86	4.44	3.34	8.02
45	30.24	4.09	2.99	8.06
50	28.04	3.79	2.69	8.07
55	26.17	3.54	2.44	8.04
60	24.56	3.32	2.22	7.98
75	20.81	2.81	1.71	7.70
90	18.14	2.45	1.35	7.30
120	14.56	1.97	0.87	6.25
150	12.25	1.66	0.56	5.00
180	10.63	1.44	0.34	3.63
210	9.42	1.27	0.17	2.17

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A7

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	12.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	19.07	17.97	5.39
10	104.19	14.08	12.98	7.79
15	83.56	11.29	10.19	9.17
20	70.25	9.49	8.39	10.07
25	60.90	8.23	7.13	10.69
30	53.93	7.29	6.19	11.13
35	48.52	6.56	5.46	11.46
40	44.18	5.97	4.87	11.69
45	40.63	5.49	4.39	11.85
50	37.65	5.09	3.99	11.96
55	35.12	4.75	3.65	12.03
60	32.94	4.45	3.35	12.06
75	27.89	3.77	2.67	12.01
90	24.29	3.28	2.18	11.78
120	19.47	2.63	1.53	11.02
150	16.36	2.21	1.11	10.00
180	14.18	1.92	0.82	8.81
210	12.56	1.70	0.60	7.51

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A7

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	26.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	36.43	35.09	10.53
10	178.56	26.81	25.47	15.28
15	142.89	21.45	20.11	18.10
20	119.95	18.01	16.67	20.00
25	103.85	15.59	14.25	21.37
30	91.87	13.79	12.45	22.41
35	82.58	12.40	11.06	23.22
40	75.15	11.28	9.94	23.86
45	69.05	10.37	9.03	24.37
50	63.95	9.60	8.26	24.78
55	59.62	8.95	7.61	25.12
60	55.89	8.39	7.05	25.38
75	47.26	7.09	5.75	25.89
90	41.11	6.17	4.83	26.09
120	32.89	4.94	3.60	25.91
150	27.61	4.14	2.80	25.24
180	23.90	3.59	2.25	24.28
210	21.14	3.17	1.83	23.11

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drain A7

OTTAWA IDF CURVE

Area =	0.054	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	33.0	m3

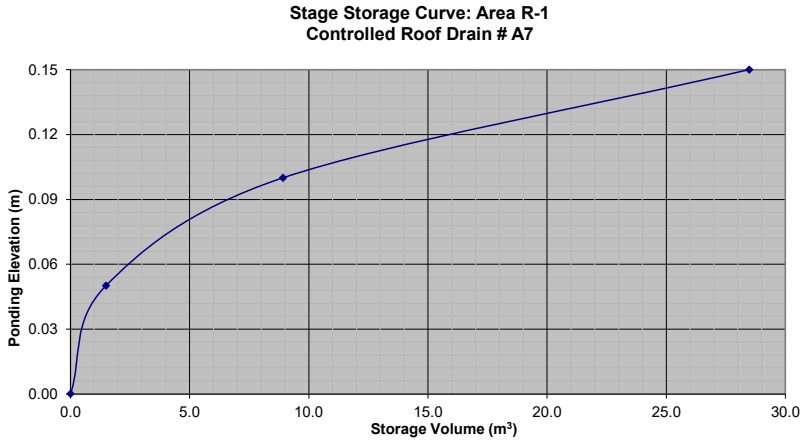
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	43.72	42.38	12.71
10	214.27	32.17	30.83	18.50
15	171.47	25.74	24.40	21.96
20	143.94	21.61	20.27	24.32
25	124.62	18.71	17.37	26.05
30	110.24	16.55	15.21	27.38
35	99.09	14.88	13.54	28.43
40	90.17	13.54	12.20	29.27
45	82.86	12.44	11.10	29.97
50	76.74	11.52	10.18	30.54
55	71.55	10.74	9.40	31.02
60	67.07	10.07	8.73	31.42
75	56.71	8.51	7.17	32.28
90	49.33	7.41	6.07	32.76
120	39.47	5.93	4.59	33.02
150	33.13	4.97	3.63	32.71
180	28.68	4.31	2.97	32.03
210	25.37	3.81	2.47	31.11

Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	1.10	10	8.1	28.5
1:5 Year	1.26	1.26	11	12.1	28.5
1:100 Year	1.34	1.34	14	26.1	28.5

Roof Drain Storage Table for Area RD A7

Elevation	Area RD A7	Total Volume
m	m^2	m^3
0.00	0	0
0.05	59.44	1.5
0.10	237.74	8.9
0.15	544.69	28.5



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A8 + A9

OTTAWA IDF CURVE

Area =	0.111	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	19.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	28.76	27.34	8.20
10	76.81	21.33	19.91	11.95
15	61.77	17.15	15.73	14.16
20	52.03	14.45	13.03	15.64
25	45.17	12.54	11.12	16.69
30	40.04	11.12	9.70	17.46
35	36.06	10.01	8.59	18.05
40	32.86	9.13	7.71	18.50
45	30.24	8.40	6.98	18.84
50	28.04	7.79	6.37	19.10
55	26.17	7.27	5.85	19.30
60	24.56	6.82	5.40	19.44
75	20.81	5.78	4.36	19.62
90	18.14	5.04	3.62	19.54
120	14.56	4.04	2.62	18.89
150	12.25	3.40	1.98	17.84
180	10.63	2.95	1.53	16.54
210	9.42	2.61	1.19	15.06

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A8 + A9

OTTAWA IDF CURVE

Area =	0.111	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	28.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	39.21	37.79	11.34
10	104.19	28.94	27.52	16.51
15	83.56	23.21	21.79	19.61
20	70.25	19.51	18.09	21.71
25	60.90	16.91	15.49	23.24
30	53.93	14.98	13.56	24.40
35	48.52	13.47	12.05	25.31
40	44.18	12.27	10.85	26.04
45	40.63	11.28	9.86	26.63
50	37.65	10.46	9.04	27.11
55	35.12	9.75	8.33	27.50
60	32.94	9.15	7.73	27.82
75	27.89	7.75	6.33	28.46
90	24.29	6.75	5.33	28.76
120	19.47	5.41	3.99	28.70
150	16.36	4.54	3.12	28.12
180	14.18	3.94	2.52	27.20
210	12.56	3.49	2.07	26.04

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A8 + A9

OTTAWA IDF CURVE

Area =	0.111	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	59.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	74.89	72.99	21.90
10	178.56	55.10	53.20	31.92
15	142.89	44.09	42.19	37.97
20	119.95	37.01	35.11	42.14
25	103.85	32.05	30.15	45.22
30	91.87	28.35	26.45	47.61
35	82.58	25.48	23.58	49.52
40	75.15	23.19	21.29	51.09
45	69.05	21.31	19.41	52.40
50	63.95	19.73	17.83	53.50
55	59.62	18.40	16.50	54.45
60	55.89	17.25	15.35	55.25
75	47.26	14.58	12.68	57.07
90	41.11	12.69	10.79	58.24
120	32.89	10.15	8.25	59.41
150	27.61	8.52	6.62	59.58
180	23.90	7.38	5.48	59.14
210	21.14	6.52	4.62	58.27

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drains A8 + A9

OTTAWA IDF CURVE

Area =	0.111	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	75.1	m3

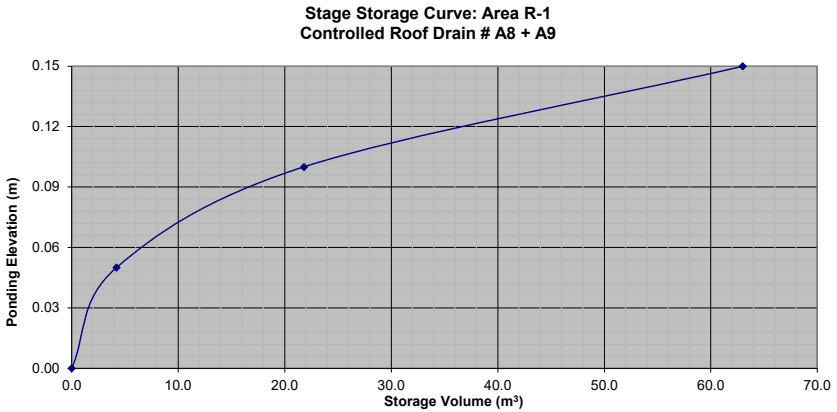
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	89.87	87.97	26.39
10	214.27	66.12	64.22	38.53
15	171.47	52.91	51.01	45.91
20	143.94	44.42	42.52	51.02
25	124.62	38.45	36.55	54.83
30	110.24	34.02	32.12	57.81
35	99.09	30.58	28.68	60.22
40	90.17	27.83	25.93	62.22
45	82.86	25.57	23.67	63.91
50	76.74	23.68	21.78	65.35
55	71.55	22.08	20.18	66.59
60	67.07	20.70	18.80	67.67
75	56.71	17.50	15.60	70.19
90	49.33	15.22	13.32	71.95
120	39.47	12.18	10.28	74.02
150	33.13	10.22	8.32	74.92
180	28.68	8.85	6.95	75.07
210	25.37	7.83	5.93	74.71

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

Design Event	Flow/Drain A8(L/s)	Flow/Drain A9(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	19.6	63.0
1:5 Year	0.79	0.79	1.58	11	28.8	63.0
1:100 Year	0.95	0.95	1.90	14	59.6	63.0

Roof Drain Storage Table for Area RDs

Elevation	Area RD A8+A9	Total Volume
m	m^2	m^3
0.00	0	0
0.05	168.65	4.2
0.10	535.21	21.8
0.15	1112.9	63.0



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A10 + A11

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A10 + A11

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A10 + A11

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drains A10 + A11

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

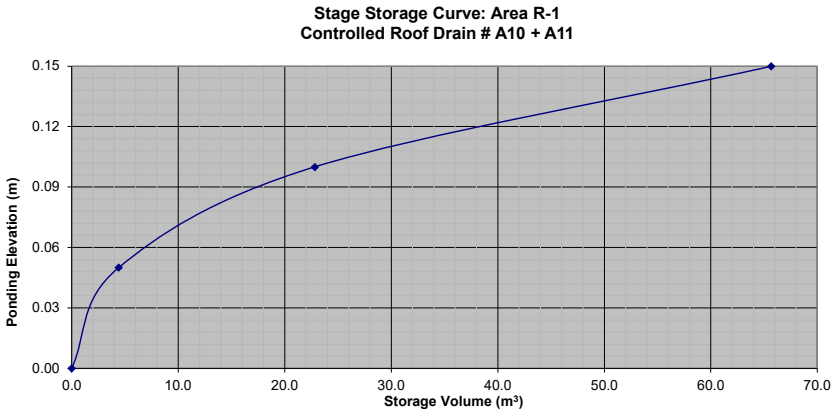
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

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

Design Event	Flow/Drain A10(L/s)	Flow/Drain A11(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD A10+A11	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A12 + A13

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A12 + A13

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A12 + A13

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drains A12 + A13

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

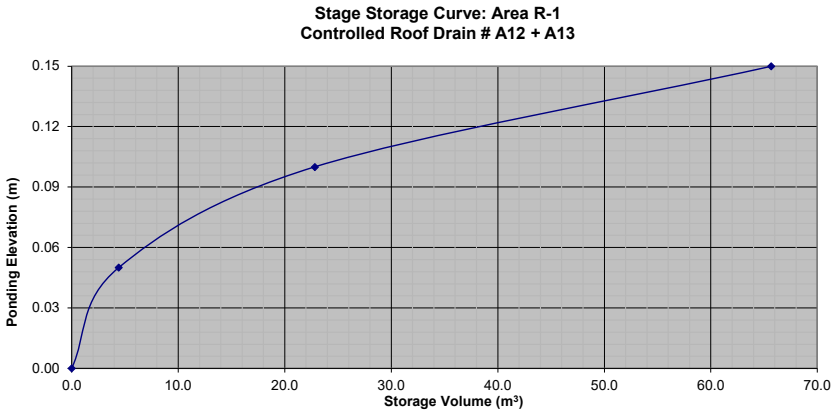
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

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

Design Event	Flow/Drain A12(L/s)	Flow/Drain A13(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD A12+A13	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A14 + A15

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A14 + A15

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A14 + A15

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drains A14 + A15

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

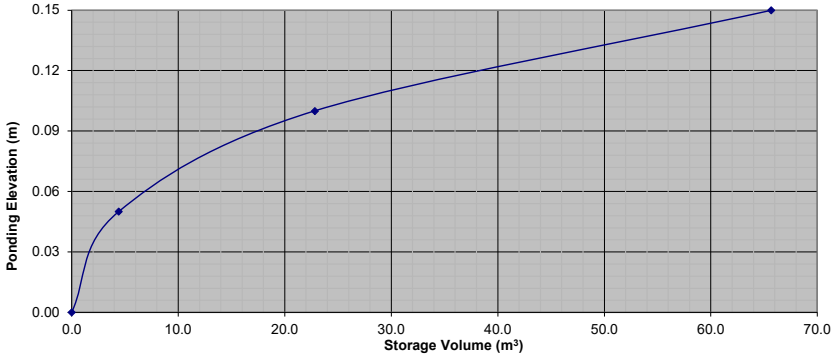
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain A14(L/s)	Flow/Drain A15(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD A14+A15	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7

Stage Storage Curve: Area R-1
Controlled Roof Drain # A14 + A15



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A16 + A17

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A16 + A17

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A16 + A17

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drains A16 + A17

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

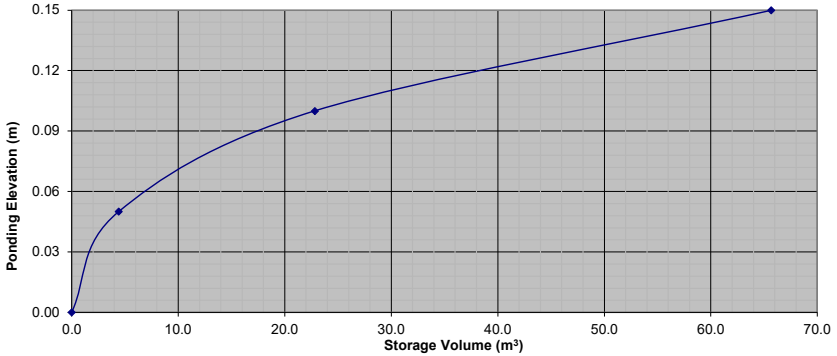
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain A16(L/s)	Flow/Drain A17(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD A16+A17	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7

Stage Storage Curve: Area R-1
Controlled Roof Drain # A16 + A17



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A18+ A19

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	21.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	31.10	29.68	8.90
10	76.81	23.06	21.64	12.98
15	61.77	18.55	17.13	15.41
20	52.03	15.62	14.20	17.04
25	45.17	13.56	12.14	18.21
30	40.04	12.02	10.60	19.08
35	36.06	10.83	9.41	19.75
40	32.86	9.87	8.45	20.27
45	30.24	9.08	7.66	20.68
50	28.04	8.42	7.00	21.00
55	26.17	7.86	6.44	21.24
60	24.56	7.37	5.95	21.43
75	20.81	6.25	4.83	21.73
90	18.14	5.45	4.03	21.75
120	14.56	4.37	2.95	21.25
150	12.25	3.68	2.26	20.33
180	10.63	3.19	1.77	19.12
210	9.42	2.83	1.41	17.73

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A18+ A19

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	31.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	42.39	40.97	12.29
10	104.19	31.28	29.86	17.92
15	83.56	25.09	23.67	21.30
20	70.25	21.09	19.67	23.61
25	60.90	18.28	16.86	25.30
30	53.93	16.19	14.77	26.59
35	48.52	14.57	13.15	27.61
40	44.18	13.27	11.85	28.43
45	40.63	12.20	10.78	29.10
50	37.65	11.30	9.88	29.65
55	35.12	10.55	9.13	30.11
60	32.94	9.89	8.47	30.50
75	27.89	8.37	6.95	31.29
90	24.29	7.29	5.87	31.71
120	19.47	5.84	4.42	31.86
150	16.36	4.91	3.49	31.43
180	14.18	4.26	2.84	30.64
210	12.56	3.77	2.35	29.61

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drains A18+ A19

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	65.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	80.97	79.07	23.72
10	178.56	59.57	57.67	34.60
15	142.89	47.67	45.77	41.19
20	119.95	40.02	38.12	45.74
25	103.85	34.64	32.74	49.12
30	91.87	30.65	28.75	51.75
35	82.58	27.55	25.65	53.86
40	75.15	25.07	23.17	55.60
45	69.05	23.04	21.14	57.07
50	63.95	21.34	19.44	58.31
55	59.62	19.89	17.99	59.37
60	55.89	18.65	16.75	60.29
75	47.26	15.76	13.86	62.39
90	41.11	13.71	11.81	63.80
120	32.89	10.97	9.07	65.33
150	27.61	9.21	7.31	65.80
180	23.90	7.97	6.07	65.60
210	21.14	7.05	5.15	64.94

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drains A18+ A19

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	82.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	97.16	95.26	28.58
10	214.27	71.48	69.58	41.75
15	171.47	57.20	55.30	49.77
20	143.94	48.02	46.12	55.34
25	124.62	41.57	39.67	59.51
30	110.24	36.78	34.88	62.78
35	99.09	33.06	31.16	65.43
40	90.17	30.08	28.18	67.64
45	82.86	27.64	25.74	69.50
50	76.74	25.60	23.70	71.11
55	71.55	23.87	21.97	72.50
60	67.07	22.38	20.48	73.71
75	56.71	18.92	17.02	76.58
90	49.33	16.46	14.56	78.61
120	39.47	13.17	11.27	81.13
150	33.13	11.05	9.15	82.38
180	28.68	9.57	7.67	82.82
210	25.37	8.46	6.56	82.71

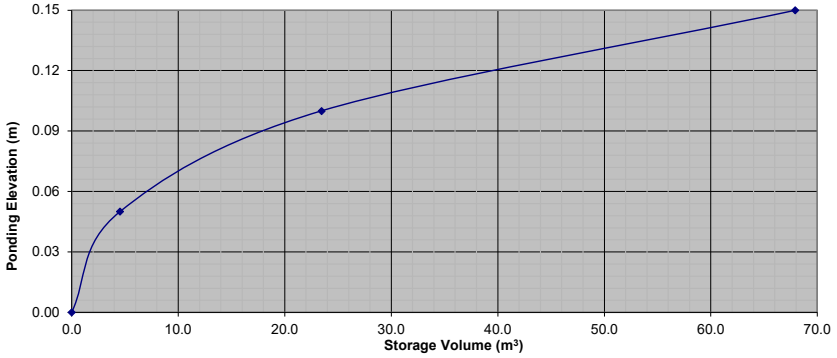
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain A18(L/s)	Flow/Drain A19(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	21.7	67.9
1:5 Year	0.79	0.79	1.58	11	31.9	67.9
1:100 Year	0.95	0.95	1.90	15	65.8	67.9

Roof Drain Storage Table for Area RDs

Elevation	Area RD A18+A19	Total Volume
m	m^2	m^3
0.00	0	0
0.05	181.44	4.5
0.10	575.87	23.5
0.15	1202.92	67.9

Stage Storage Curve: Area R-1
Controlled Roof Drain # A18 + A19



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A20

OTTAWA IDF CURVE

Area =	0.061	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	9.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	15.81	14.55	4.36
10	76.81	11.72	10.46	6.28
15	61.77	9.43	8.17	7.35
20	52.03	7.94	6.68	8.02
25	45.17	6.89	5.63	8.45
30	40.04	6.11	4.85	8.73
35	36.06	5.50	4.24	8.91
40	32.86	5.02	3.76	9.01
45	30.24	4.62	3.36	9.06
50	28.04	4.28	3.02	9.06
55	26.17	3.99	2.73	9.02
60	24.56	3.75	2.49	8.96
75	20.81	3.18	1.92	8.62
90	18.14	2.77	1.51	8.15
120	14.56	2.22	0.96	6.93
150	12.25	1.87	0.61	5.49
180	10.63	1.62	0.36	3.91
210	9.42	1.44	0.18	2.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A20

OTTAWA IDF CURVE

Area =	0.061	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	13.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	21.55	20.29	6.09
10	104.19	15.90	14.64	8.79
15	83.56	12.75	11.49	10.34
20	70.25	10.72	9.46	11.35
25	60.90	9.29	8.03	12.05
30	53.93	8.23	6.97	12.55
35	48.52	7.40	6.14	12.90
40	44.18	6.74	5.48	13.16
45	40.63	6.20	4.94	13.34
50	37.65	5.75	4.49	13.46
55	35.12	5.36	4.10	13.53
60	32.94	5.03	3.77	13.56
75	27.89	4.26	3.00	13.48
90	24.29	3.71	2.45	13.21
120	19.47	2.97	1.71	12.32
150	16.36	2.50	1.24	11.13
180	14.18	2.16	0.90	9.77
210	12.56	1.92	0.66	8.27

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A20

OTTAWA IDF CURVE

Area =	0.061	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	27.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	41.16	39.27	11.78
10	178.56	30.28	28.39	17.03
15	142.89	24.23	22.34	20.11
20	119.95	20.34	18.45	22.14
25	103.85	17.61	15.72	23.58
30	91.87	15.58	13.69	24.64
35	82.58	14.00	12.11	25.44
40	75.15	12.74	10.85	26.05
45	69.05	11.71	9.82	26.51
50	63.95	10.85	8.96	26.87
55	59.62	10.11	8.22	27.13
60	55.89	9.48	7.59	27.32
75	47.26	8.01	6.12	27.56
90	41.11	6.97	5.08	27.44
120	32.89	5.58	3.69	26.56
150	27.61	4.68	2.79	25.13
180	23.90	4.05	2.16	23.36
210	21.14	3.59	1.70	21.37

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drain A20

OTTAWA IDF CURVE

Area =	0.061	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	35.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	49.39	47.50	14.25
10	214.27	36.34	34.45	20.67
15	171.47	29.08	27.19	24.47
20	143.94	24.41	22.52	27.02
25	124.62	21.13	19.24	28.86
30	110.24	18.69	16.80	30.25
35	99.09	16.80	14.91	31.32
40	90.17	15.29	13.40	32.16
45	82.86	14.05	12.16	32.84
50	76.74	13.01	11.12	33.37
55	71.55	12.13	10.24	33.80
60	67.07	11.37	9.48	34.14
75	56.71	9.62	7.73	34.77
90	49.33	8.37	6.48	34.97
120	39.47	6.69	4.80	34.59
150	33.13	5.62	3.73	33.56
180	28.68	4.86	2.97	32.12
210	25.37	4.30	2.41	30.40

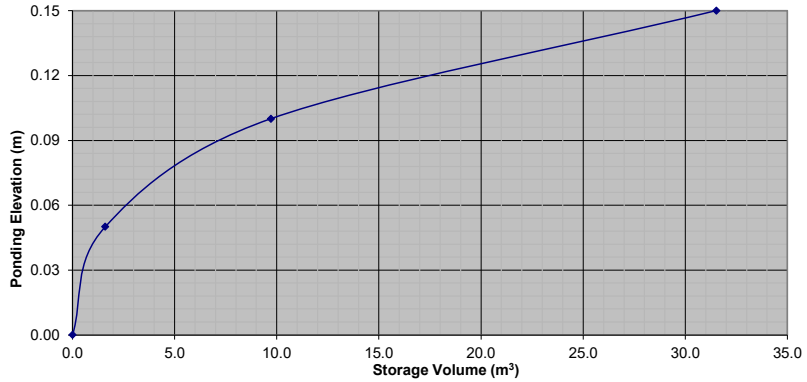
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.26	1.26	10	9.1	31.5
1:5 Year	1.34	1.34	11	13.6	31.5
1:100 Year	1.89	1.89	14	27.6	31.5

Roof Drain Storage Table for Area RD A20

Elevation	Area RD A20	Total Volume
m	m^2	m^3
0.00	0	0
0.05	64.08	1.6
0.10	259.99	9.7
0.15	612.24	31.5

Stage Storage Curve: Area R-1
Controlled Roof Drain # A20



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Roof Drains A21 to A24

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	13.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	19.95	18.85	5.66
10	76.81	14.80	13.70	8.22
15	61.77	11.90	10.80	9.72
20	52.03	10.02	8.92	10.71
25	45.17	8.70	7.60	11.40
30	40.04	7.71	6.61	11.91
35	36.06	6.95	5.85	12.28
40	32.86	6.33	5.23	12.56
45	30.24	5.83	4.73	12.76
50	28.04	5.40	4.30	12.91
55	26.17	5.04	3.94	13.01
60	24.56	4.73	3.63	13.07
75	20.81	4.01	2.91	13.09
90	18.14	3.50	2.40	12.93
120	14.56	2.81	1.71	12.28
150	12.25	2.36	1.26	11.34
180	10.63	2.05	0.95	10.23
210	9.42	1.81	0.71	9.00

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Roof Drains A21 to A24

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	19.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	27.20	26.10	7.83
10	104.19	20.07	18.97	11.38
15	83.56	16.10	15.00	13.50
20	70.25	13.53	12.43	14.92
25	60.90	11.73	10.63	15.95
30	53.93	10.39	9.29	16.72
35	48.52	9.35	8.25	17.32
40	44.18	8.51	7.41	17.79
45	40.63	7.83	6.73	18.16
50	37.65	7.25	6.15	18.46
55	35.12	6.77	5.67	18.70
60	32.94	6.35	5.25	18.89
75	27.89	5.37	4.27	19.23
90	24.29	4.68	3.58	19.33
120	19.47	3.75	2.65	19.08
150	16.36	3.15	2.05	18.47
180	14.18	2.73	1.63	17.62
210	12.56	2.42	1.32	16.62

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Roof Drains A21 to A24

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	39.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	51.95	50.37	15.11
10	178.56	38.22	36.64	21.99
15	142.89	30.59	29.01	26.11
20	119.95	25.68	24.10	28.92
25	103.85	22.23	20.65	30.97
30	91.87	19.67	18.09	32.55
35	82.58	17.68	16.10	33.80
40	75.15	16.09	14.51	34.81
45	69.05	14.78	13.20	35.64
50	63.95	13.69	12.11	36.33
55	59.62	12.76	11.18	36.90
60	55.89	11.96	10.38	37.39
75	47.26	10.12	8.54	38.41
90	41.11	8.80	7.22	38.99
120	32.89	7.04	5.46	39.32
150	27.61	5.91	4.33	38.97
180	23.90	5.12	3.54	38.20
210	21.14	4.53	2.95	37.12

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Roof Drains A21 to A24

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	49.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	62.34	60.76	18.23
10	214.27	45.87	44.29	26.57
15	171.47	36.71	35.13	31.61
20	143.94	30.81	29.23	35.08
25	124.62	26.68	25.10	37.64
30	110.24	23.60	22.02	39.63
35	99.09	21.21	19.63	41.23
40	90.17	19.30	17.72	42.53
45	82.86	17.74	16.16	43.62
50	76.74	16.43	14.85	44.54
55	71.55	15.32	13.74	45.33
60	67.07	14.36	12.78	46.00
75	56.71	12.14	10.56	47.51
90	49.33	10.56	8.98	48.49
120	39.47	8.45	6.87	49.46
150	33.13	7.09	5.51	49.61
180	28.68	6.14	4.56	49.25
210	25.37	5.43	3.85	48.53

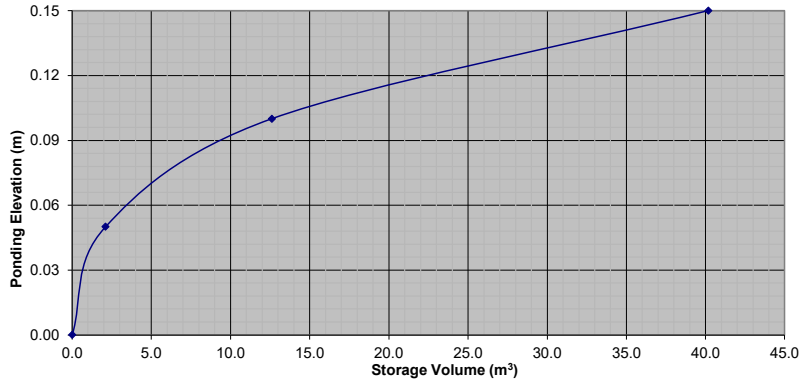
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	4.40	10	13.1	40.2
1:5 Year	1.34	5.36	11	19.3	40.2
1:100 Year	1.58	6.32	15	39.3	40.2

Roof Drain Storage Table for Area RDs

Elevation	Area Roof Drains	Total Volume
m	m^2	m^3
0.00	0	0
0.05	83.96	2.1
0.10	335.82	12.6
0.15	767.08	40.2

Stage Storage Curve: Area R-1
Controlled Roof Drains #A21 to A24



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A25

OTTAWA IDF CURVE

Area =	0.065	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	9.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	16.84	15.58	4.68
10	76.81	12.49	11.23	6.74
15	61.77	10.05	8.79	7.91
20	52.03	8.46	7.20	8.64
25	45.17	7.35	6.09	9.13
30	40.04	6.51	5.25	9.45
35	36.06	5.86	4.60	9.67
40	32.86	5.34	4.08	9.80
45	30.24	4.92	3.66	9.88
50	28.04	4.56	3.30	9.90
55	26.17	4.26	3.00	9.89
60	24.56	3.99	2.73	9.84
75	20.81	3.38	2.12	9.56
90	18.14	2.95	1.69	9.13
120	14.56	2.37	1.11	7.98
150	12.25	1.99	0.73	6.59
180	10.63	1.73	0.47	5.06
210	9.42	1.53	0.27	3.42

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A25

OTTAWA IDF CURVE

Area =	0.065	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	14.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	22.96	21.70	6.51
10	104.19	16.94	15.68	9.41
15	83.56	13.59	12.33	11.10
20	70.25	11.42	10.16	12.20
25	60.90	9.90	8.64	12.97
30	53.93	8.77	7.51	13.52
35	48.52	7.89	6.63	13.92
40	44.18	7.19	5.93	14.22
45	40.63	6.61	5.35	14.44
50	37.65	6.12	4.86	14.59
55	35.12	5.71	4.45	14.69
60	32.94	5.36	4.10	14.75
75	27.89	4.54	3.28	14.74
90	24.29	3.95	2.69	14.53
120	19.47	3.17	1.91	13.72
150	16.36	2.66	1.40	12.61
180	14.18	2.31	1.05	11.30
210	12.56	2.04	0.78	9.85

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-1: Building A Controlled Roof Drain A25

OTTAWA IDF CURVE

Area =	0.065	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	29.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	43.86	41.97	12.59
10	178.56	32.27	30.38	18.23
15	142.89	25.82	23.93	21.54
20	119.95	21.68	19.79	23.74
25	103.85	18.77	16.88	25.31
30	91.87	16.60	14.71	26.48
35	82.58	14.92	13.03	27.37
40	75.15	13.58	11.69	28.05
45	69.05	12.48	10.59	28.59
50	63.95	11.56	9.67	29.00
55	59.62	10.77	8.88	29.32
60	55.89	10.10	8.21	29.56
75	47.26	8.54	6.65	29.92
90	41.11	7.43	5.54	29.91
120	32.89	5.94	4.05	29.19
150	27.61	4.99	3.10	27.89
180	23.90	4.32	2.43	26.24
210	21.14	3.82	1.93	24.33

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-1: Building A Controlled Roof Drain A25

OTTAWA IDF CURVE

Area =	0.065	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	37.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	52.63	50.74	15.22
10	214.27	38.72	36.83	22.10
15	171.47	30.99	29.10	26.19
20	143.94	26.01	24.12	28.94
25	124.62	22.52	20.63	30.94
30	110.24	19.92	18.03	32.46
35	99.09	17.91	16.02	33.63
40	90.17	16.29	14.40	34.57
45	82.86	14.97	13.08	35.32
50	76.74	13.87	11.98	35.93
55	71.55	12.93	11.04	36.43
60	67.07	12.12	10.23	36.83
75	56.71	10.25	8.36	37.61
90	49.33	8.91	7.02	37.93
120	39.47	7.13	5.24	37.75
150	33.13	5.99	4.10	36.87
180	28.68	5.18	3.29	35.56
210	25.37	4.58	2.69	33.96

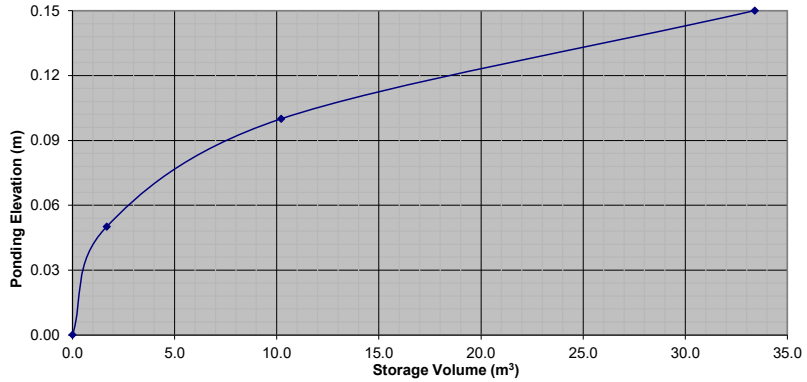
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.26	1.26	10	9.9	33.4
1:5 Year	1.34	1.34	11	14.8	33.4
1:100 Year	1.89	1.89	14	29.9	33.4

Roof Drain Storage Table for Area RD A25

Elevation	Area RD A25	Total Volume
m	m^2	m^3
0.00	0	0
0.05	66.86	1.7
0.10	274.75	10.2
0.15	652.42	33.4

Stage Storage Curve: Area R-1
Controlled Roof Drain # A25



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B1

OTTAWA IDF CURVE

Area =	0.078	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	12.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	20.21	18.95	5.69
10	76.81	14.99	13.73	8.24
15	61.77	12.05	10.79	9.71
20	52.03	10.15	8.89	10.67
25	45.17	8.81	7.55	11.33
30	40.04	7.81	6.55	11.80
35	36.06	7.04	5.78	12.13
40	32.86	6.41	5.15	12.37
45	30.24	5.90	4.64	12.53
50	28.04	5.47	4.21	12.64
55	26.17	5.11	3.85	12.70
60	24.56	4.79	3.53	12.72
75	20.81	4.06	2.80	12.61
90	18.14	3.54	2.28	12.32
120	14.56	2.84	1.58	11.39
150	12.25	2.39	1.13	10.18
180	10.63	2.07	0.81	8.79
210	9.42	1.84	0.58	7.28

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B1

OTTAWA IDF CURVE

Area =	0.078	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	18.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	27.55	26.29	7.89
10	104.19	20.33	19.07	11.44
15	83.56	16.31	15.05	13.54
20	70.25	13.71	12.45	14.94
25	60.90	11.88	10.62	15.94
30	53.93	10.52	9.26	16.68
35	48.52	9.47	8.21	17.24
40	44.18	8.62	7.36	17.67
45	40.63	7.93	6.67	18.01
50	37.65	7.35	6.09	18.26
55	35.12	6.85	5.59	18.46
60	32.94	6.43	5.17	18.61
75	27.89	5.44	4.18	18.82
90	24.29	4.74	3.48	18.79
120	19.47	3.80	2.54	18.28
150	16.36	3.19	1.93	17.40
180	14.18	2.77	1.51	16.28
210	12.56	2.45	1.19	15.00

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B1

OTTAWA IDF CURVE

Area =	0.078	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	37.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	52.63	50.74	15.22
10	178.56	38.72	36.83	22.10
15	142.89	30.99	29.10	26.19
20	119.95	26.01	24.12	28.94
25	103.85	22.52	20.63	30.94
30	91.87	19.92	18.03	32.46
35	82.58	17.91	16.02	33.63
40	75.15	16.29	14.40	34.57
45	69.05	14.97	13.08	35.32
50	63.95	13.87	11.98	35.93
55	59.62	12.93	11.04	36.43
60	55.89	12.12	10.23	36.83
75	47.26	10.25	8.36	37.61
90	41.11	8.91	7.02	37.93
120	32.89	7.13	5.24	37.75
150	27.61	5.99	4.10	36.87
180	23.90	5.18	3.29	35.56
210	21.14	4.58	2.69	33.96

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drain B1

OTTAWA IDF CURVE

Area =	0.078	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	48.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	63.15	61.26	18.38
10	214.27	46.46	44.57	26.74
15	171.47	37.18	35.29	31.76
20	143.94	31.21	29.32	35.19
25	124.62	27.02	25.13	37.70
30	110.24	23.90	22.01	39.63
35	99.09	21.49	19.60	41.15
40	90.17	19.55	17.66	42.39
45	82.86	17.97	16.08	43.41
50	76.74	16.64	14.75	44.25
55	71.55	15.51	13.62	44.96
60	67.07	14.54	12.65	45.56
75	56.71	12.30	10.41	46.83
90	49.33	10.70	8.81	47.56
120	39.47	8.56	6.67	48.02
150	33.13	7.18	5.29	47.65
180	28.68	6.22	4.33	46.76
210	25.37	5.50	3.61	45.51

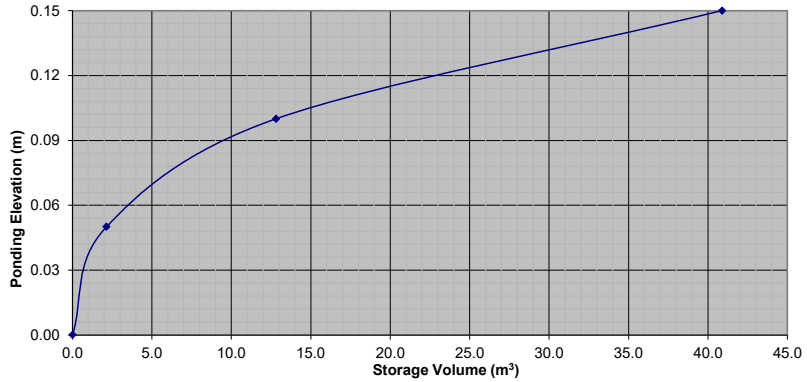
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.26	1.26	10	12.7	40.9
1:5 Year	1.34	1.34	11	18.8	40.9
1:100 Year	1.89	1.89	14	37.9	40.9

Roof Drain Storage Table for Area RD B1

Elevation	Area RD B1	Total Volume
m	m^2	m^3
0.00	0	0
0.05	85.4	2.1
0.10	341.6	12.8
0.15	781.11	40.9

Stage Storage Curve: Area R-2
Controlled Roof Drain # B1



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Roof Drains B2 to B5

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	13.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	19.95	18.85	5.66
10	76.81	14.80	13.70	8.22
15	61.77	11.90	10.80	9.72
20	52.03	10.02	8.92	10.71
25	45.17	8.70	7.60	11.40
30	40.04	7.71	6.61	11.91
35	36.06	6.95	5.85	12.28
40	32.86	6.33	5.23	12.56
45	30.24	5.83	4.73	12.76
50	28.04	5.40	4.30	12.91
55	26.17	5.04	3.94	13.01
60	24.56	4.73	3.63	13.07
75	20.81	4.01	2.91	13.09
90	18.14	3.50	2.40	12.93
120	14.56	2.81	1.71	12.28
150	12.25	2.36	1.26	11.34
180	10.63	2.05	0.95	10.23
210	9.42	1.81	0.71	9.00

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Roof Drains B2 to B5

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	19.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	27.20	26.10	7.83
10	104.19	20.07	18.97	11.38
15	83.56	16.10	15.00	13.50
20	70.25	13.53	12.43	14.92
25	60.90	11.73	10.63	15.95
30	53.93	10.39	9.29	16.72
35	48.52	9.35	8.25	17.32
40	44.18	8.51	7.41	17.79
45	40.63	7.83	6.73	18.16
50	37.65	7.25	6.15	18.46
55	35.12	6.77	5.67	18.70
60	32.94	6.35	5.25	18.89
75	27.89	5.37	4.27	19.23
90	24.29	4.68	3.58	19.33
120	19.47	3.75	2.65	19.08
150	16.36	3.15	2.05	18.47
180	14.18	2.73	1.63	17.62
210	12.56	2.42	1.32	16.62

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Roof Drains B2 to B5

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	39.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	51.95	50.37	15.11
10	178.56	38.22	36.64	21.99
15	142.89	30.59	29.01	26.11
20	119.95	25.68	24.10	28.92
25	103.85	22.23	20.65	30.97
30	91.87	19.67	18.09	32.55
35	82.58	17.68	16.10	33.80
40	75.15	16.09	14.51	34.81
45	69.05	14.78	13.20	35.64
50	63.95	13.69	12.11	36.33
55	59.62	12.76	11.18	36.90
60	55.89	11.96	10.38	37.39
75	47.26	10.12	8.54	38.41
90	41.11	8.80	7.22	38.99
120	32.89	7.04	5.46	39.32
150	27.61	5.91	4.33	38.97
180	23.90	5.12	3.54	38.20
210	21.14	4.53	2.95	37.12

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Roof Drains B2 to B5

OTTAWA IDF CURVE

Area =	0.077	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	49.6	m3

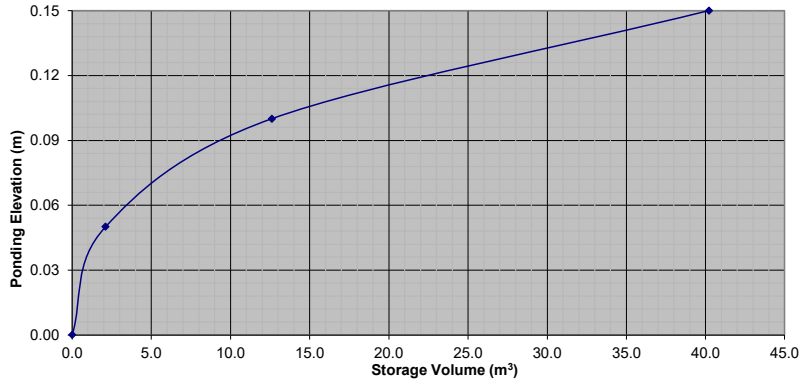
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	62.34	60.76	18.23
10	214.27	45.87	44.29	26.57
15	171.47	36.71	35.13	31.61
20	143.94	30.81	29.23	35.08
25	124.62	26.68	25.10	37.64
30	110.24	23.60	22.02	39.63
35	99.09	21.21	19.63	41.23
40	90.17	19.30	17.72	42.53
45	82.86	17.74	16.16	43.62
50	76.74	16.43	14.85	44.54
55	71.55	15.32	13.74	45.33
60	67.07	14.36	12.78	46.00
75	56.71	12.14	10.56	47.51
90	49.33	10.56	8.98	48.49
120	39.47	8.45	6.87	49.46
150	33.13	7.09	5.51	49.61
180	28.68	6.14	4.56	49.25
210	25.37	5.43	3.85	48.53

Watts Accutrol Flow Control Roof Drains:			RD-100-A-ADJ set to 3/4 Exposed		
Design Event	**Flow/Drain (L/s)**	**Total Flow (L/s)**	**Ponding (cm)**	**Storage (m^3)**	
				Required	**Provided**
1:2 Year	1.10	4.40	10	13.1	40.2
1:5 Year	1.34	5.36	11	19.3	40.2
1:100 Year	1.58	6.32	15	39.3	40.2

Roof Drain Storage Table for Area RDs

Elevation	Area Roof Drains	Total Volume
m	m^2	m^3
0.00	0	0
0.05	83.96	2.1
0.10	335.83	12.6
0.15	768.5	40.2

Stage Storage Curve: Area R-2
Controlled Roof Drains #B2 to B5



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B6

OTTAWA IDF CURVE

Area =	0.080	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	13.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	20.73	19.47	5.84
10	76.81	15.37	14.11	8.47
15	61.77	12.36	11.10	9.99
20	52.03	10.41	9.15	10.99
25	45.17	9.04	7.78	11.67
30	40.04	8.02	6.76	12.16
35	36.06	7.22	5.96	12.51
40	32.86	6.58	5.32	12.76
45	30.24	6.05	4.79	12.94
50	28.04	5.61	4.35	13.06
55	26.17	5.24	3.98	13.13
60	24.56	4.92	3.66	13.16
75	20.81	4.17	2.91	13.08
90	18.14	3.63	2.37	12.81
120	14.56	2.91	1.65	11.91
150	12.25	2.45	1.19	10.73
180	10.63	2.13	0.87	9.36
210	9.42	1.88	0.62	7.87

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B6

OTTAWA IDF CURVE

Area =	0.080	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	19.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	28.26	27.00	8.10
10	104.19	20.86	19.60	11.76
15	83.56	16.72	15.46	13.92
20	70.25	14.06	12.80	15.36
25	60.90	12.19	10.93	16.39
30	53.93	10.79	9.53	17.16
35	48.52	9.71	8.45	17.75
40	44.18	8.84	7.58	18.20
45	40.63	8.13	6.87	18.56
50	37.65	7.54	6.28	18.83
55	35.12	7.03	5.77	19.04
60	32.94	6.59	5.33	19.20
75	27.89	5.58	4.32	19.45
90	24.29	4.86	3.60	19.45
120	19.47	3.90	2.64	18.98
150	16.36	3.28	2.02	18.14
180	14.18	2.84	1.58	17.05
210	12.56	2.51	1.25	15.79

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B6

OTTAWA IDF CURVE

Area =	0.080	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	39.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	53.98	52.09	15.63
10	178.56	39.71	37.82	22.69
15	142.89	31.78	29.89	26.90
20	119.95	26.68	24.79	29.74
25	103.85	23.10	21.21	31.81
30	91.87	20.43	18.54	33.37
35	82.58	18.37	16.48	34.60
40	75.15	16.71	14.82	35.57
45	69.05	15.36	13.47	36.36
50	63.95	14.22	12.33	37.00
55	59.62	13.26	11.37	37.52
60	55.89	12.43	10.54	37.95
75	47.26	10.51	8.62	38.79
90	41.11	9.14	7.25	39.17
120	32.89	7.32	5.43	39.07
150	27.61	6.14	4.25	38.26
180	23.90	5.32	3.43	37.00
210	21.14	4.70	2.81	35.44

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drain B6

OTTAWA IDF CURVE

Area =	0.080	ha	Qallow =	1.89	L/s
C =	1.00		Vol(max) =	49.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	64.77	62.88	18.86
10	214.27	47.65	45.76	27.46
15	171.47	38.14	36.25	32.62
20	143.94	32.01	30.12	36.15
25	124.62	27.71	25.82	38.74
30	110.24	24.52	22.63	40.73
35	99.09	22.04	20.15	42.31
40	90.17	20.05	18.16	43.60
45	82.86	18.43	16.54	44.65
50	76.74	17.07	15.18	45.53
55	71.55	15.91	14.02	46.27
60	67.07	14.92	13.03	46.90
75	56.71	12.61	10.72	48.25
90	49.33	10.97	9.08	49.04
120	39.47	8.78	6.89	49.60
150	33.13	7.37	5.48	49.31
180	28.68	6.38	4.49	48.48
210	25.37	5.64	3.75	47.29

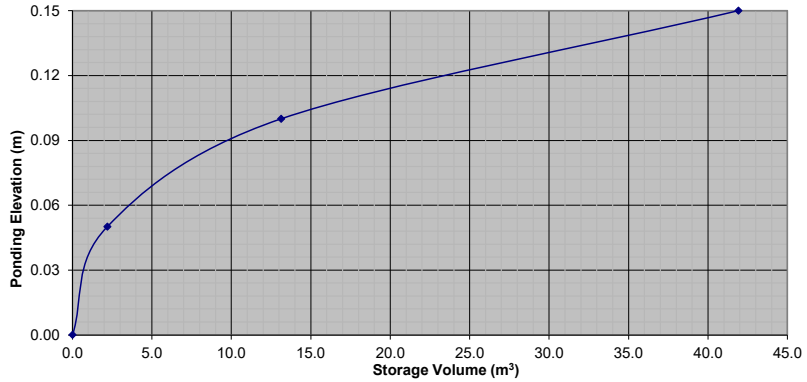
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.26	1.26	10	13.2	41.9
1:5 Year	1.34	1.34	11	19.4	41.9
1:100 Year	1.89	1.89	14	39.2	41.9

Roof Drain Storage Table for Area RD B6

Elevation	Area RD B6	Total Volume
m	m^2	m^3
0.00	0	0
0.05	87.57	2.2
0.10	350.29	13.1
0.15	800.92	41.9

Stage Storage Curve: Area R-2
Controlled Roof Drain # B6



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B7 + B8

OTTAWA IDF CURVE

Area = 0.111 ha Qallow = 1.42 L/s
C = 0.90 Vol(max) = 19.6 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	28.76	27.34	8.20
10	76.81	21.33	19.91	11.95
15	61.77	17.15	15.73	14.16
20	52.03	14.45	13.03	15.64
25	45.17	12.54	11.12	16.69
30	40.04	11.12	9.70	17.46
35	36.06	10.01	8.59	18.05
40	32.86	9.13	7.71	18.50
45	30.24	8.40	6.98	18.84
50	28.04	7.79	6.37	19.10
55	26.17	7.27	5.85	19.30
60	24.56	6.82	5.40	19.44
75	20.81	5.78	4.36	19.62
90	18.14	5.04	3.62	19.54
120	14.56	4.04	2.62	18.89
150	12.25	3.40	1.98	17.84
180	10.63	2.95	1.53	16.54
210	9.42	2.61	1.19	15.06

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B7 + B8

OTTAWA IDF CURVE

Area = 0.111 ha Qallow = 1.58 L/s
C = 0.90 Vol(max) = 28.8 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	39.21	37.79	11.34
10	104.19	28.94	27.52	16.51
15	83.56	23.21	21.79	19.61
20	70.25	19.51	18.09	21.71
25	60.90	16.91	15.49	23.24
30	53.93	14.98	13.56	24.40
35	48.52	13.47	12.05	25.31
40	44.18	12.27	10.85	26.04
45	40.63	11.28	9.86	26.63
50	37.65	10.46	9.04	27.11
55	35.12	9.75	8.33	27.50
60	32.94	9.15	7.73	27.82
75	27.89	7.75	6.33	28.46
90	24.29	6.75	5.33	28.76
120	19.47	5.41	3.99	28.70
150	16.36	4.54	3.12	28.12
180	14.18	3.94	2.52	27.20
210	12.56	3.49	2.07	26.04

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B7 + B8

OTTAWA IDF CURVE

Area = 0.111 ha Qallow = 1.90 L/s
C = 1.00 Vol(max) = 59.6 m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	74.89	72.99	21.90
10	178.56	55.10	53.20	31.92
15	142.89	44.09	42.19	37.97
20	119.95	37.01	35.11	42.14
25	103.85	32.05	30.15	45.22
30	91.87	28.35	26.45	47.61
35	82.58	25.48	23.58	49.52
40	75.15	23.19	21.29	51.09
45	69.05	21.31	19.41	52.40
50	63.95	19.73	17.83	53.50
55	59.62	18.40	16.50	54.45
60	55.89	17.25	15.35	55.25
75	47.26	14.58	12.68	57.07
90	41.11	12.69	10.79	58.24
120	32.89	10.15	8.25	59.41
150	27.61	8.52	6.62	59.58
180	23.90	7.38	5.48	59.14
210	21.14	6.52	4.62	58.27

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drains B7 + B8

OTTAWA IDF CURVE

Area = 0.111 ha Qallow = 1.90 L/s
C = 1.00 Vol(max) = 75.1 m3

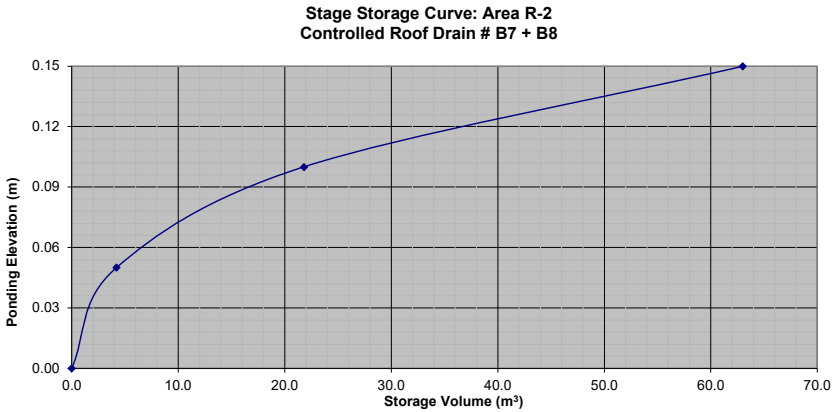
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	89.87	87.97	26.39
10	214.27	66.12	64.22	38.53
15	171.47	52.91	51.01	45.91
20	143.94	44.42	42.52	51.02
25	124.62	38.45	36.55	54.83
30	110.24	34.02	32.12	57.81
35	99.09	30.58	28.68	60.22
40	90.17	27.83	25.93	62.22
45	82.86	25.57	23.67	63.91
50	76.74	23.68	21.78	65.35
55	71.55	22.08	20.18	66.59
60	67.07	20.70	18.80	67.67
75	56.71	17.50	15.60	70.19
90	49.33	15.22	13.32	71.95
120	39.47	12.18	10.28	74.02
150	33.13	10.22	8.32	74.92
180	28.68	8.85	6.95	75.07
210	25.37	7.83	5.93	74.71

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

Design Event	Flow/Drain B7(L/s)	Flow/Drain B8(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	19.6	63.0
1:5 Year	0.79	0.79	1.58	11	28.8	63.0
1:100 Year	0.95	0.95	1.90	14	59.6	63.0

Roof Drain Storage Table for Area RDs

Elevation	Area RD B7+B8	Total Volume
m	m^2	m^3
0.00	0	0
0.05	168.65	4.2
0.10	535.21	21.8
0.15	1112.9	63.0



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B9 + B10

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B9 + B10

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B9 + B10

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drains B9 + B10

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

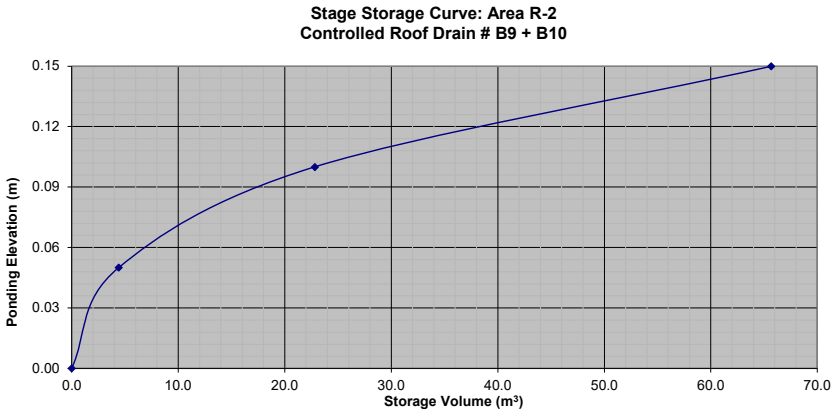
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

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

Design Event	Flow/Drain B9(L/s)	Flow/Drain B10(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD B9+B10	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B11 + B12

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B11 + B12

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B11 + B12

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drains B11 + B12

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

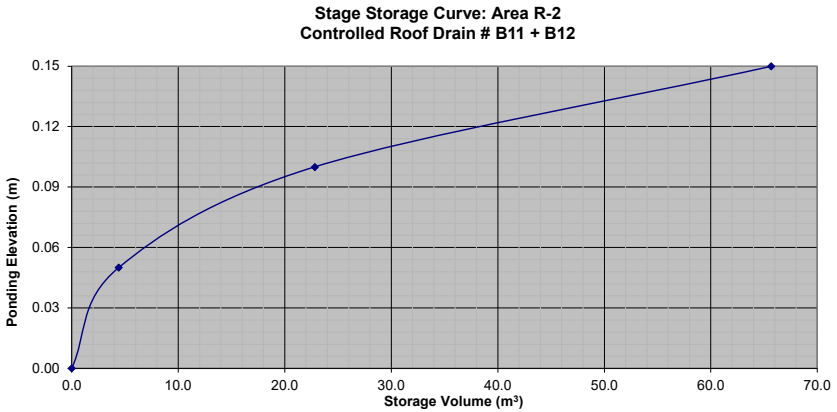
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

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

Design Event	Flow/Drain B11(L/s)	Flow/Drain B12(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD B11+B12	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B13 + B14

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B13 + B14

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B13 + B14

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drains B13 + B14

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

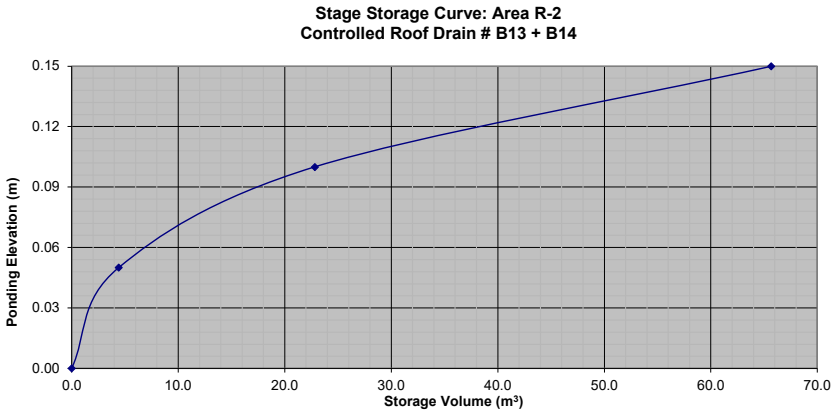
Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

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

Design Event	Flow/Drain B13(L/s)	Flow/Drain B14(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD B13+B14	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B15 + B16

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	29.80	28.38	8.51
10	76.81	22.10	20.68	12.41
15	61.77	17.77	16.35	14.72
20	52.03	14.97	13.55	16.26
25	45.17	13.00	11.58	17.36
30	40.04	11.52	10.10	18.18
35	36.06	10.38	8.96	18.81
40	32.86	9.46	8.04	19.29
45	30.24	8.70	7.28	19.66
50	28.04	8.07	6.65	19.94
55	26.17	7.53	6.11	20.16
60	24.56	7.07	5.65	20.33
75	20.81	5.99	4.57	20.56
90	18.14	5.22	3.80	20.52
120	14.56	4.19	2.77	19.94
150	12.25	3.53	2.11	18.95
180	10.63	3.06	1.64	17.69
210	9.42	2.71	1.29	16.24

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B15 + B16

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	30.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	40.62	39.20	11.76
10	104.19	29.98	28.56	17.14
15	83.56	24.04	22.62	20.36
20	70.25	20.21	18.79	22.55
25	60.90	17.52	16.10	24.15
30	53.93	15.52	14.10	25.37
35	48.52	13.96	12.54	26.33
40	44.18	12.71	11.29	27.10
45	40.63	11.69	10.27	27.73
50	37.65	10.83	9.41	28.24
55	35.12	10.11	8.69	28.66
60	32.94	9.48	8.06	29.01
75	27.89	8.02	6.60	29.72
90	24.29	6.99	5.57	30.07
120	19.47	5.60	4.18	30.11
150	16.36	4.71	3.29	29.59
180	14.18	4.08	2.66	28.73
210	12.56	3.61	2.19	27.63

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B15 + B16

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	62.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	77.59	75.69	22.71
10	178.56	57.09	55.19	33.11
15	142.89	45.68	43.78	39.40
20	119.95	38.35	36.45	43.74
25	103.85	33.20	31.30	46.95
30	91.87	29.37	27.47	49.45
35	82.58	26.40	24.50	51.45
40	75.15	24.02	22.12	53.10
45	69.05	22.08	20.18	54.47
50	63.95	20.45	18.55	55.64
55	59.62	19.06	17.16	56.63
60	55.89	17.87	15.97	57.49
75	47.26	15.11	13.21	59.43
90	41.11	13.14	11.24	60.71
120	32.89	10.52	8.62	62.04
150	27.61	8.83	6.93	62.34
180	23.90	7.64	5.74	62.01
210	21.14	6.76	4.86	61.23

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drains B15 + B16

OTTAWA IDF CURVE

Area =	0.115	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	78.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	93.11	91.21	27.36
10	214.27	68.50	66.60	39.96
15	171.47	54.82	52.92	47.63
20	143.94	46.02	44.12	52.94
25	124.62	39.84	37.94	56.91
30	110.24	35.24	33.34	60.02
35	99.09	31.68	29.78	62.54
40	90.17	28.83	26.93	64.63
45	82.86	26.49	24.59	66.39
50	76.74	24.54	22.64	67.91
55	71.55	22.87	20.97	69.21
60	67.07	21.44	19.54	70.36
75	56.71	18.13	16.23	73.03
90	49.33	15.77	13.87	74.91
120	39.47	12.62	10.72	77.18
150	33.13	10.59	8.69	78.23
180	28.68	9.17	7.27	78.52
210	25.37	8.11	6.21	78.27

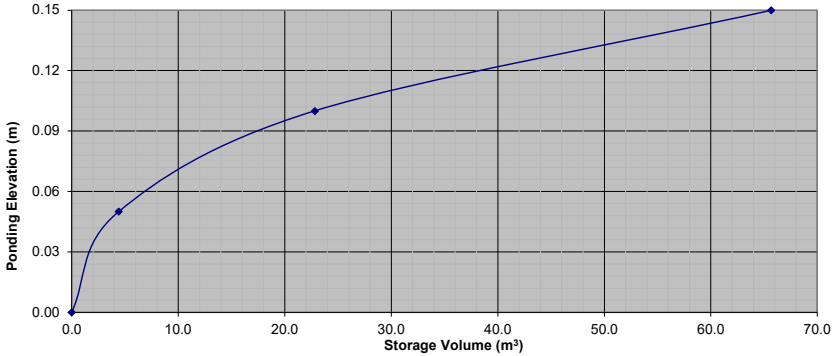
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain B15(L/s)	Flow/Drain B16(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	20.6	65.7
1:5 Year	0.79	0.79	1.58	11	30.1	65.7
1:100 Year	0.95	0.95	1.90	14	62.3	65.7

Roof Drain Storage Table for Area RDs

Elevation	Area RD B15+B16	Total Volume
m	m^2	m^3
0.00	0	0
0.05	176.58	4.4
0.10	559.87	22.8
0.15	1154.08	65.7

Stage Storage Curve: Area R-2
Controlled Roof Drain # B15 + B16



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B17+ B18

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.42	L/s
C =	0.90		Vol(max) =	21.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	31.10	29.68	8.90
10	76.81	23.06	21.64	12.98
15	61.77	18.55	17.13	15.41
20	52.03	15.62	14.20	17.04
25	45.17	13.56	12.14	18.21
30	40.04	12.02	10.60	19.08
35	36.06	10.83	9.41	19.75
40	32.86	9.87	8.45	20.27
45	30.24	9.08	7.66	20.68
50	28.04	8.42	7.00	21.00
55	26.17	7.86	6.44	21.24
60	24.56	7.37	5.95	21.43
75	20.81	6.25	4.83	21.73
90	18.14	5.45	4.03	21.75
120	14.56	4.37	2.95	21.25
150	12.25	3.68	2.26	20.33
180	10.63	3.19	1.77	19.12
210	9.42	2.83	1.41	17.73

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B17+ B18

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.58	L/s
C =	0.90		Vol(max) =	31.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	42.39	40.97	12.29
10	104.19	31.28	29.86	17.92
15	83.56	25.09	23.67	21.30
20	70.25	21.09	19.67	23.61
25	60.90	18.28	16.86	25.30
30	53.93	16.19	14.77	26.59
35	48.52	14.57	13.15	27.61
40	44.18	13.27	11.85	28.43
45	40.63	12.20	10.78	29.10
50	37.65	11.30	9.88	29.65
55	35.12	10.55	9.13	30.11
60	32.94	9.89	8.47	30.50
75	27.89	8.37	6.95	31.29
90	24.29	7.29	5.87	31.71
120	19.47	5.84	4.42	31.86
150	16.36	4.91	3.49	31.43
180	14.18	4.26	2.84	30.64
210	12.56	3.77	2.35	29.61

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drains B17+ B18

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	65.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	80.97	79.07	23.72
10	178.56	59.57	57.67	34.60
15	142.89	47.67	45.77	41.19
20	119.95	40.02	38.12	45.74
25	103.85	34.64	32.74	49.12
30	91.87	30.65	28.75	51.75
35	82.58	27.55	25.65	53.86
40	75.15	25.07	23.17	55.60
45	69.05	23.04	21.14	57.07
50	63.95	21.34	19.44	58.31
55	59.62	19.89	17.99	59.37
60	55.89	18.65	16.75	60.29
75	47.26	15.76	13.86	62.39
90	41.11	13.71	11.81	63.80
120	32.89	10.97	9.07	65.33
150	27.61	9.21	7.31	65.80
180	23.90	7.97	6.07	65.60
210	21.14	7.05	5.15	64.94

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drains B17+ B18

OTTAWA IDF CURVE

Area =	0.120	ha	Qallow =	1.90	L/s
C =	1.00		Vol(max) =	82.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	97.16	95.26	28.58
10	214.27	71.48	69.58	41.75
15	171.47	57.20	55.30	49.77
20	143.94	48.02	46.12	55.34
25	124.62	41.57	39.67	59.51
30	110.24	36.78	34.88	62.78
35	99.09	33.06	31.16	65.43
40	90.17	30.08	28.18	67.64
45	82.86	27.64	25.74	69.50
50	76.74	25.60	23.70	71.11
55	71.55	23.87	21.97	72.50
60	67.07	22.38	20.48	73.71
75	56.71	18.92	17.02	76.58
90	49.33	16.46	14.56	78.61
120	39.47	13.17	11.27	81.13
150	33.13	11.05	9.15	82.38
180	28.68	9.57	7.67	82.82
210	25.37	8.46	6.56	82.71

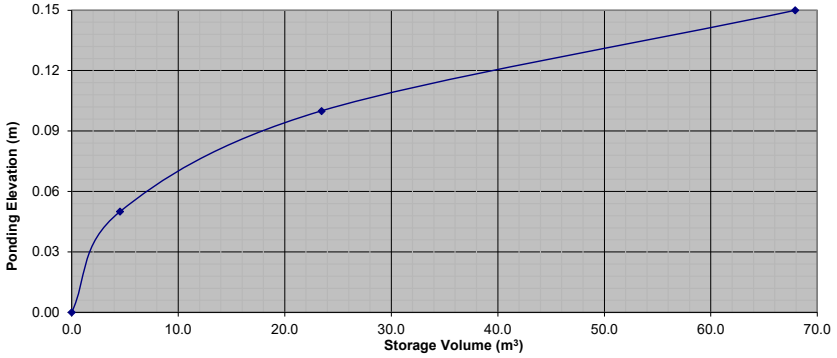
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 1/4 Exposed

Design Event	Flow/Drain B17(L/s)	Flow/Drain B18(L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	0.71	0.71	1.42	10	21.7	67.9
1:5 Year	0.79	0.79	1.58	11	31.9	67.9
1:100 Year	0.95	0.95	1.90	15	65.8	67.9

Roof Drain Storage Table for Area RDs

Elevation	Area RD B17+B18	Total Volume
m	m^2	m^3
0.00	0	0
0.05	181.44	4.5
0.10	575.87	23.5
0.15	1202.92	67.9

Stage Storage Curve: Area R-2
Controlled Roof Drain # B17 + B18



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B19

OTTAWA IDF CURVE

Area =	0.053	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	7.9	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	13.73	12.63	3.79
10	76.81	10.18	9.08	5.45
15	61.77	8.19	7.09	6.38
20	52.03	6.90	5.80	6.96
25	45.17	5.99	4.89	7.33
30	40.04	5.31	4.21	7.58
35	36.06	4.78	3.68	7.73
40	32.86	4.36	3.26	7.82
45	30.24	4.01	2.91	7.86
50	28.04	3.72	2.62	7.86
55	26.17	3.47	2.37	7.82
60	24.56	3.26	2.16	7.76
75	20.81	2.76	1.66	7.47
90	18.14	2.41	1.31	7.05
120	14.56	1.93	0.83	5.98
150	12.25	1.62	0.52	4.72
180	10.63	1.41	0.31	3.34
210	9.42	1.25	0.15	1.87

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B19

OTTAWA IDF CURVE

Area =	0.053	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	11.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	18.72	17.62	5.29
10	104.19	13.82	12.72	7.63
15	83.56	11.08	9.98	8.98
20	70.25	9.32	8.22	9.86
25	60.90	8.08	6.98	10.46
30	53.93	7.15	6.05	10.89
35	48.52	6.43	5.33	11.20
40	44.18	5.86	4.76	11.42
45	40.63	5.39	4.29	11.58
50	37.65	4.99	3.89	11.68
55	35.12	4.66	3.56	11.74
60	32.94	4.37	3.27	11.77
75	27.89	3.70	2.60	11.69
90	24.29	3.22	2.12	11.45
120	19.47	2.58	1.48	10.67
150	16.36	2.17	1.07	9.63
180	14.18	1.88	0.78	8.43
210	12.56	1.66	0.56	7.12

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B19

OTTAWA IDF CURVE

Area =	0.053	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	25.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	35.76	34.42	10.33
10	178.56	26.31	24.97	14.98
15	142.89	21.05	19.71	17.74
20	119.95	17.67	16.33	19.60
25	103.85	15.30	13.96	20.94
30	91.87	13.54	12.20	21.95
35	82.58	12.17	10.83	22.74
40	75.15	11.07	9.73	23.36
45	69.05	10.17	8.83	23.85
50	63.95	9.42	8.08	24.25
55	59.62	8.78	7.44	24.57
60	55.89	8.24	6.90	24.82
75	47.26	6.96	5.62	25.30
90	41.11	6.06	4.72	25.47
120	32.89	4.85	3.51	25.25
150	27.61	4.07	2.73	24.55
180	23.90	3.52	2.18	23.56
210	21.14	3.12	1.78	22.37

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drain B19

OTTAWA IDF CURVE

Area =	0.053	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	32.2	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	42.91	41.57	12.47
10	214.27	31.57	30.23	18.14
15	171.47	25.26	23.92	21.53
20	143.94	21.21	19.87	23.84
25	124.62	18.36	17.02	25.53
30	110.24	16.24	14.90	26.83
35	99.09	14.60	13.26	27.85
40	90.17	13.29	11.95	28.67
45	82.86	12.21	10.87	29.35
50	76.74	11.31	9.97	29.90
55	71.55	10.54	9.20	30.37
60	67.07	9.88	8.54	30.75
75	56.71	8.36	7.02	31.57
90	49.33	7.27	5.93	32.02
120	39.47	5.82	4.48	32.23
150	33.13	4.88	3.54	31.88
180	28.68	4.23	2.89	31.17
210	25.37	3.74	2.40	30.22

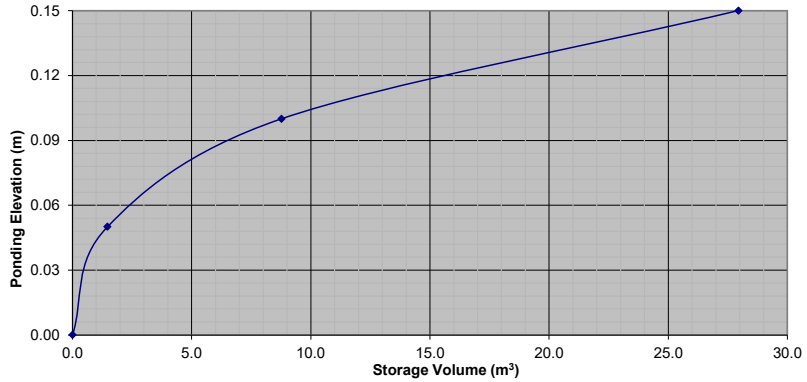
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	1.10	10	7.9	27.9
1:5 Year	1.26	1.26	11	11.8	27.9
1:100 Year	1.34	1.34	14	25.5	27.9

Roof Drain Storage Table for Area RD B19

Elevation	Area RD B19	Total Volume
m	m^2	m^3
0.00	0	0
0.05	58.46	1.5
0.10	233.85	8.8
0.15	532.75	27.9

Stage Storage Curve: Area R-2
Controlled Roof Drain # B19



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Roof Drains B20 to B23

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	7.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	13.48	12.38	3.71
10	76.81	9.99	8.89	5.34
15	61.77	8.04	6.94	6.24
20	52.03	6.77	5.67	6.80
25	45.17	5.88	4.78	7.16
30	40.04	5.21	4.11	7.40
35	36.06	4.69	3.59	7.54
40	32.86	4.28	3.18	7.62
45	30.24	3.93	2.83	7.65
50	28.04	3.65	2.55	7.64
55	26.17	3.40	2.30	7.61
60	24.56	3.20	2.10	7.54
75	20.81	2.71	1.61	7.24
90	18.14	2.36	1.26	6.81
120	14.56	1.89	0.79	5.72
150	12.25	1.59	0.49	4.45
180	10.63	1.38	0.28	3.05
210	9.42	1.22	0.12	1.57

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Roof Drains B20 to B23

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	11.5	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	18.37	17.27	5.18
10	104.19	13.56	12.46	7.47
15	83.56	10.87	9.77	8.79
20	70.25	9.14	8.04	9.65
25	60.90	7.92	6.82	10.23
30	53.93	7.02	5.92	10.65
35	48.52	6.31	5.21	10.95
40	44.18	5.75	4.65	11.16
45	40.63	5.29	4.19	11.30
50	37.65	4.90	3.80	11.40
55	35.12	4.57	3.47	11.45
60	32.94	4.29	3.19	11.47
75	27.89	3.63	2.53	11.38
90	24.29	3.16	2.06	11.12
120	19.47	2.53	1.43	10.32
150	16.36	2.13	1.03	9.26
180	14.18	1.84	0.74	8.04
210	12.56	1.63	0.53	6.72

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Roof Drains B20 to B23

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	23.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	35.09	33.51	10.05
10	178.56	25.81	24.23	14.54
15	142.89	20.66	19.08	17.17
20	119.95	17.34	15.76	18.91
25	103.85	15.01	13.43	20.15
30	91.87	13.28	11.70	21.06
35	82.58	11.94	10.36	21.75
40	75.15	10.86	9.28	22.28
45	69.05	9.98	8.40	22.69
50	63.95	9.25	7.67	23.00
55	59.62	8.62	7.04	23.23
60	55.89	8.08	6.50	23.40
75	47.26	6.83	5.25	23.63
90	41.11	5.94	4.36	23.56
120	32.89	4.76	3.18	22.86
150	27.61	3.99	2.41	21.70
180	23.90	3.46	1.88	20.25
210	21.14	3.06	1.48	18.61

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Roof Drains B20 to B23

OTTAWA IDF CURVE

Area =	0.052	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	30.0	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	42.10	40.52	12.16
10	214.27	30.97	29.39	17.64
15	171.47	24.79	23.21	20.89
20	143.94	20.81	19.23	23.07
25	124.62	18.01	16.43	24.65
30	110.24	15.94	14.36	25.84
35	99.09	14.33	12.75	26.76
40	90.17	13.04	11.46	27.49
45	82.86	11.98	10.40	28.08
50	76.74	11.09	9.51	28.54
55	71.55	10.34	8.76	28.92
60	67.07	9.70	8.12	29.22
75	56.71	8.20	6.62	29.78
90	49.33	7.13	5.55	29.98
120	39.47	5.71	4.13	29.71
150	33.13	4.79	3.21	28.89
180	28.68	4.15	2.57	27.72
210	25.37	3.67	2.09	26.31

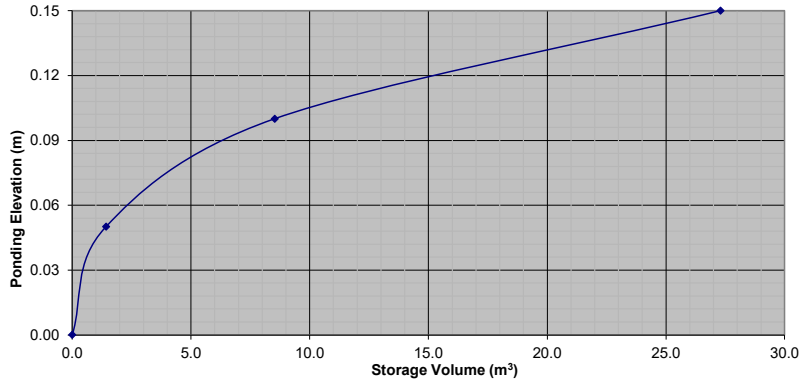
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	4.40	10	7.7	27.3
1:5 Year	1.34	5.36	11	11.5	27.3
1:100 Year	1.58	6.32	14	23.6	27.3

Roof Drain Storage Table for Area RDs

Elevation	Area Roof Drains	Total Volume
m	m^2	m^3
0.00	0	0
0.05	56.79	1.4
0.10	227.14	8.5
0.15	524	27.3

Stage Storage Curve: Area R-2
Controlled Roof Drains #B20 to B23



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B24

OTTAWA IDF CURVE

Area =	0.055	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	8.3	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	14.25	13.15	3.95
10	76.81	10.57	9.47	5.68
15	61.77	8.50	7.40	6.66
20	52.03	7.16	6.06	7.27
25	45.17	6.22	5.12	7.67
30	40.04	5.51	4.41	7.94
35	36.06	4.96	3.86	8.11
40	32.86	4.52	3.42	8.21
45	30.24	4.16	3.06	8.27
50	28.04	3.86	2.76	8.28
55	26.17	3.60	2.50	8.25
60	24.56	3.38	2.28	8.21
75	20.81	2.86	1.76	7.94
90	18.14	2.50	1.40	7.54
120	14.56	2.00	0.90	6.51
150	12.25	1.69	0.59	5.27
180	10.63	1.46	0.36	3.91
210	9.42	1.30	0.20	2.47

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B24

OTTAWA IDF CURVE

Area =	0.055	ha	Qallow =	1.26	L/s
C =	0.90		Vol(max) =	12.4	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	19.43	18.33	5.50
10	104.19	14.34	13.24	7.94
15	83.56	11.50	10.40	9.36
20	70.25	9.67	8.57	10.28
25	60.90	8.38	7.28	10.92
30	53.93	7.42	6.32	11.38
35	48.52	6.68	5.58	11.71
40	44.18	6.08	4.98	11.95
45	40.63	5.59	4.49	12.13
50	37.65	5.18	4.08	12.24
55	35.12	4.83	3.73	12.32
60	32.94	4.53	3.43	12.36
75	27.89	3.84	2.74	12.32
90	24.29	3.34	2.24	12.11
120	19.47	2.68	1.58	11.37
150	16.36	2.25	1.15	10.36
180	14.18	1.95	0.85	9.19
210	12.56	1.73	0.63	7.91

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B24

OTTAWA IDF CURVE

Area =	0.055	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	26.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	37.11	35.77	10.73
10	178.56	27.30	25.96	15.58
15	142.89	21.85	20.51	18.46
20	119.95	18.34	17.00	20.40
25	103.85	15.88	14.54	21.81
30	91.87	14.05	12.71	22.87
35	82.58	12.63	11.29	23.70
40	75.15	11.49	10.15	24.36
45	69.05	10.56	9.22	24.89
50	63.95	9.78	8.44	25.32
55	59.62	9.12	7.78	25.66
60	55.89	8.55	7.21	25.94
75	47.26	7.23	5.89	26.48
90	41.11	6.29	4.95	26.71
120	32.89	5.03	3.69	26.57
150	27.61	4.22	2.88	25.94
180	23.90	3.65	2.31	25.00
210	21.14	3.23	1.89	23.85

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drain B24

OTTAWA IDF CURVE

Area =	0.055	ha	Qallow =	1.34	L/s
C =	1.00		Vol(max) =	33.8	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	44.53	43.19	12.96
10	214.27	32.76	31.42	18.85
15	171.47	26.22	24.88	22.39
20	143.94	22.01	20.67	24.80
25	124.62	19.05	17.71	26.57
30	110.24	16.86	15.52	27.93
35	99.09	15.15	13.81	29.00
40	90.17	13.79	12.45	29.87
45	82.86	12.67	11.33	30.59
50	76.74	11.73	10.39	31.18
55	71.55	10.94	9.60	31.68
60	67.07	10.26	8.92	32.10
75	56.71	8.67	7.33	32.99
90	49.33	7.54	6.20	33.50
120	39.47	6.04	4.70	33.81
150	33.13	5.07	3.73	33.53
180	28.68	4.39	3.05	32.89
210	25.37	3.88	2.54	32.00

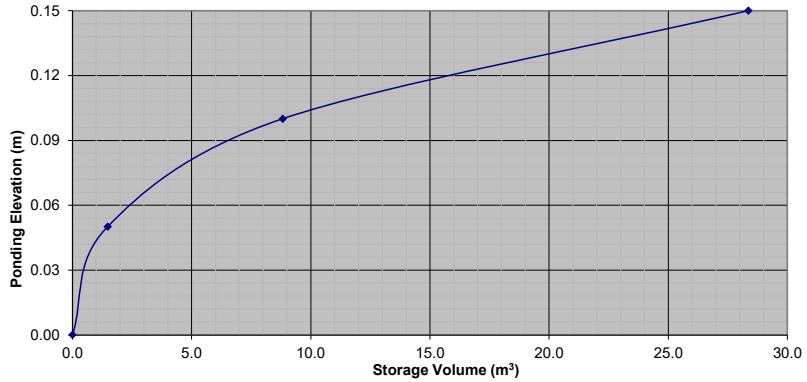
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to 3/4 Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	1.10	10	8.3	28.4
1:5 Year	1.26	1.26	11	12.4	28.4
1:100 Year	1.34	1.34	14	26.7	28.4

Roof Drain Storage Table for Area RD B24

Elevation	Area RD B24	Total Volume
m	m^2	m^3
0.00	0	0
0.05	58.78	1.5
0.10	235.13	8.8
0.15	546.53	28.4

Stage Storage Curve: Area R-2
Controlled Roof Drain # B24



Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:2 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B25

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	1.10	L/s
C =	0.90		Vol(max) =	5.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	103.57	10.11	9.01	2.70
10	76.81	7.49	6.39	3.84
15	61.77	6.03	4.93	4.43
20	52.03	5.08	3.98	4.77
25	45.17	4.41	3.31	4.96
30	40.04	3.91	2.81	5.05
35	36.06	3.52	2.42	5.08
40	32.86	3.21	2.11	5.06
45	30.24	2.95	1.85	5.00
50	28.04	2.74	1.64	4.91
55	26.17	2.55	1.45	4.80
60	24.56	2.40	1.30	4.67
75	20.81	2.03	0.93	4.19
90	18.14	1.77	0.67	3.62
120	14.56	1.42	0.32	2.31
150	12.25	1.20	0.10	0.86
180	10.63	1.04	-0.06	-0.68
210	9.42	0.92	-0.18	-2.28

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:5 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B25

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	1.34	L/s
C =	0.90		Vol(max) =	7.7	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	141.18	13.78	12.68	3.80
10	104.19	10.17	9.07	5.44
15	83.56	8.15	7.05	6.35
20	70.25	6.85	5.75	6.91
25	60.90	5.94	4.84	7.26
30	53.93	5.26	4.16	7.49
35	48.52	4.73	3.63	7.63
40	44.18	4.31	3.21	7.71
45	40.63	3.96	2.86	7.73
50	37.65	3.67	2.57	7.72
55	35.12	3.43	2.33	7.68
60	32.94	3.21	2.11	7.61
75	27.89	2.72	1.62	7.30
90	24.29	2.37	1.27	6.86
120	19.47	1.90	0.80	5.76
150	16.36	1.60	0.50	4.47
180	14.18	1.38	0.28	3.06
210	12.56	1.23	0.13	1.58

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR EVENT
AREA R-2: Building B Controlled Roof Drain B25

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	16.1	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	242.70	26.31	24.73	7.42
10	178.56	19.36	17.78	10.67
15	142.89	15.49	13.91	12.52
20	119.95	13.01	11.43	13.71
25	103.85	11.26	9.68	14.52
30	91.87	9.96	8.38	15.08
35	82.58	8.95	7.37	15.48
40	75.15	8.15	6.57	15.76
45	69.05	7.49	5.91	15.95
50	63.95	6.93	5.35	16.06
55	59.62	6.46	4.88	16.12
60	55.89	6.06	4.48	16.13
75	47.26	5.12	3.54	15.95
90	41.11	4.46	2.88	15.54
120	32.89	3.57	1.99	14.30
150	27.61	2.99	1.41	12.72
180	23.90	2.59	1.01	10.92
210	21.14	2.29	0.71	8.98

Proposed Industrial Development
Novatech Project No. 119123
REQUIRED STORAGE - 1:100 YEAR + 20%
AREA R-2: Building B Controlled Roof Drain B25

OTTAWA IDF CURVE

Area =	0.039	ha	Qallow =	1.58	L/s
C =	1.00		Vol(max) =	20.6	m3

Time (min)	Intensity (mm/hr)	Q (L/s)	Qnet (L/s)	Vol (m3)
5	291.24	31.58	30.00	9.00
10	214.27	23.23	21.65	12.99
15	171.47	18.59	17.01	15.31
20	143.94	15.61	14.03	16.83
25	124.62	13.51	11.93	17.90
30	110.24	11.95	10.37	18.67
35	99.09	10.74	9.16	19.24
40	90.17	9.78	8.20	19.67
45	82.86	8.98	7.40	19.99
50	76.74	8.32	6.74	20.22
55	71.55	7.76	6.18	20.39
60	67.07	7.27	5.69	20.49
75	56.71	6.15	4.57	20.56
90	49.33	5.35	3.77	20.35
120	39.47	4.28	2.70	19.44
150	33.13	3.59	2.01	18.11
180	28.68	3.11	1.53	16.52
210	25.37	2.75	1.17	14.75

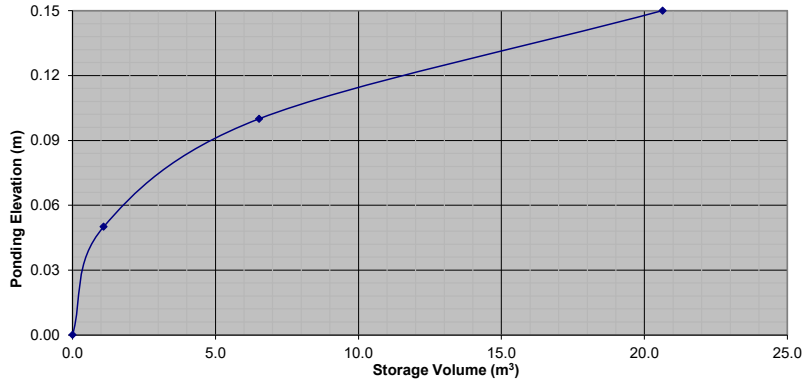
Watts Accutrol Flow Control Roof Drains: RD-100-A-ADJ set to Fully Exposed

Design Event	Flow/Drain (L/s)	Total Flow (L/s)	Ponding (cm)	Storage (m^3) Required	Storage (m^3) Provided
1:2 Year	1.10	1.10	9	5.1	20.6
1:5 Year	1.34	1.34	11	7.7	20.6
1:100 Year	1.58	1.58	13	16.1	20.6

Roof Drain Storage Table for Area RD B25

Elevation	Area RD B25	Total Volume
m	m^2	m^3
0.00	0	0
0.05	43.49	1.1
0.10	173.95	6.5
0.15	390.27	20.6

Stage Storage Curve: Area R-2
Controlled Roof Drain # B25



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

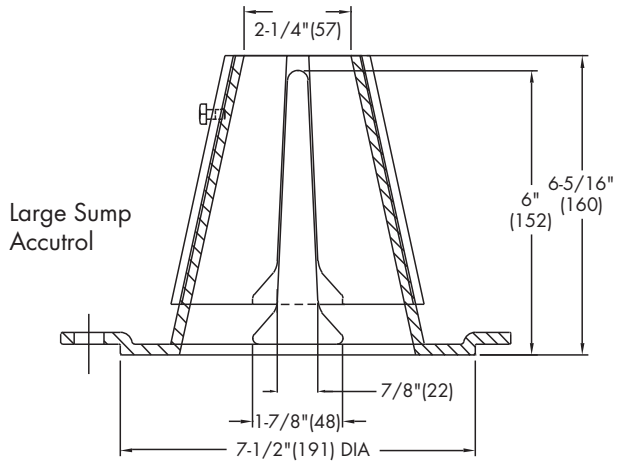
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

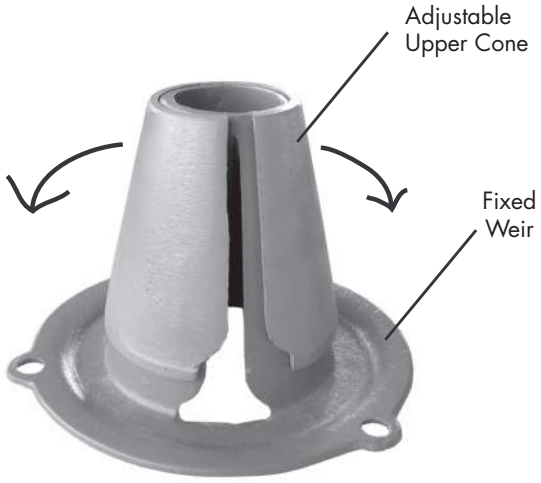
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the 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

IPEX Tempest™ Inlet Control Devices

Municipal Technical Manual Series

Vol. I, 2nd Edition

PRODUCT INFORMATION: TEMPEST LOW, MEDIUM FLOW (LMF) ICD

Purpose

To control the amount of storm water runoff entering a sewer system by allowing a specified flow volume out of a catch basin or manhole at a specified head. This approach conserves pipe capacity so that catch basins downstream do not become uncontrollably surcharged, which can lead to basement floods, flash floods and combined sewer overflows.

Product Description

Our LMF ICD is designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter and larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 14 preset flow curves, the LMF ICD has the ability to provide flow rates: 2lps – 17lps (31gpm – 270gpm)

Product Function

The LMF ICD vortex flow action allows the LMF ICD to provide a narrower flow curve using a larger orifice than a conventional orifice plate ICD, making it less likely to clog. When comparing flows at the same head level, the LMF ICD has the ability to restrict more flow than a conventional ICD during a rain event, preserving greater sewer capacity.

Product Construction

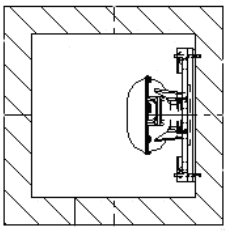
Constructed from durable PVC, the LMF ICD is light weight 8.9 Kg (19.7 lbs).

Product Applications

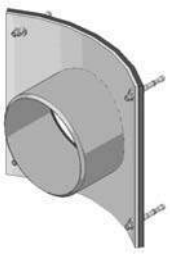
Will accommodate both square and round applications:

Square Application

Universal Mounting Plate



Round Application



+

Spigot CB Wall Plate

=

Universal Mounting Plate Hub Adapter

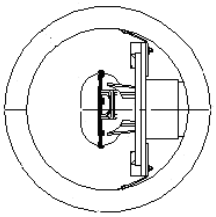


Chart 1: LMF 14 Preset Flow Curves

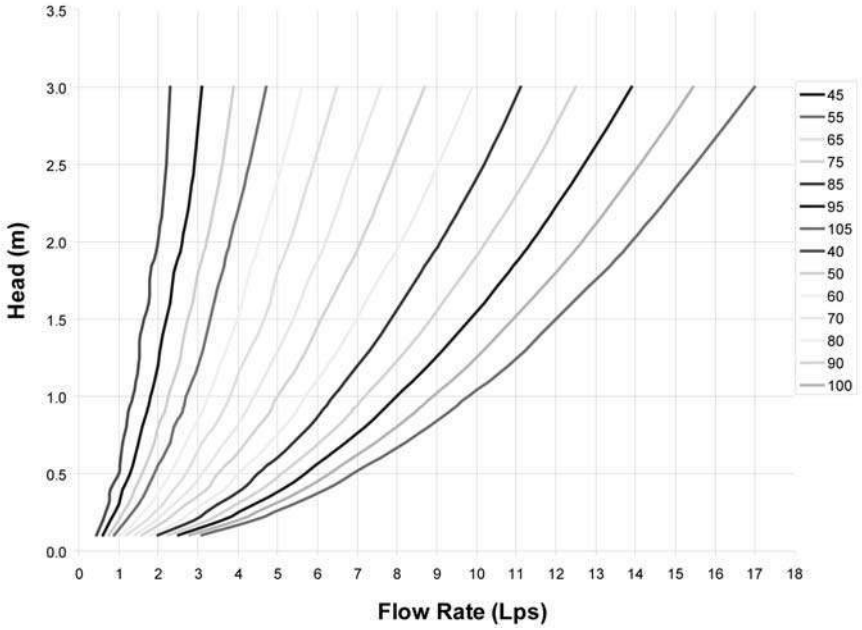
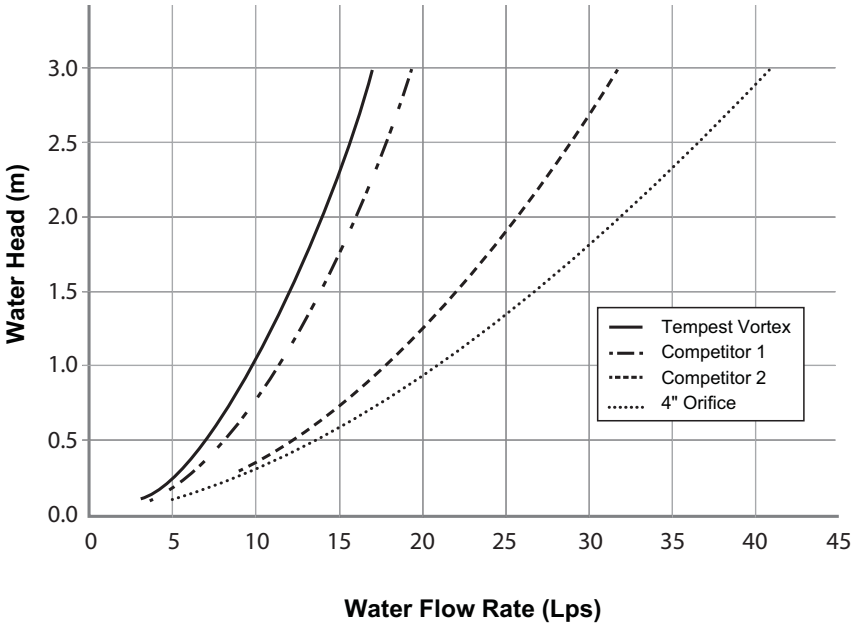


Chart 2: LMF Flow vs. ICD Alternatives



PRODUCT INSTALLATION

Instructions to assemble a TEMPEST LMF ICD into a Square Catch Basin:

STEPS:

1. Materials and tooling verification:
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level, and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers, (4) nuts, universal mounting plate, ICD device.
2. Use the mounting wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a minimum of 1-1/2" depth up to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the universal mounting plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the wall mounting plate and the catch basin wall.
6. From the ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the universal mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut down the pipe flush to the catch basin wall.
- Call your IPEX representative for more information or if you have any questions about our products.

Instructions to assemble a TEMPEST LMF ICD into a Round Catch Basin:

STEPS:

1. Materials and tooling verification.
   - Tooling: impact drill, 3/8" concrete bit, torque wrench for 9/16" nut, hand hammer, level and marker.
   - Material: (4) concrete anchor 3/8 x 3-1/2, (4) washers and (4) nuts, spigot CB wall plate, universal mounting plate hub adapter, ICD device.
2. Use the spigot catch basin wall plate to locate and mark the hole (4) pattern on the catch basin wall. You should use a level to ensure that the plate is at the horizontal.
3. Use an impact drill with a 3/8" concrete bit to make the four holes at a depth between 1-1/2" to 2-1/2". Clean the concrete dust from the holes.
4. Install the anchors (4) in the holes by using a hammer. Thread the nuts on the top of the anchors to protect the threads when you hit the anchors with the hammer. Remove the nuts from the ends of the anchors.
5. Install the CB spigot wall plate on the anchors and screw the 4 nuts in place with a maximum torque of 40 N.m (30 lbf-ft). There should be no gap between the spigot wall plate and the catch basin wall.
6. Apply solvent cement on the hub of the universal mounting plate, hub adapter and the spigot of the CB wall plate, then slide the hub over the spigot. Make sure the universal mounting plate is at the horizontal and its hub is completely inserted onto the spigot. Normally, the corners of the universal mounting plate hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the ICD device by hooking the end of the reach bar to the handle of the ICD device. Align the triangular plate portion into the mounting wall plate. Push down the device to be sure it has centered in to the mounting plate and has created a seal.

⚠ WARNING

- Verify that the outlet pipe doesn't protrude into the catch basin. If it does, cut back the pipe flush to the catch basin wall.
- The solvent cement which is used in this installation is to be approved for PVC.
- The solvent cement should not be used below 0°C (32°F) or in a high humidity environment. Refer to the IPEX solvent cement guide to confirm the required curing time or visit the IPEX Online Solvent Cement Training Course available at www.ipexinc.com.
- Call your IPEX representative for more information or if you have any questions about our products.

PRODUCT TECHNICAL SPECIFICATION

General

Inlet control devices (ICD's) are designed to provide flow control at a specified rate for a given water head level and also provide odour and floatable control. All ICD's will be IPEX Tempest or approved equal.

All devices shall be removable from a universal mounting plate. An operator from street level using only a T-bar with a hook will be able to retrieve the device while leaving the universal mounting plate secured to the catch basin wall face. The removal of the TEMPEST devices listed above must not require any unbolting or special manipulation or any special tools.

High Flow (HF) Sump devices will consist of a removable threaded cap which can be accessible from street level with out entry into the catchbasin (CB). The removal of the threaded cap shall not require any special tools other than the operator's hand.

ICD's shall have no moving parts.

Materials

ICD's are to be manufactured from Polyvinyl Chloride (PVC) or Polyurethane material, designed to be durable enough to withstand multiple freeze-thaw cycles and exposure to harsh elements.

The inner ring seal will be manufactured using a Buna or Nitrile material with hardness between Duro 50 and Duro 70.

The wall seal is to be comprised of a 3/8" thick Neoprene Closed Cell Sponge gasket which is attached to the back of the wall plate.

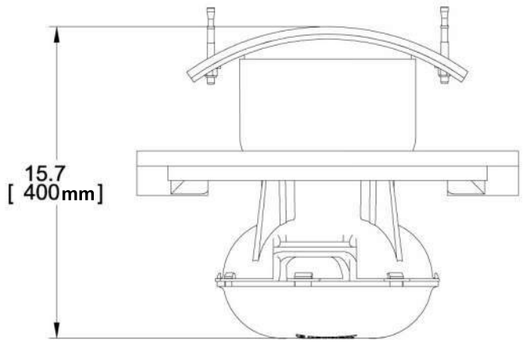
All hardware will be made from 304 stainless steel.

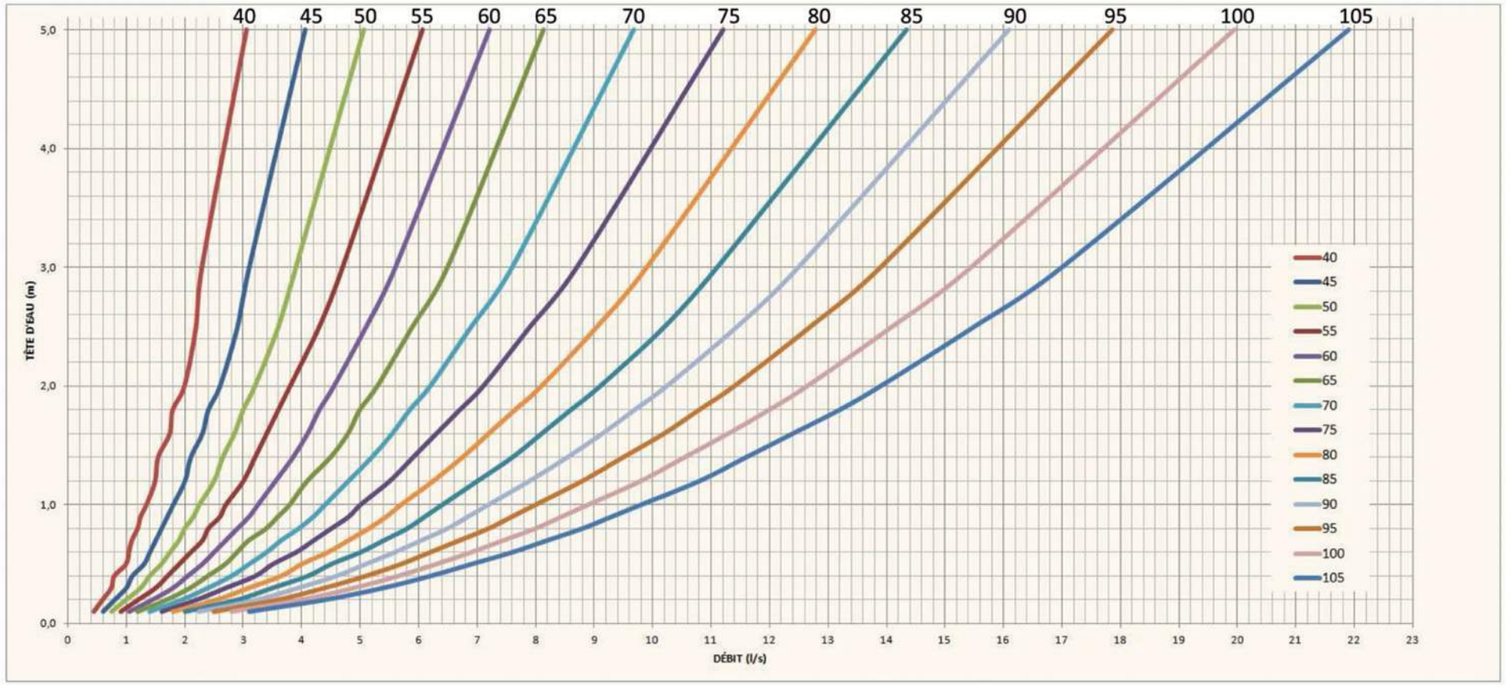
Dimensioning

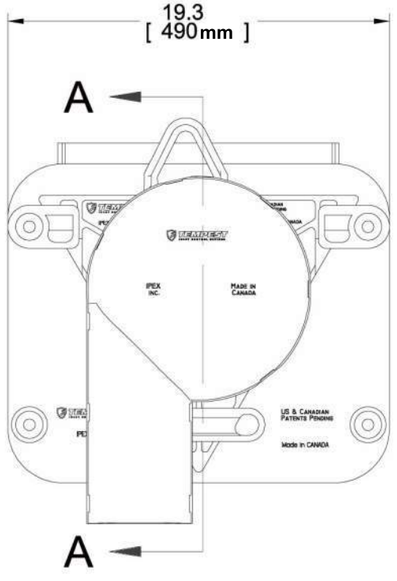
The Low Medium Flow (LMF), High Flow (HF) and the High Flow (HF) Sump shall allow for a minimum outlet pipe diameter of 200mm with a 600mm deep Catch Basin sump.

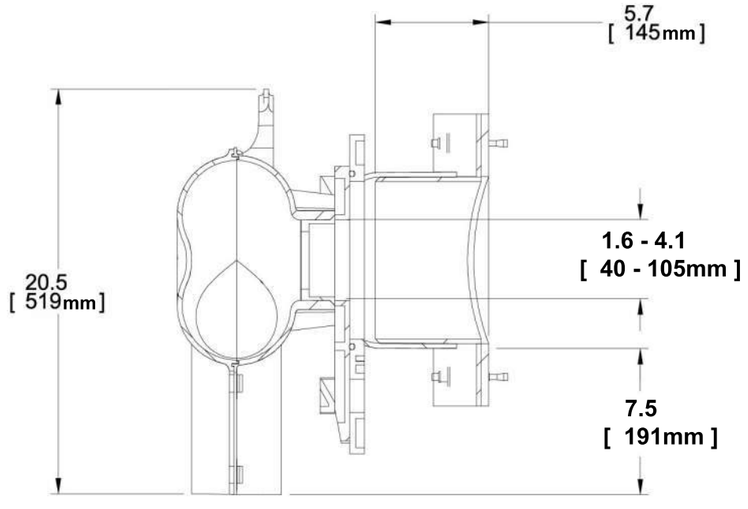
Installation

Contractor shall be responsible for securing, supporting and connecting the ICD's to the existing influent pipe and catchbasin/manhole structure as specified and designed by the Engineer.

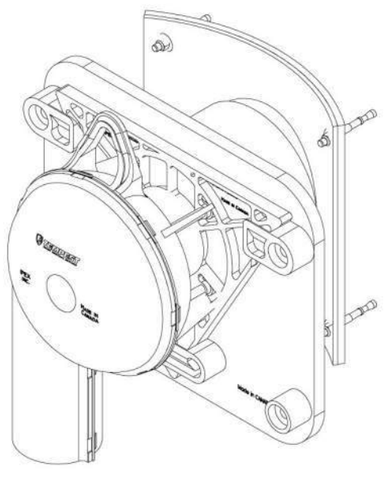








SECTION A-A



IPEX — Product development engineering, 3 Place du commerce, Suite 101, Île des Soeurs, Montréal, QC, H3E 1H7, Canada Tel 514 769 2200, www.ipexna.com			
PROJECTION	UNITS	TITLE	
	in [mm]	Tempest LMF round CB assembly [VORTEX]	SIZE B · SCALE(S) 1/8 · 1-2014

Appendix E
Development Servicing Study Checklist

NOVATECH
Engineers, Planners & Landscape Architects

Project Name: 575 Dealership Drive
Project Number: 119123
Date: May 3, 2023

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	NA		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	1	Fig 1, Fig 2
Plan showing the site and location of all existing services.	Y	1	Fig 2, Engineering Drawings
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	N		
Summary of Pre-consultation Meetings with City and other approval agencies.	Y	1.0	Appendix A
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Y	1.0	
Statement of objectives and servicing criteria.	Y	1.0	
Identification of existing and proposed infrastructure available in the immediate area.	Y		Engineering Drawings
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Y	4.0	
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Y		Engineering Drawings

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A		
Proposed phasing of the development, if applicable.	N/A		
Reference to geotechnical studies and recommendations concerning servicing.	Y	1.0	Geotechnical Report submitted under separate cover
All preliminary and formal site plan submissions should have the following information:			
Metric scale	Y		Engineering Drawings
North arrow (including construction North)	Y		Engineering Drawings
Key plan	Y		Engineering Drawings, Fig 1
Name and contact information of applicant and property owner	Y		Engineering Drawings
Property limits including bearings and dimensions	Y		Engineering Drawings
Existing and proposed structures and parking areas	Y		Engineering Drawings
Easements, road widening and rights-of-way	Y		Engineering Drawings
Adjacent street names	Y		Engineering Drawings, Fig 1

Development Servicing Study Checklist

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	Na		
Availability of public infrastructure to service proposed development.	Y	2.0	
Identification of system constraints.	Y	2.0	
Identify boundary conditions.	Y	2.0	Appendix B
Confirmation of adequate domestic supply and pressure.	Y	2.0	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	2.0	Appendix B
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	2.0	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	Y	2.0	
Address reliability requirements such as appropriate location of shut-off valves.	Y	2.0	
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	2.0	Appendix B
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	2.0	Fig 4, Fig 5
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	Y	2.0	
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	2.0	Appendix B
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Y	2.0	Appendix B

Development Servicing Study Checklist

4.3 Wastewater	Addressed (Y/N/NA)	Section	Comments
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	3.0	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	Y	3.0	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	NA		
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	3.0	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	3.0	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Y	3.0	Appendix C
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	3.0	Appendix C
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	4.0	
Analysis of the available capacity in existing public infrastructure.	Y	4.0	Appendix D
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y		Fig 1, Fig 2 Engineering Drawings
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	4.0	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	4.0	
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	4.0	
Set-back from private sewage disposal systems.	N/A		
Watercourse and hazard lands setbacks.	N/A		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Y	1.0	Appendix A
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A		
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	4.0	Appendix D
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A		
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	4.0	Appendix D
Any proposed diversion of drainage catchment areas from one outlet to another.	Y	4.0	
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	4.0	Fig 7 Engineering Drawings
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Identification of municipal drains and related approval requirements.	N/A		
Description of how the conveyance and storage capacity will be achieved for the development.	Y	4.0	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y		
Inclusion of hydraulic analysis including HGL elevations.	N		
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	5.0	Engineering Drawings
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A		
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

Development Servicing Study Checklist

4.5 Approval and Permit Requirements	Addressed (Y/N/NA)	Section	Comments
Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Y	1.0	Appendix A
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	NA		
Changes to Municipal Drains.	NA		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	NA		

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y	6.0	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	7.0	Appendices

Appendix F
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 THE GEOTECHNICAL INVESTIGATION REPORT (NO. PG6514-1, REV. 2, DATED OCTOBER 10, 2023) AS WELL AS THE SLOPE STABILITY ANALYSIS (NO. PG6514-MEMO.01, REV. 1, DATED OCTOBER 10, 2023) BOTH PREPARED BY PATERSON GROUP INC., 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 HARD SURFACED AREAS AND DIMENSIONS.
11. REFER TO THE 'SITE SERVICING AND STORMWATER MANAGEMENT REPORT' (R-2023-069) PREPARED BY NOVATECH.
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 LOT PAINTING AS REQUIRED BY ARCHITECT.
14. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A SERVICING PLAN OF 119123-GP1 AND 119123-GP2 INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THE SERVICING PLANS. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, T/WM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.

SEWER NOTES:

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

ITEM	SPEC. No.	REFERENCE
CATCHBASIN (600x600mm)	705.010	OPSD
TWIN INLET CATCHBASIN (600x1450mm) 'DCB'	705.020	OPSD
DITCH INLET CB 'TYPE A' (600x1200mm) 'DICB'	705.040	OPSD
STORM / SANITARY MANHOLE (1200mmØ)	701.010	OPSD
STORM / CATCHBASIN MANHOLE (2400mmØ)	701.013	OPSD
CB, FRAME & COVER	400.020	OPSD
STORM / SANITARY MH FRAME & COVER	401.010	OPSD
WATERTIGHT MH FRAME AND COVER	401.030	OPSD
DITCH INLET GRATING	403.010	OPSD
SAFETY PLATFORMS FOR CIRCULAR MHs	404.020	OPSD
SEWER TRENCH	S6	CITY OF OTTAWA
SANITARY / STORM SEWER / CB LEAD	PVC DR 35	
STORM SUPER-PIPE (600mm DIAMETER AND OVER)	CONCRETE 65-D	

3. THE WEEPING TILE SERVICE SHALL BE EQUIPPED WITH A BACKFLOW PREVENTION DEVICE AS PER THE CITY OF OTTAWA STANDARD DETAIL S14.
4. INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 1.8m COVER WITH HI-40 INSULATION PER INSULATION DETAIL FOR SHALLOW SEWERS. PROVIDE 150mm CLEARANCE BETWEEN PIPE AND INSULATION.
5. SERVICES ARE TO BE CONSTRUCTED TO 1.0m FROM FACE OF BUILDING AT A MINIMUM SLOPE OF 1.0%.
6. PIPE BEDDING, COVER AND BACKFILL ARE TO BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. THE USE OF CLEAR CRUSHED STONE AS A BEDDING LAYER SHALL NOT BE PERMITTED.
7. FLEXIBLE CONNECTIONS ARE REQUIRED FOR CONNECTING PIPES TO MANHOLES (FOR EXAMPLE KOR-N-SEAL, PSX: POSITIVE SEAL AND DURASEAL). THE CONCRETE CRADLE FOR THE PIPE CAN BE ELIMINATED.
8. 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.
9. TYPICAL STORM MANHOLES AND CATCHBASIN MANHOLES ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED. ALL CATCHBASINS ARE TO HAVE 600mm SUMPS UNLESS OTHERWISE INDICATED.
10. ALL CATCHBASINS, MANHOLES AND/OR CATCHBASIN MANHOLES THAT ARE TO HAVE ICD'S INSTALLED WITHIN THEM ARE TO HAVE 600mm SUMPS.
11. ALL WEEPING TILE CONNECTIONS TO BE MADE TO THE PROPOSED STORM SEWER SYSTEM DOWNSTREAM OF ANY INLET CONTROL DEVICES.
12. THE CONTRACTOR IS TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH, CLEAN AND RE-TELEVISE (CCTV) ALL SEWERS & APPURTENANCES. PROVIDE A COPY OF ALL CCTV INSPECTION REPORTS TO THE ENGINEER FOR REVIEW.

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 98% 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.
10. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON PLANS 119123-GR1 AND 119123-GR2.

PAVEMENT STRUCTURES:

LIGHT DUTY PAVEMENT
50mm HL-3 or SUPERPAVE 12.5
150mm GRANULAR "A"
300mm GRANULAR "B" TYPE II
ASPHALT GRADE PG 58-34 - TRAFFIC LEVEL 'B'
*INSTALLED PER GEOTECHNICAL REPORT

HEAVY DUTY PAVEMENT
40mm HL-3 or SUPERPAVE 12.5
50mm HL-8 or SUPERPAVE 19.0
150mm GRANULAR "A"
450mm GRANULAR "B" TYPE II
ASPHALT GRADE PG 58-34 - TRAFFIC LEVEL 'B'
*INSTALLED PER GEOTECHNICAL REPORT

HEAVY DUTY CONCRETE
150mm REINFORCED CONCRETE
150mm GRANULAR "A"
450mm GRANULAR "B" TYPE II
INSTALLED PER CITY DETAIL SC23
(w/ INCREASED GRANULAR 'B' THICKNESS)

HEAVY DUTY PAVEMENT - ROADWAY RE-INSTATEMENT
MATCH EXISTING GRANULAR STRUCTURE OF ROADWAY IN TRENCHES
MATCH EXISTING ASPHALT THICKNESSES IN TRENCHES
NEW ASPHALT GRADE: PG 58-34
PROVIDE MUNICIPAL ROADWAY ASPHALT OVERLAY AS SHOWN, PER CITY STANDARD DETAIL R10. REFER TO AMENDED ROAD ACTIVITY BY-LAW 2003-445.

BENCHMARK INFO:

OLS JOB BENCHMARK No. 1 ON THE TOP OF SPINDLE OF THE EXISTING MUNICIPAL FIRE HYDRANT LOCATED NEAR THE MID-BLOCK OF THE SUBJECT SUTE IN THE EAST BOULEVARD OF CITIGATE DRIVE HAVING A GEODETIC ELEVATION OF 97.69m. (JOB BENCHMARK No. 2 AT THE NORTH-EAST CORNER OF CITIGATE AND DEALERSHIP DRIVE IS ALSO SHOWN ON THE OLS SURVEYOR'S PLAN Ref. No. 21797-21 PrtLt17 Con4(RF) T F.

ALL ELEVATIONS ARE REFERRED TO THE CGVD28 GEODETIC DATUM. BEARINGS ARE GRID, DERIVED FROM CONTROL MONUMENT No. 00820118014 HAVING A GEODETIC ELEVATION OF 103.306m.

THE EXISTING GRADES SHOWN ON THE PLANS ARE TAKEN DIRECTLY FROM TOPOGRAPHICAL SURVEY PLAN (Ref. No. 21797-21 PrtLt17 Con4(RF) T F), PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK SIGNED AND DATED JULY 29, 2021.

SURROUNDING BACKGROUND TOPO INFORMATION BEYOND THE LIMITS OF THE SITE SURVEY ARE SHOWN FROM CITY OF OTTAWA 1:1000 MAPPING INFORMATION FOR CONTEXT ONLY.

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.

M:\2019\119123\CAD\Design\119123-NLD.dwg, NLD, Oct 12, 2023 - 9:42am, smatthews

EROSION AND SEDIMENT CONTROL NOTES :

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

1. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA. THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.
2. EROSION AND SEDIMENT CONTROL MEASURES WILL BE IMPLEMENTED DURING CONSTRUCTION IN ACCORDANCE WITH THE "GUIDELINES ON EROSION AND SEDIMENT CONTROL FOR URBAN CONSTRUCTION SITES" (GOVERNMENT OF ONTARIO, MAY 1987). THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MEETING ALL REGULATORY AGENCY REQUIREMENTS.
3. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER BAGS WILL BE PLACED UNDER GRATES OF NEARBY CATCHBASINS AND STRUCTURES. A LIGHT DUTY SILT FENCE BARRIER WILL ALSO BE INSTALLED AROUND THE CONSTRUCTION AREA (WHERE APPLICABLE). THESE CONTROL MEASURES WILL REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
4. TO LIMIT EROSION: MINIMIZE THE AMOUNT OF EXPOSED SOILS AT ANY GIVEN TIME, RE-VEGETATE EXPOSED AREAS AND SLOPES AS SOON AS POSSIBLE AND PROTECT EXPOSED SLOPES WITH NATURAL OR SYNTHETIC MULCHES.
5. FOR MATERIAL STOCKPILING: MINIMIZE THE AMOUNT OF EXPOSED MATERIALS AT ANY GIVEN TIME; APPLY TEMPORARY SEEDING, TARPS, COMPACTION AND/OR SURFACE ROUGHENING AS REQUIRED TO STABILIZE STOCKPILED MATERIALS THAT WILL NOT BE USED WITHIN 14 DAYS.
6. THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE ENGINEER, THE MEASURES ARE NO LONGER REQUIRED. NO CONTROL MEASURES MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
7. THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE ENGINEER ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO ANY STORM SEWER SYSTEM. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.
8. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
9. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.
10. THE CONTRACTOR SHALL ENSURE PROPER DUST CONTROL IS PROVIDED WITH THE APPLICATION OF WATER (AND IF REQUIRED, CALCIUM CHLORIDE) DURING DRY PERIODS. MONITOR DUST LEVELS DURING SITE PREPARATION/EXCAVATION, AND CONSTRUCTION ACTIVITIES, AND WHEN DUST LEVELS BECOME VISUALLY APPARENT SPRAY WATER TO MINIMIZE THE RELEASE OF DUST FROM GRAVEL, PAVED AREAS AND EXPOSED SOILS. USE CHEMICAL DUST SUPPRESSANTS ONLY WHERE NECESSARY ON PROBLEM AREAS.

WATERMAIN NOTES:

1. SUPPLY AND CONSTRUCT ALL WATERMAINS AND APPURTENANCES IN ACCORDANCE WITH THE CITY OF OTTAWA STANDARDS AND SPECIFICATIONS - ALL CURRENT VERSIONS AND 'AS AMENDED'. EXCAVATION, INSTALLATION, BACKFILL AND RESTORATION OF ALL WATERMAINS BY THE CONTRACTOR. CONNECTIONS AND SHUT-OFFS AT THE MAIN BY CITY OF OTTAWA FORCES. CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR IN THE PRESENCE CITY OF OTTAWA FORCES.
2. SPECIFICATIONS:

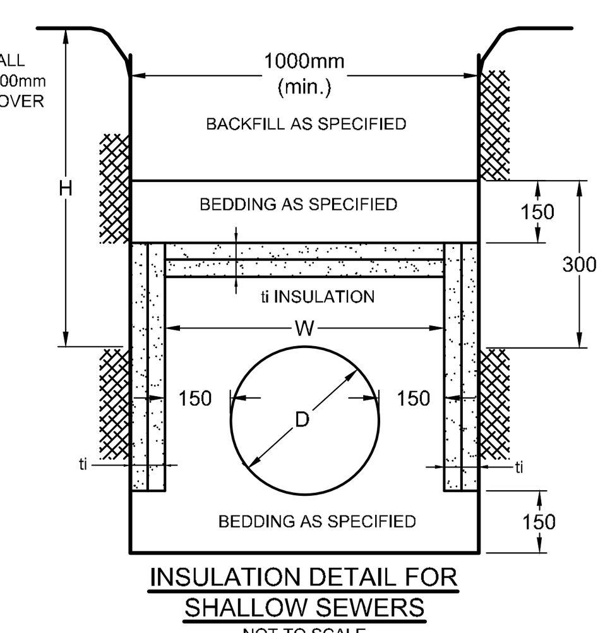
ITEM	SPEC. No.	REFERENCE
DISTRICT METERING AREA CHAMBER	W3	CITY OF OTTAWA
WATERMAIN TRENCHING	W17	CITY OF OTTAWA
HYDRANT INSTALLATION	W19	CITY OF OTTAWA
THERMAL INSULATION IN SHALLOW TRENCHES	W22	CITY OF OTTAWA
THERMAL INSULATION AT OPEN STRUCTURES	W23	CITY OF OTTAWA
VALVE BOX ASSEMBLY	W24	CITY OF OTTAWA
WATERMAIN CROSSING BELOW SEWER	W25	CITY OF OTTAWA
WATERMAIN CROSSING OVER SEWER	W25.2	CITY OF OTTAWA
CATHODIC PROTECTION FOR PVC WATERMAIN	W40	CITY OF OTTAWA
ANODE INSTALLATION FOR PVC WATERMAIN	W42	CITY OF OTTAWA
WATERMAIN MATERIAL	PVC DR 18	

3. WATERMAIN SHALL BE MINIMUM 2.4m DEPTH BELOW GRADE UNLESS OTHERWISE INDICATED.
4. PROVIDE MINIMUM 0.5m CLEARANCE BETWEEN OUTSIDE OF PIPES AT ALL CROSSINGS, WHERE POSSIBLE UNLESS OTHERWISE INDICATED.
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED, UNLESS OTHERWISE INDICATED.

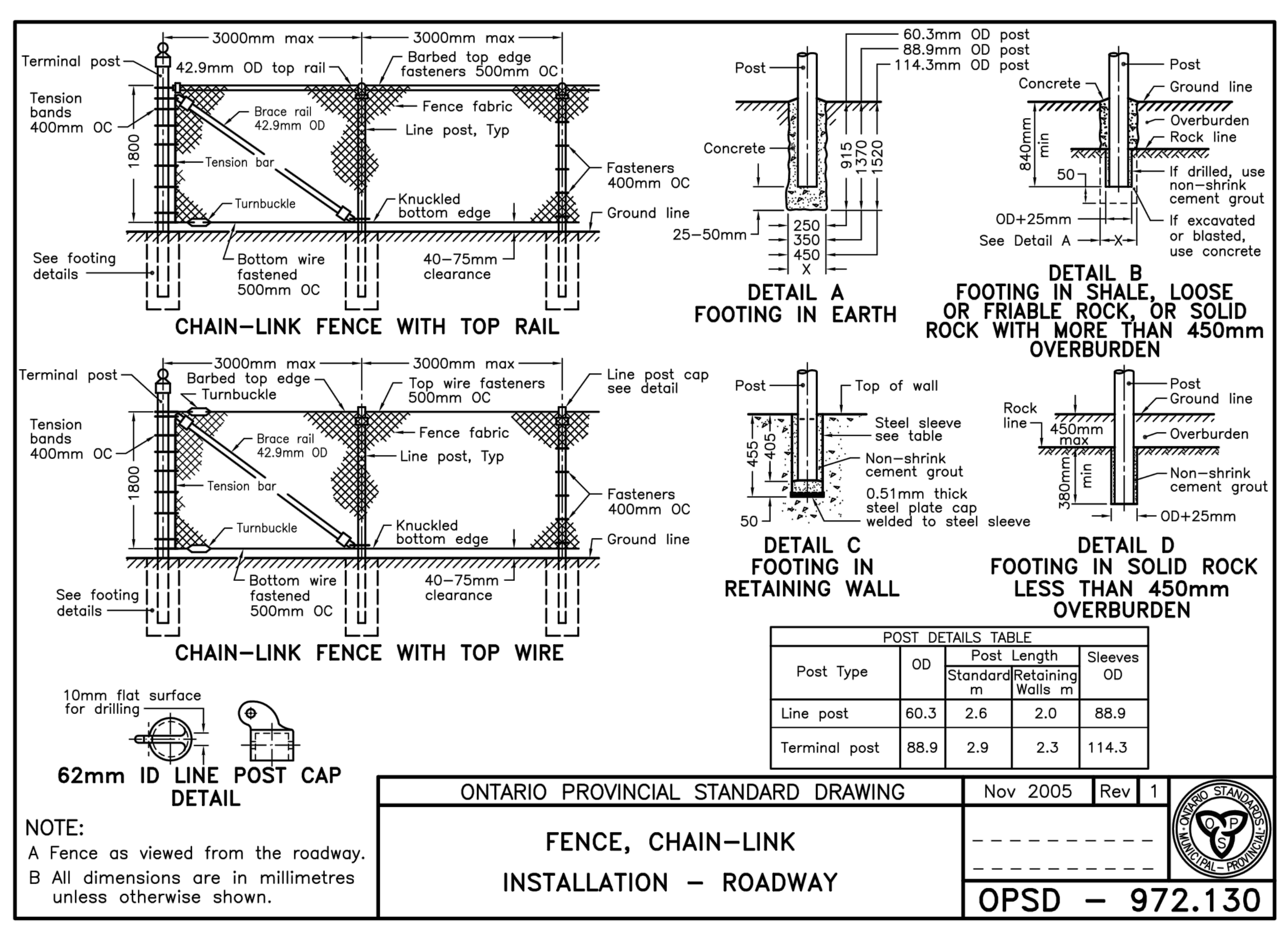
INSULATION NOTES:
1. THE THICKNESS OF SEWER INSULATION SHALL BE THE EQUIVALENT OF 25mm FOR EVERY 300mm REDUCTION IN THE REQUIRED DEPTH OF COVER LESS THAN 1800mm (SEE TABLE BELOW)

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

COVER (mm)	INSULATION THICKNESS (mm)
1800-1500	50
1500-1200	75
1200-900	100
900-600	125



INSULATION DETAIL FOR SHALLOW SEWERS
NOT TO SCALE



PROPOSED 250mmØ WATERMAIN TABLE: NORTH / SOUTH ON-SITE LOOP

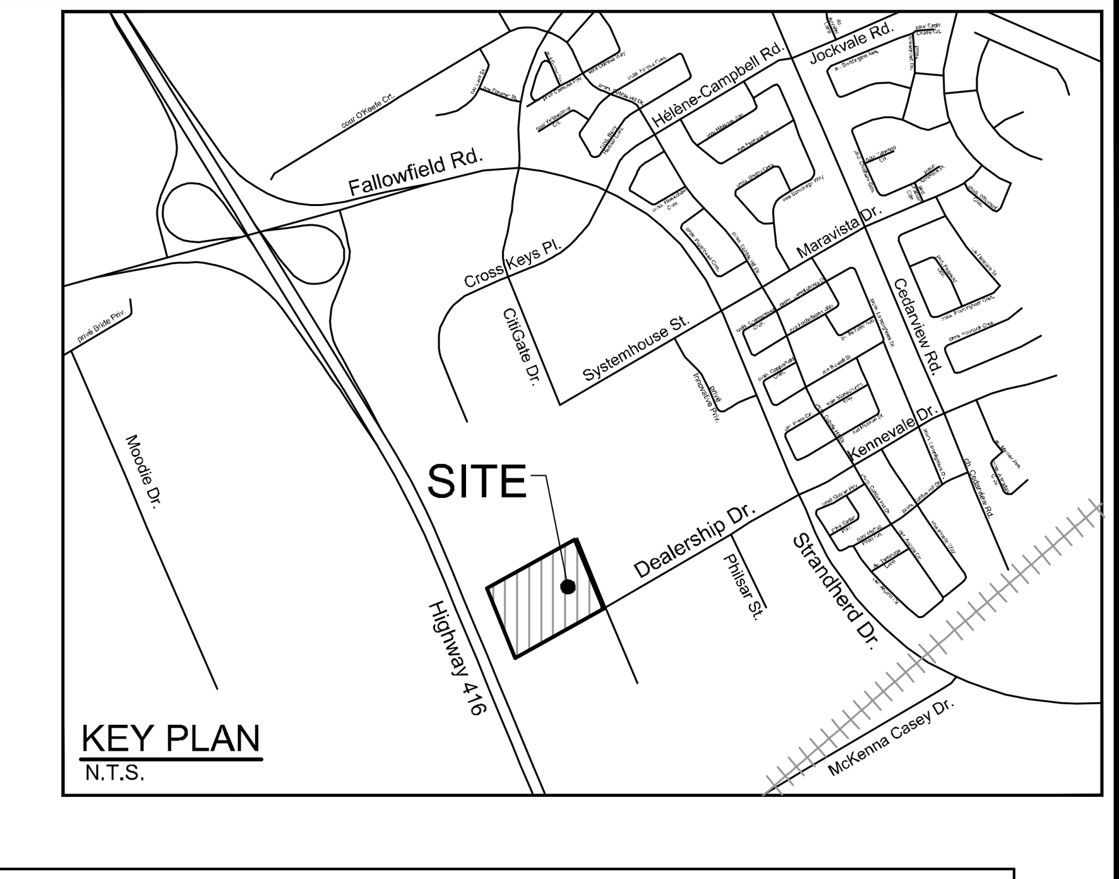
STATION	SURFACE ELEVATION	T/WM ELEVATION	COMMENTS
0+000	96.37	93.99 *	CONNECTION TO EXISTING 250mmØ PVC STUB /w 11.25° H.BEND
0+004.0	96.45	94.00	250mmØ VALVE & VALVE BOX @ PROPERTY LINE
0+005.4	96.40	94.00	11.25° HORIZONTAL BEND
0+009.0	96.22	94.05 **	CROSS BELOW 200mmØ CB LEAD [Inv=94.49m] (±0.4m CLEARANCE)
0+025	96.54	94.14	- - -
0+050	96.94	94.54	- - -
0+071.9	97.15	94.75 **	CROSS BELOW 200mmØ CB LEAD [Inv=95.44m] (±0.7m CLEARANCE)
0+075	97.18	94.78	- - -
0+100	97.44	95.04	- - -
0+125	97.85	95.45	- - -
0+130.1	98.05	95.60	250 x 250 x 150 TEE (HYDRANT No. 01)
0+140.3	98.02	95.62 **	CROSS BELOW 200mmØ CB LEAD [Inv=96.29m] (±0.7m CLEARANCE)
0+150	98.58	96.18	- - -
0+156.0	98.94	96.54	250 x 200 REDUCER
0+160.9	99.25	96.85	200 x 200 x 200 TEE (1+000)
0+167.7	99.67	97.27	200 x 200 x 200 TEE (BUILDING 'B' WATER SERVICE @ 2+000)
0+174.0	100.04	97.64	200mmØ VALVE & VALVE BOX
0+175	100.09	97.69	- - -
0+183.0	100.57	98.17	11.25° HORIZONTAL BEND
0+200	101.56	99.16	- - -
0+214.8	102.10	99.70 **	CROSS BELOW 200mmØ CB LEAD [Inv=100.34m] (±0.6m CLEARANCE)
0+225	102.42	100.02	- - -
0+250	103.21	100.81	- - -
0+273.4	103.95	101.55	11.25° HORIZONTAL BEND
0+275.0	103.96	101.56	200 x 150 REDUCER
0+276.5	103.97	101.57	150mmØ VALVE & VALVE BOX
0+280.0	104.18	101.58	FIRE HYDRANT No. 02
1+000	99.25	96.85	200 x 200 x 200 TEE (0+160.9)
1+001.5	99.26	96.80	200mmØ VALVE & VALVE BOX
1+002.5	99.27	96.74	CROSS BELOW 250mmØ SAN [Inv=97.04m] (±0.3m CLEARANCE)
1+004.2	99.29	96.75	CROSS ABOVE 375mmØ STM [Obv=95.97m] (±0.6m CLEARANCE)
1+008.8	99.56	97.16	11.25° HORIZONTAL BEND
1+013.0	100.00	97.60	CROSS ABOVE 200mmØ FIRE LINE [97.10] (±0.3m CLEARANCE)
1+016.2	100.05	97.80	CROSS BELOW CONCRETE RETAINING WALL (±0.7m CLEARANCE)
1+025	102.90	98.60	- - -
1+050	102.78	100.30	- - -
1+075	102.70	100.30	- - -
1+100	102.70	100.30	- - -
1+125	102.68	100.28	- - -
1+150	102.64	100.24	- - -
1+175	102.75	100.20	- - -
1+181.0	102.55	100.15	11.25° HORIZONTAL BEND
1+188.1	102.20	99.80	200 x 200 x 150 TEE (HYDRANT No. 03)
1+189.0	102.20	99.80	45° HORIZONTAL BEND
1+192.0	102.12	99.72	200mmØ VALVE & VALVE BOX
1+195.1	102.13	99.72	45° HORIZONTAL BEND
1+200	102.10	99.70	- - -
1+225	101.29	98.89	- - -
1+250	100.21	97.81	- - -
1+257.2	99.90	97.50	CROSS BELOW 200mmØ CB LEAD [Inv=98.07m] (±0.6m CLEARANCE)
1+275	99.14	96.74	- - -
1+300	98.05	95.65	- - -
1+308.4	97.67	95.27	22.5° HORIZONTAL BEND
1+311.4	97.55	95.15	11.25° HORIZONTAL BEND
1+325	97.60	94.80	- - -
1+329.4	97.66	94.49	22.5° HORIZONTAL BEND
1+330.8	97.68	94.49	CROSS BELOW 375mmØ STM [Inv=94.99m] (±0.5m CLEARANCE)
1+338.0	97.25	94.49	DISTRICT METERING CHAMBER AND VALVE (per W3)
1+339.8	97.10	94.49 *	CONNECTION TO EXISTING 200mmØ PVC STUB
2+000	99.67	97.27	200 x 200 x 200 BUILDING 'B' SERVICE TEE (0+168.7)
2+004.1	99.71	97.31	CROSS ABOVE 375mmØ STM [Obv=96.17m] (±0.9m CLEARANCE)
2+005.1	99.72	97.32	200mmØ VALVE & VALVE BOX
2+006.6	99.98	97.35	200mmØ BUILDING 'A' SERVICE CAP (1.0m FROM FOUNDATION WALL)
3+000	100.10	97.25	200mmØ FIRE LINE BLDG 'B' CAP (1.0m FROM FOUNDATION WALL)
3+002.0	100.00	97.10	CROSS BELOW 200mmØ WM [us/wm=97.40m] (±0.3m CLEARANCE)
3+019.2	98.60	96.20	45° HORIZONTAL BEND
3+025	98.20	95.80	- - -
3+025.5	98.05	95.80	CROSS BELOW 250mmØ STM [Inv=96.42m] (±0.6m CLEARANCE)
3+032.9	97.90	95.80	22.5° VERTICAL BEND
3+036.5	98.08	94.34	22.5° VERTICAL BEND
3+039.0	98.15	94.34	CROSS BELOW 1200mmØ STM [Inv=94.99m] (±0.5m CLEARANCE)
3+040.5	98.17	94.34	22.5° VERTICAL BEND
3+044.1	98.24	95.85	22.5° VERTICAL BEND
3+044.7	98.25	95.85	45° HORIZONTAL BEND
3+050	98.48	96.05	- - -
3+061.0	98.50	96.05	200mmØ FIRE LINE BLDG 'A' CAP (1.0m FROM FOUNDATION WALL)
4+000	97.58	94.34 *	CONNECTION TO EXISTING 200mmØ PVC STUB
4+002.2	98.14	94.34	22.5° VERTICAL BEND
4+005.6	98.17	95.77	50mmØ PEX SERVICE TEE FOR BUILDING 'A' (5+00)
4+006.6	98.19	96.18	200mmØ SERVICE EXTENSION CAP
5+00	98.17	95.77	50mmØ PEX SERVICE TEE FOR BUILDING 'A' (4+00)
5+03.0	98.07	95.67	50mmØ SERVICE POST & SHUT-OFF VALVE
5+12.3	97.68	95.28	90° LONG RADIUS HORIZONTAL BEND ON PEX SERVICE TUBING
5+023.3	97.95	94.75	50mmØ BUILDING 'A' SERVICE CAP (1.0m FROM FOUNDATION WALL)

* CONNECTIONS TO EXISTING 250mmØ / 200mmØ WM STUBS. EXACT ELEVATIONS TO BE FIELD DETERMINED.
** PROVIDE THERMAL INSULATION AS PER CITY OF OTTAWA DETAILS W22 IN SHALLOW TRENCHES WHERE COVER IS LESS THAN 2.4m AND/OR W23 ADJACENT TO OPEN STRUCTURES.
*** PIPE CROSSINGS WITH WATERMAINS ARE TO BE IN ACCORDANCE WITH CITY STANDARDS W25 AND W25.2 TO AVOID CONFLICTS, WHERE POSSIBLE.

THIS PLAN IS TO BE READ IN CONJUNCTION WITH CIVIL PLANS 119123-GP1&GP2 AND PLANS 119123-GR1&GR2

LEGEND

- SITE BOUNDARY
- ℄ SWALE AND DIRECTION OF FLOW
- 127.55 PROPOSED ELEVATION; 127.45 EXISTING ELEVATION
- 127.55(S) PROPOSED SWALE ELEVATION
- 127.55 PROPOSED TERRACE ELEVATION
- MAXIMUM 3: 1 SIDESLOPE
- 2.0% PARKING GRADE AND DIRECTION
- FFE PROPOSED FINISHED FLOOR ELEVATION
- USF PROPOSED UNDER SIDE OF FOOTING ELEVATION
- PROPOSED BUILDING ENTRANCE
- PROPOSED LIMIT OF BUILDING OVERHANG
- T/G= TOP OF GRATE ELEVATION
- MH100 PROPOSED STORM MANHOLE
- CB1 PROPOSED CATCHBASIN
- CB1 PROPOSED CATCHBASIN WITH TEMPORARY SILTSACK
- CBT1 PROPOSED CATCHBASIN TEE
- CBE1 PROPOSED CATCHBASIN ELBOW
- PROPOSED STORM SEWER AND DIRECTION OF FLOW
- PROPOSED CATCHBASIN LEAD AND DIRECTION OF FLOW
- PROPOSED CATCHBASIN SUBDRAIN AND DIRECTION OF FLOW
- MH101 PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY SEWER AND DIRECTION OF FLOW
- PROPOSED WATERMAIN
- BEND PROPOSED BEND AND THRUSTBLOCK 11.25°, 22.5°, 45° OR TEE
- VVB PROPOSED VALVE AND VALVE BOX
- HYD PROPOSED HYDRANT C/W VALVE & LEAD
- PROPOSED CAP
- Ⓐ PIPE CROSSING LOCATION
- PROPOSED ROOF DRAIN
- PROPOSED BARRIER CURB
- DC PROPOSED DEPRESSED CURB
- TACTILE WALKING SURFACE INDICATOR (TWSI)
- CURB CUTOUT
- PROPOSED LIGHT STANDARD
- PROPOSED SIAMESE CONNECTION
- GM PROPOSED GAS METER LOCATION
- HM PROPOSED HYDRO METER LOCATION
- PROPOSED TRANSFORMER PAD C/W BOLLARDS
- CLAY DIKE AS PER CITY OF OTTAWA DETAIL S8
- SILT FENCE AS PER OPSD 219.110
- EMERGENCY OVERLAND FLOW ROUTE
- STRAW BALES AS PER OPSD 219.100
- MM CONSTRUCTION ACCESS MUD MAT
- ICD PROPOSED INLET CONTROL DEVICE
- 1:5 YR / 1:100 YR APPROXIMATE PONDING LIMITS
- STORM DRAINAGE BOUNDARY
- 0.637 / A-1 / 0.36 AREA (ha) / SUB-CATCHMENT AREA ID / 1:5 YR POST-DEV. RUNOFF COEFFICIENT
- +102.52 *EXISTING ELEVATION*
- *EXISTING STORM MANHOLE AND SEWER*
- *EXISTING SANITARY MANHOLE AND SEWER*
- *EXISTING WATERMAIN*
- EX. WMH *EXISTING WATER MANHOLE*
- VVB *EXISTING VALVE AND VALE BOX*
- *EXISTING FIRE HYDRANT*
- EX.CB *EXISTING CATCHBASIN*
- T/G *EXISTING TOP OF GRATE*
- EX UP *EXISTING UTILITY POLE C/W GUY WIRES*
- LS *EXISTING LIGHT STANDARD*
- TSL *EXISTING TRAFFIC STREET LIGHT*
- x *EXISTING FENCE*
- G *EXISTING UNDERGROUND GASMAIN*
- UH *EXISTING UNDERGROUND HYDRO*
- UB *EXISTING UNDERGROUND BELL CABLE*
- B *EXISTING BELL PEDESTAL*
- *EXISTING TREES / SHRUBS*
- HEAVY DUTY ASPHALT/FIRE ROUTE
- GEO-GRID SLOPE STABILIZATION PER GEOTECHNICAL RECOMMENDATIONS
- ROADCUT REINSTATEMENT
- WATERMAIN INSULATION AREA AS PER CITY OF OTTAWA DETAIL W22



KEY PLAN
N.T.S.

CRITICAL SEWER PIPE CROSSING TABLE

CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE	SURFACE ELEVATION
Ⓐ	200mmØ T/WM=96.74	250mmØ SAN INV=97.04	± 0.3m	99.27 m
Ⓑ	375mmØ STM OBV=95.97	200mmØ US/WM=96.55	± 0.6m	99.29 m
Ⓒ	375mmØ STM OBV=96.13	250mmØ SAN INV=97.65	± 1.5m	99.62 m
Ⓓ	375mmØ STM OBV=96.17	200mmØ U/S WM=97.11	± 0.9m	99.71 m
Ⓔ	200mmØ T/FL=97.10	200mmØ U/S WM=97.40	± 0.3m	100.00 m
Ⓕ	200mmØ T/FL=95.80	375mmØ STM INV=96.42	± 0.6m	98.05 m
Ⓖ	200mmØ T/FL=94.34	1200mmØ STM INV=94.99	± 0.5m	98.15 m
Ⓗ	200mmØ T/WM=94.49	375mmØ STM INV=94.99	± 0.5m	97.68 m

✱ SEE 119123-GP1 AND GP2 PLANS FOR SEWER CROSSING LOCATIONS AND NOTES ON 119123-NLD

BUILDING 'A' ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS A1 to A25)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING 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)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	13 cm
R-1	RD 2 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 3 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 4 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 5 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 6 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 7 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 8 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 9 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 10 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 11 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 13 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 14 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 15 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 16 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 17 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 18 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 19 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 20 (RD-100-A-ADJ)	FULLY EXPOSED	1.34L/s	11 cm	1.89 L/s	14 cm
R-1	RD 21 (RD-100-A-ADJ)	3/4 EXPOSED	1.34L/s	11 cm	1.58 L/s	15 cm
R-1	RD 22 (RD-100-A-ADJ)	3/4 EXPOSED	1.34L/s	11 cm	1.58 L/s	15 cm
R-1	RD 23 (RD-100-A-ADJ)	3/4 EXPOSED	1.34L/s	11 cm	1.58 L/s	15 cm
R-1	RD 24 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-1	RD 25 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm

BUILDING 'B' ROOF DRAIN TABLE: AREA R-2 (ROOF DRAINS B1 to B25)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING 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)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm
R-2	RD 2 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 3 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 4 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 5 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 6 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm
R-2	RD 7 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 8 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 9 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 10 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 11 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 13 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 14 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 15 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 16 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 17 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-2	RD 18 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-2	RD 19 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-2	RD 20 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 21 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 22 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 23 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 24 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-2	RD 25 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.58 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2023-069) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

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

INLET CONTROL DEVICE DATA TABLE: AREA A-5 (OUTLET PIPE of STM MH 06)

DESIGN EVENT	ICD TYPE (PLUG TYPE)	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	½ PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR 227mmØ ORIFICE PLUG	375mmØ PVC DR35	110.7	55.4	0.99	95.96	137	> 675 m^3
1:5 YR			141.1	70.6	1.61	96.58	191	
1:100 YR			182.4	91.2	2.69	97.66	435	

INLET CONTROL DEVICE DATA TABLE: AREA A-6 (OUTLET PIPE of STM MH 11)

DESIGN EVENT	ICD TYPE (PLUG TYPE)	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	½ PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	TEMPEST VORTEX LMF MODEL 60	300mmØ PVC DR35	3.6	1.8	1.20	95.80	7	39 m^3
1:5 YR			4.7	2.4	2.15	96.75	9	
1:100 YR			5.9	3.0	3.40	98.00	20	

ALL PROJECT NOTES, DETAILS AND SPECIFICATIONS ARE TO MEET THE MOST CURRENT AND AMENDED VERSIONS OF THE CITY OF OTTAWA AND PROVINCIAL STANDARDS

No.	REVISION	DATE	BY
2	REVISED PER CITY COMMENTS	OCT 6/23	DDB
1	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 3/23	DDB

SCALE: NOT TO SCALE

DESIGN: SM / BM / DDB
CHECKED: DDB
DRAWN: SM
CHECKED: BM / DDB
APPROVED: DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER D. D. BLAIR 100122737 Oct. 6 2023 PROVINCE OF ONTARIO

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
480 & 486 CITIGATE DRIVE - PROPOSED WAREHOUSES

DRAWING NAME
NOTES, LEGEND AND DETAILS

PROJECT No. 119123
REV: REV # 2
DRAWING No. 119123-NLD

D07-12-23-0064

PLAN24x36.DWG - 914.4mmx609.6mm

plan # __

INLET CONTROL DEVICE DATA TABLE: AREA A-6 (OUTLET PIPE of STM MH 11)								
DESIGN EVENT	ICD TYPE (PLUG TYPE)	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	½ PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	TEMPEST VORTEX LMF MODEL 60	300mmØ PVC DR35	3.6	1.8	1.20	95.80	7	39 m^3
1:5 YR			4.7	2.4	2.15	96.75	9	
1:100 YR			5.9	3.0	3.40	98.00	20	

INLET CONTROL DEVICE DATA TABLE: AREA A-5 (OUTLET PIPE of STM MH 06)								
DESIGN EVENT	ICD TYPE (PLUG TYPE)	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	½ PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR 227mmØ ORIFICE PLUG	375mmØ PVC DR35	110.7	55.4	0.99	95.96	137	> 675 m^3
1:5 YR			141.1	70.6	1.61	96.58	191	
1:100 YR			182.4	91.2	2.69	97.66	435	

THIS PLAN IS TO BE READ IN CONJUNCTION WITH CIVIL PLANS 119123-NLD AND 119123-GR1&GR2

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	REVISED PER CITY COMMENTS	OCT 6/23	DDB
1	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 3/23	DDB

SCALE 1:400

DESIGN SM / BM / DDB
CHECKED DDB
DRAWN SM
CHECKED BM / DDB
APPROVED DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
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Oct. 6 2023
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LOCATION
CITY of OTTAWA
480 & 486 CITIGATE DRIVE - PROPOSED WAREHOUSES

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 119123
REV # 2
DRAWING No. 119123-GP1

D07-12-23-0064

plan # __

BUILDING 'A' ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS A1 to A25)						
AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING 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)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	13 cm
R-1	RD 2 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 3 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 4 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 5 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 6 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 7 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-1	RD 8 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 9 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 10 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 11 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 13 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 14 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 15 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 16 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 17 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-1	RD 18 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 19 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-1	RD 20 (RD-100-A-ADJ)	FULLY EXPOSED	1.34L/s	11 cm	1.89 L/s	14 cm
R-1	RD 21 (RD-100-A-ADJ)	3/4 EXPOSED	1.34L/s	11 cm	1.58 L/s	15 cm
R-1	RD 22 (RD-100-A-ADJ)	3/4 EXPOSED	1.34L/s	11 cm	1.58 L/s	15 cm
R-1	RD 23 (RD-100-A-ADJ)	3/4 EXPOSED	1.34L/s	11 cm	1.58 L/s	15 cm
R-1	RD 24 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-1	RD 25 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2023-069) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

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

BUILDING 'B' ROOF DRAIN TABLE: AREA R-2 (ROOF DRAINS B1 to B25)						
AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING 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)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm
R-2	RD 2 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 3 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 4 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 5 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 6 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm
R-2	RD 7 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 8 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 9 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 10 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 11 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 13 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 14 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 15 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 16 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 17 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-2	RD 18 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-2	RD 19 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-2	RD 20 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 21 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 22 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 23 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 24 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-2	RD 25 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.58 L/s	13 cm

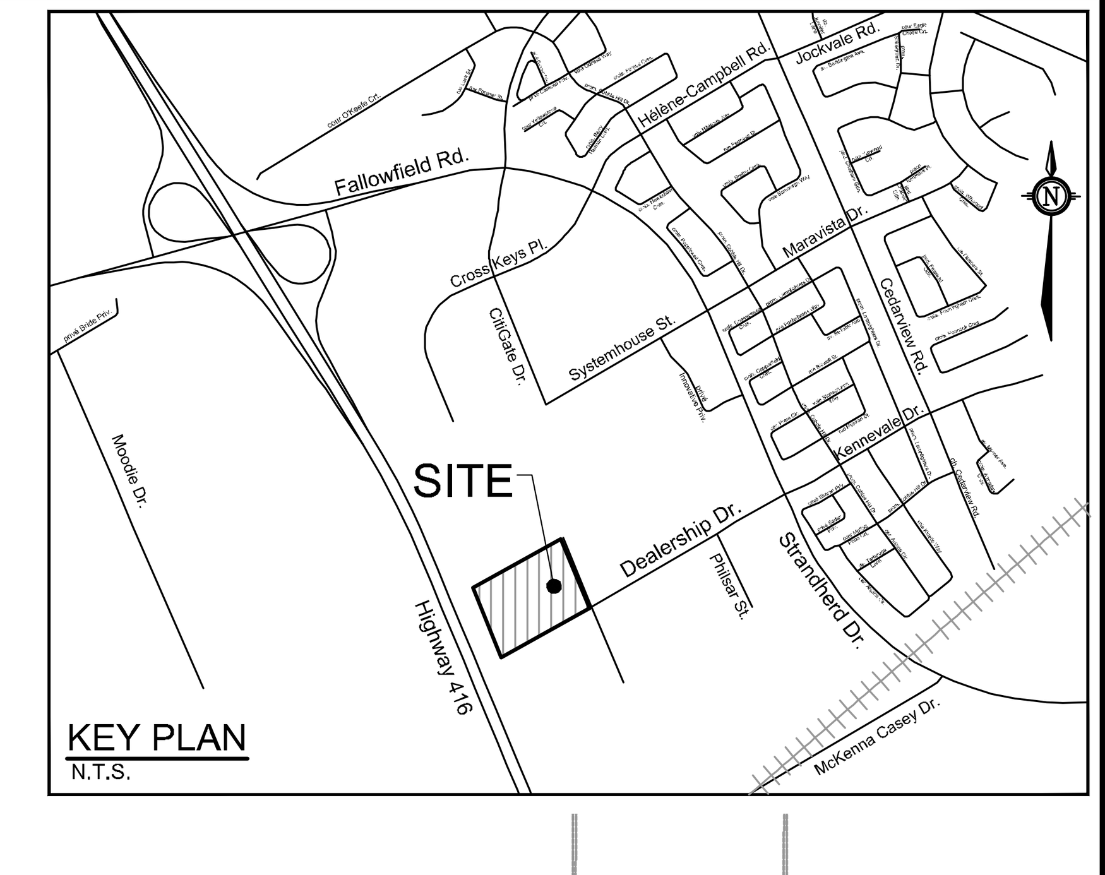
* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2023-069) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

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

CRITICAL SEWER PIPE CROSSING TABLE				
CROSSING	LOWER PIPE	HIGHER PIPE	CLEARANCE	SURFACE ELEVATION
A	200mmØ T/WM=96.74	250mmØ SAN INV=97.04	± 0.3m	99.27 m
B	375mmØ STM OBV=95.97	200mmØ US/WM=96.55	± 0.6m	99.29 m
C	375mmØ STM OBV=96.13	250mmØ SAN INV=97.65	± 1.5m	99.62 m
D	375mmØ STM OBV=96.17	200mmØ U/S WM=97.11	± 0.9m	99.71 m
E	200mmØ T/FL=97.10	200mmØ U/S WM=97.40	± 0.3m	100.00 m
F	200mmØ T/FL=95.80	375mmØ STM INV=96.42	± 0.6m	98.05 m
G	200mmØ T/FL=94.34	1200mmØ STM INV=94.99	± 0.5m	98.15 m
H	200mmØ T/WM=94.49	375mmØ STM INV=94.99	± 0.5m	97.68 m

✱ SEE 119123-GP1 AND GP2 PLANS FOR SEWER CROSSING LOCATIONS AND NOTES ON 119123-NLD

THIS PLAN IS TO BE READ IN CONJUNCTION WITH CIVIL PLANS 119123-NLD AND 119123-GR1&GR2



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	REVISED PER CITY COMMENTS	OCT 6/23	DDB
1	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 3/23	DDB

SCALE 1:400

DESIGN SM / BM / DDB
CHECKED DDB
DRAWN SM
CHECKED BM / DDB
APPROVED DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Oct. 6 2023
PROVINCE OF ONTARIO

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
480 & 486 CITIGATE DRIVE - PROPOSED WAREHOUSES

DRAWING NAME
GENERAL PLAN OF SERVICES

PROJECT No. 119123
REV REV # 2
DRAWING No. 119123-GP2

D07-12-23-0064

plan # __


REFER TO PLAN 119123-GR2 FOR CONTINUATION OF ON-SITE GRADING
REFER TO PLAN 119123-GR2 FOR CONTINUATION OF ON-SITE SERVICING
BUILDING 'B'
486 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 104.40 m
MECH. ROOM FFE = 100.00 m
USF = 102.37 m
BUILDING 'A'
480 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 98.70 m
USF = 96.67 m
EXPOSED FOUNDATION WALLS AND DEEPER FOOTINGS (OR INSULATION) IS REQUIRED WHERE THE EXTERIOR GRADE OF THE BUILDING IS LOWER THAN THE FFE (UP TO 1.0m)
EXPOSED FOUNDATION WALLS AND DEEPER FOOTINGS (OR INSULATION) IS REQUIRED WHERE THE EXTERIOR GRADE OF THE BUILDING IS LOWER THAN THE FFE (UP TO 4.65m)
EXPOSED FOUNDATION WALLS AND DEEPER FOOTINGS (OR INSULATION) IS REQUIRED WHERE THE EXTERIOR GRADE OF THE BUILDING IS LOWER THAN THE FFE (UP TO 1.7m)
PROVIDE CHAINLINK ROADWAY FENCE COMPLETE WITH TOP RAIL ALONG SHARED PROPERTY LINE WITH MTO PER OPSD 972.012
MAXIMUM 2:1 SIDESLOPES c/w GEOGRID per SLOPE STABILITY REPORT
MAXIMUM 3:1 SIDESLOPES
MATCH INTO EXISTING ELEVATIONS ALONG THE SOUTH PROPERTY LINE (MAXIMUM 3:1 SIDESLOPES) MAINTAIN AND PROTECT EXISTING VEGETATION, WHERE POSSIBLE.
MATCH INTO EXISTING TEMPORARY ROADWAY ELEVATIONS AT EAST SITE ENTRANCE. FUTURE ACCESS TO BE INSTALLED IN ACCORDANCE WITH SC7.1.
MATCH INTO EXISTING ELEVATIONS ALONG THE EAST PROPERTY LINE (MAXIMUM 3:1 SIDESLOPES)
MATCH INTO EXISTING TEMPORARY ROADWAY ELEVATIONS AT SOUTH-EAST SITE ENTRANCE, FUTURE ACCESS TO BE INSTALLED IN ACCORDANCE WITH SC7.1
SITE BENCHMARK No.1 FIRE HYDRANT Top of Spindle Elevation=97.69
SITE BENCHMARK No.2 FIRE HYDRANT Top of Spindle Elevation=97.23
STRUCTURAL CONC. RETAINING WALLS c/w GUIDERAILING
STRUCTURAL RETAINING WALL /w GUARD
CITIGATE DR
DEALERSHIP DRIVE
KEY PLAN
N.T.S.
SITE
Fallowfield Rd.
Highway 416
Dealership Dr.
M&E ROOMS
MECH RM
OFFICE

THIS PLAN IS TO BE READ IN CONJUNCTION WITH CIVIL PLANS 119123-NLD AND 119123-GP1&GP2

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

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LOCATION
CITY of OTTAWA
480 & 486 CITIGATE DRIVE - PROPOSED WAREHOUSES

DRAWING NAME
GRADING PLAN

PROJECT No. 119123
REV REV # 2
DRAWING No. 119123-GR1

D07-12-23-0064

plan # __

THIS PLAN IS TO BE READ IN CONJUNCTION WITH CIVIL PLANS 119123-NLD AND 119123-GP1&GP2
KEY PLAN
N.T.S.
SITE
Fallowfield Rd.
Dealership Dr.
Highway 416
MATCH INTO EXISTING ELEVATIONS ALONG THE NORTH PROPERTY LINE (MAXIMUM 3:1 SIDESLOPES) MAINTAIN AND PROTECT EXISTING VEGETATION, WHERE POSSIBLE.
MATCH INTO EXISTING TEMPORARY ROADWAY ELEVATIONS AT NORTH-EAST SITE ENTRANCE, FUTURE ACCESS TO BE INSTALLED IN ACCORDANCE WITH SC7.1
STRUCTURAL RETAINING WALL /w GUARD
PROVIDE CONCRETE UP-STAND WALLS WHERE THE EXTERIOR GRADE IS HIGHER THAN THE FFE OF THE BUILDING (UP TO 2.8m)
EXPOSED FOUNDATION WALLS AND DEEPER FOOTINGS (OR INSULATION) IS REQUIRED WHERE THE EXTERIOR GRADE OF THE BUILDING IS LOWER THAN THE FFE (UP TO 0.75m)
EXPOSED FOUNDATION WALLS AND DEEPER FOOTINGS (OR INSULATION) IS REQUIRED WHERE THE EXTERIOR GRADE OF THE BUILDING IS LOWER THAN THE FFE (UP TO 1.0m)
MAXIMUM 3:1 SIDESLOPES
MAXIMUM 2:1 SIDESLOPES c/w GEOGRID per SLOPE STABILITY REPORT
PROVIDE CHAINLINK ROADWAY FENCE COMPLETE WITH TOP RAIL ALONG SHARED PROPERTY LINE WITH MTO PER OPSD 972.012
0.3m WIDE FLAT-BOTTOM SWALE
MAINTAIN AND PROTECT EXISTING MUNICIPAL INFRASTRUCTURE WITHIN THE R.O.W. DURING ALL PHASES OF CONSTRUCTION
CITIGATE DRIVE
SITE BENCHMARK No.1
FIRE HYDRANT
Top of Spindle
Elevation=97.69
MATCH INTO EXISTING TEMPORARY ROADWAY ELEVATIONS AT EAST SITE ENTRANCE, FUTURE ACCESS TO BE INSTALLED IN ACCORDANCE WITH SC7.1.
MATCH INTO EXISTING ELEVATIONS ALONG THE EAST PROPERTY LINE (MAXIMUM 3:1 SIDESLOPES)
BUILDING 'A'
480 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 98.70 m
USF = 96.67 m
BUILDING 'B'
486 CITIGATE DRIVE
HIGH 1-STOREY WAREHOUSE
FFE = 104.40 m
MECH. ROOM FFE = 100.00 m
USF = 102.37 m
OFFICE
STRUCTURAL CONC. RETAINING WALLS c/w GUIDERAILING
REFER TO PLAN 119123-GR1 FOR CONTINUATION OF ON-SITE GRADING

NOTE:
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LOCATION
CITY of OTTAWA
480 & 486 CITIGATE DRIVE - PROPOSED WAREHOUSES

DRAWING NAME
GRADING PLAN

PROJECT No. 119123
REV # 2
DRAWING No. 119123-GR2

D07-12-23-0064

plan # __

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SCALE 1:750

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DRAWN	SM
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LICENSED PROFESSIONAL ENGINEER D. D. BLAIR 100122737 Oct. 6 2023 PROVINCE OF ONTARIO

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LOCATION
CITY of OTTAWA
480 & 486 CITIGATE DRIVE - PROPOSED WAREHOUSES

DRAWING NAME
EROSION AND SEDIMENT CONTROL PLAN

PROJECT No. 119123
REV REV # 2
DRAWING No. 119123-ESC

D07-12-23-0064

plan # __

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BUILDING 'A' ROOF DRAIN TABLE: AREA R-1 (ROOF DRAINS A1 to A25)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING 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)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	13 cm
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BUILDING 'B' ROOF DRAIN TABLE: AREA R-2 (ROOF DRAINS B1 to B25)

AREA ID *	ROOF DRAIN No. (WATTS MODEL)	ROOF DRAIN OPENING 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)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm
R-2	RD 2 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 3 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 4 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 5 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	15 cm
R-2	RD 6 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.89 L/s	14 cm
R-2	RD 7 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 8 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 9 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 10 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 11 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 12 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 13 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 14 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 15 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 16 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	14 cm
R-2	RD 17 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-2	RD 18 (RD-100-A-ADJ)	1/4 EXPOSED	0.79 L/s	11 cm	0.95 L/s	15 cm
R-2	RD 19 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-2	RD 20 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 21 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 22 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 23 (RD-100-A-ADJ)	3/4 EXPOSED	1.34 L/s	11 cm	1.58 L/s	14 cm
R-2	RD 24 (RD-100-A-ADJ)	3/4 EXPOSED	1.26 L/s	11 cm	1.34 L/s	14 cm
R-2	RD 25 (RD-100-A-ADJ)	FULLY EXPOSED	1.34 L/s	11 cm	1.58 L/s	13 cm

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2023-069) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.

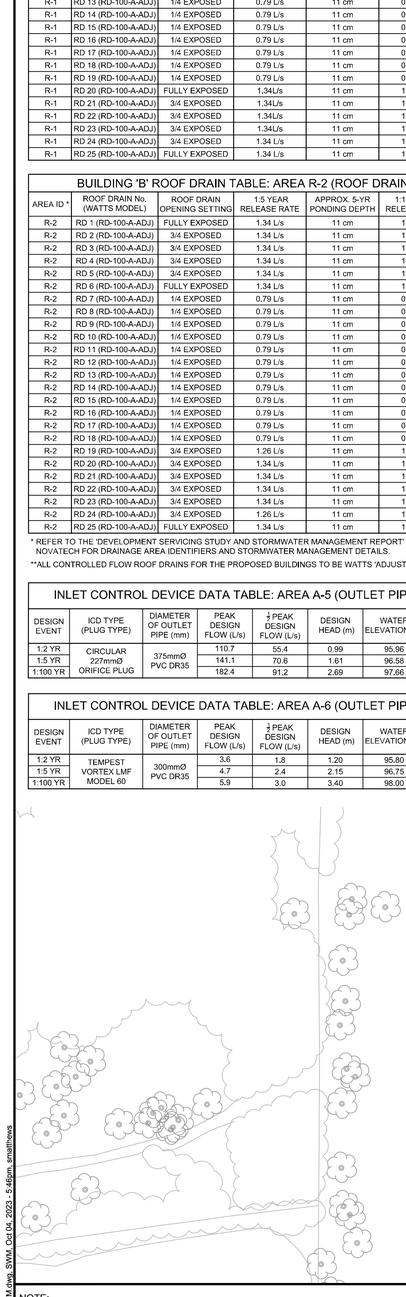
**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDINGS TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.

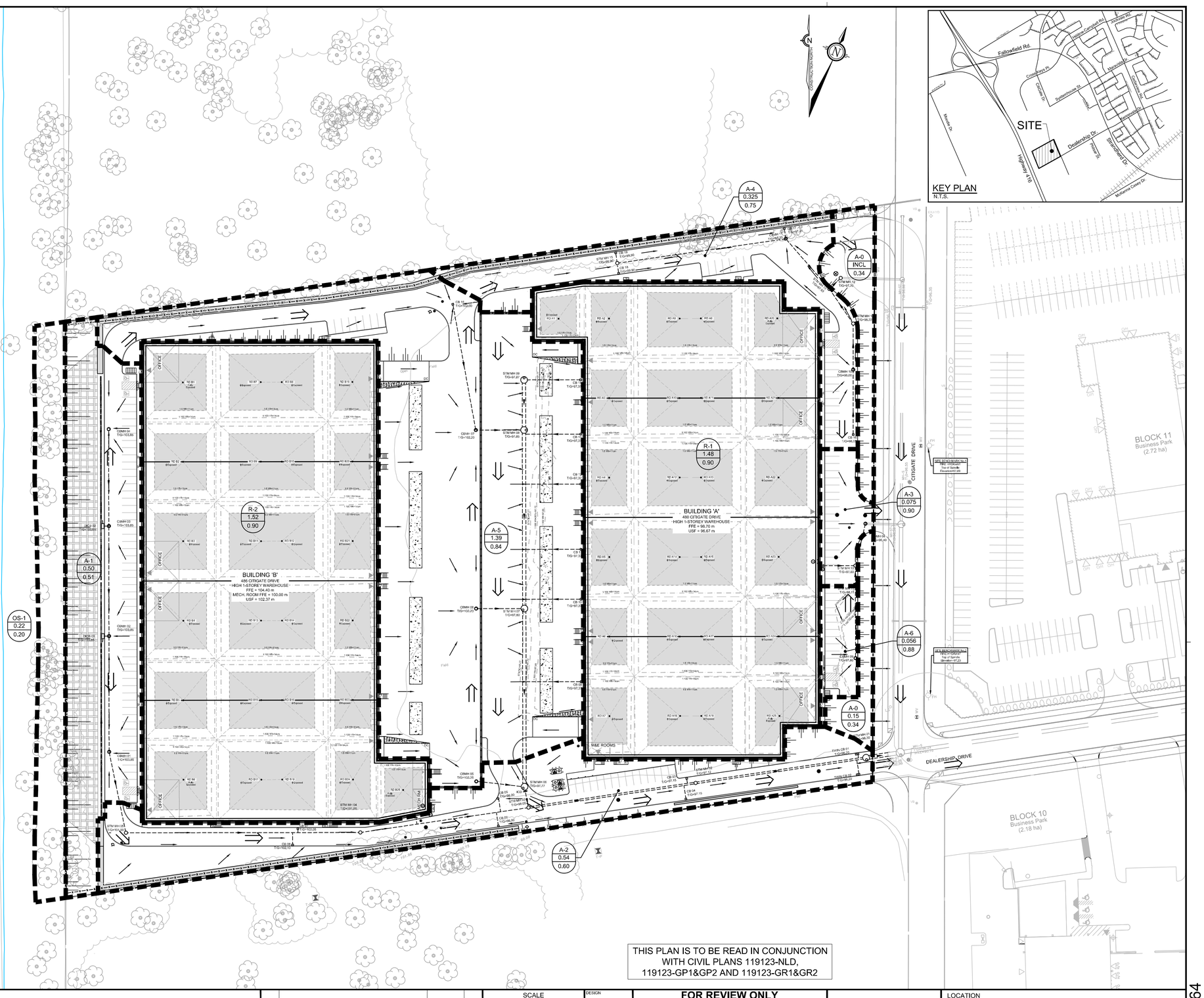
INLET CONTROL DEVICE DATA TABLE: AREA A-5 (OUTLET PIPE of STM MH 06)

DESIGN EVENT	ICD TYPE (PLUG TYPE)	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	½ PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	CIRCULAR 227mmØ ORIFICE PLUG	375mmØ PVC DR35	110.7	55.4	0.99	95.96	137	> 675 m^3
1:5 YR			141.1	70.6	1.61	96.58	191	
1:100 YR			182.4	91.2	2.69	97.66	435	

INLET CONTROL DEVICE DATA TABLE: AREA A-6 (OUTLET PIPE of STM MH 11)

DESIGN EVENT	ICD TYPE (PLUG TYPE)	DIAMETER OF OUTLET PIPE (mm)	PEAK DESIGN FLOW (L/s)	½ PEAK DESIGN FLOW (L/s)	DESIGN HEAD (m)	WATER ELEVATION (m)	VOLUME (m^3)	AVAILABLE STORAGE
1:2 YR	TEMPEST VORTEX LMF MODEL 60	300mmØ PVC DR35	3.6	1.8	1.20	95.80	7	39 m^3
1:5 YR			4.7	2.4	2.15	96.75	9	
1:100 YR			5.9	3.0	3.40	98.00	20	





THIS PLAN IS TO BE READ IN CONJUNCTION WITH CIVIL PLANS 119123-NLD, 119123-GP1&GP2 AND 119123-GR1&GR2

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	REVISED PER CITY COMMENTS	OCT 6/23	DDB
1	ISSUED FOR CITY OF OTTAWA REVIEW	MAY 3/23	DDB

SCALE
1:750
1:750
0 10 20 30

DESIGN SM / BM / DDB
CHECKED DDB
DRAWN SM
CHECKED BM / DDB
APPROVED DDB

FOR REVIEW ONLY

LICENSED PROFESSIONAL ENGINEER
D. D. BLAIR
100122737
Oct. 6 2023
PROVINCE OF ONTARIO

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LOCATION
CITY of OTTAWA
480 & 486 CITIGATE DRIVE - PROPOSED WAREHOUSES

DRAWING NAME
POST-DEVELOPMENT STORMWATER MANAGEMENT PLAN

PROJECT No. 119123
REV REV # 2
DRAWING No. 119123-SWM

D07-12-23-0064

plan #

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