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# NOKIA OTTAWA INNOVATION CAMPUS
## 570 March Road

Development Servicing Study and
Stormwater Management Report

# NOKIA OTTAWA INNOVATION CAMPUS
# 570 MARCH ROAD

# DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT

Prepared by:

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November 15, 2024
**Revised: February 7, 2025**

Ref: R-2023-082
Novatech File No. 123043

NOVATECH
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February 7, 2025

Nokia Ottawa Innovation Campus
600 March Road
Ottawa, ON
K2K 2T6

**Attention: Margaret Wolodarski, Program Manager**

**Re: Development Servicing Study and Stormwater Management Report**
**Nokia Ottawa Innovation Campus**
**570 March Road, Ottawa, ON**
**Novatech File No.: 123043**

Enclosed is a copy of the 'Development Servicing Study and Stormwater Management Report' prepared for the proposed Nokia Ottawa Innovation Campus development located at 570 March Road. This report addresses the approach to site servicing, grading, and stormwater management, and is being submitted in support of a Site Plan Control application.

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

**NOVATECH**

François Thauvette, P. Eng.
Senior Project Manager

cc: Jean-Miguel Roy (City of Ottawa)
Elaine Guenette (S+A)
Barry Hand (Gensler)



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**C-600** - Plan and Profile – Legget Drive (P1) – Not included (Plan to be submitted seperately for municipal approval)

**C-601** - Plan and Profile – Legget Drive (P2)

## PREVIOUSLY APPROVED PLANS

98066-STM - Storm Drainage Area Plan

98066-SAN - Sanitary Drainage Area Plan

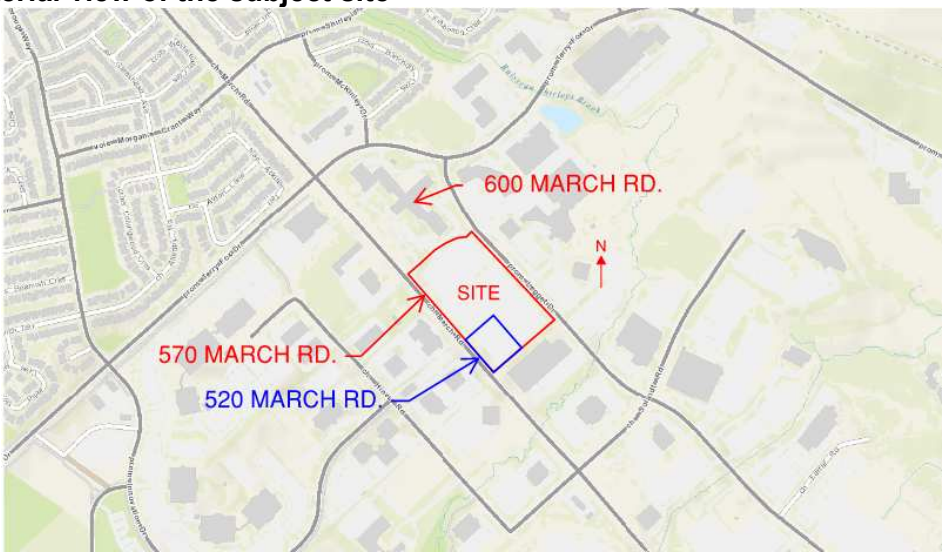
# 1.0 INTRODUCTION

Nokia has recently severed their 10.45 ha property into three parcels; the 600 March Road property to the north including the existing office tower and adjacent parking lots (5.18 ha), and the existing surface parking lots to the south, which will be re-developed as the new Nokia Ottawa Innovation Campus (4.49 ha) at 570 March Road as well as what is being referred to as the Retained Lands (0.78ha) at 520 March Road, which will be developed in the future. As part of the proposed re-development, Nokia has retained Novatech to complete the site servicing, grading, and stormwater management design for the new Nokia campus. This report is being submitted in support of a Site Plan Control application for the recently severed portion of the previously larger property.

## 1.1 Location and Site Description

The subject site consists of the recently severed portion of the Nokia property located at 570 March Road within the Kanata Research Park (KRP). The area to be redeveloped currently consists of the main surface parking lots for Nokia employees. The severed portions of the original property cover an approximate area of 5.270 ha (post road widening), including the new Nokia Ottawa Innovation Campus (4.49 ha) and Retained Lands (0.78ha) to be developed in the future. The subject site is generally surrounded by other commercial properties. The legal description of the Nokia site is designated as Part 5 and Part 7, while the Retained Lands consists of Part 8 on Registered Plan 4R-35453.

**Figure 1: Aerial view of the subject site**




## 1.2 Pre-Consultation Information

An initial pre-consultation meeting was held with the City of Ottawa on February 8, 2023, at which time the client was advised of the general submission requirements. Subsequent meetings were held with City of Ottawa staff to further discuss the project and the approach to site servicing, drainage, and stormwater management. Based on a review of **O. Reg. 525/98: Approval Exemptions**, a Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) for on-site stormwater management will be required for the proposed development as multiple properties are being serviced by shared sewer systems. An ECA will also be required for the extension of the sanitary sewer in Legget Drive. Refer to **Appendix A** for a summary of the correspondence related to the proposed development.

## 1.3 Proposed Development

The proposed development will consist of the new Nokia Ottawa Innovation Campus, as outlined in RED on **Figure 1**. Although not part of this specific Site Plan Control Application, the Retained Lands, outlined in BLUE, are also depicted. The new Nokia campus will consist of several buildings, including an 8-storey office tower and adjacent 1-storey commercial buildings at the north end of the property, while a 5-storey R&D Lab is being proposed along Legget Drive. A central 2-storey Common Area (Social Café) will link these buildings with the 3-storey open-air parking structure, while also providing access to the central courtyard (outdoor amenity area). The Retained Lands are located in the southwest corner of the site and consist of a separate property parcel (520 March Road) to be developed in the future. The remainder of the property will consist of access roads and a large exterior work yard, which will house electrical equipment, battery banks and generators. The proposed development will include two private roadways between March Road and Legget Drive: the Lifestyle Street along the north end of the property to provide access to the office tower and commercial spaces, as well as a service road at the south end of the property to provide access to the Retained Lands and the 'back' of the Nokia Campus. Visitor parking will be provided off March Road, on the west side of the office tower, adjacent to the central courtyard. Shipping and receiving will be provided off Legget Drive, both at-grade near the southwest corner of the Lab building and/or via the underground truck dock at the north end of the Lab building.

The proposed Nokia Campus and future development of the Retained Lands will be serviced by the municipal sanitary and storm sewers in Legget Drive, including the construction of new private on-site sewers, as well as an extension of the municipal sanitary sewer within Legget Drive. A new private looped watermain network running along the Lifestyle Street, the west property line and the south service road will be required to provide necessary water to the proposed Nokia development.

**The full servicing, grading and stormwater management (SWM) design of the 520 March Road property (Retained Lands) is not part of the subject Site Plan Control Application. The detailed design of the 520 March Road property will be completed when the site is developed in the future. All preliminary analysis pertaining to the Retained Lands contained within this report, excluding the interim SWM design, is for <u>information purposes only</u> to assist in the future development of the property.**

## 1.4 Reference Material

The following design guidelines have been used to establish the servicing and stormwater management requirements for the proposed development:

- Ottawa Sewer Design Guidelines (2012) and Technical Bulletins (2010-present)
- Ottawa Design Guidelines for Water Distribution (2010) & Tech. Bulletins (2010-present)
- Ministry of the Environment Design Guidelines for Sewage Works (2008)
- Ministry of the Environment Stormwater Management Planning and Design Manual (2003)
- Ministry of the Environment Design Guidelines for Drinking Water Systems (2008)
- Fire Underwriters Survey (FUS) Water Supply for Public Fire protection

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

1. The "Shirley's Brook and Watts Creek Subwatershed Study" prepared by Dillon Consulting in September 1999.

2. The “Stormwater Management Plan, Kanata Research Park” prepared by Novatech Engineering Consultants Ltd., revised in April 2000.
3. The “Sanitary and Storm Trunk Sewer Design Brief - Kanata Research Park Lands” prepared by Novatech, dated November 12, 2014.
4. The “Assessment of Adequacy of Public Services Report,” prepared by CIMA+, dated July 28, 2022.
5. The Geotechnical Investigation and Hydrogeological Assessment (No.: PG12646241-RPT-2), prepared by GHD on February 7, 2025.
6. The “Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus” prepared by Novatech, dated February 7, 2025.

## 2.0 SITE SERVICING

The objective of the site servicing design is to provide proper sewage outlets, a suitable domestic water supply, and to ensure that appropriate fire protection is provided for the proposed development. The servicing criteria, the expected sewage flows, and the water demands are to conform to the requirements of the City of Ottawa municipal design guidelines for sewer and water distribution systems. Refer to the enclosed **General Plan of Services** (C-100) and to the subsequent sections of the report for further details.

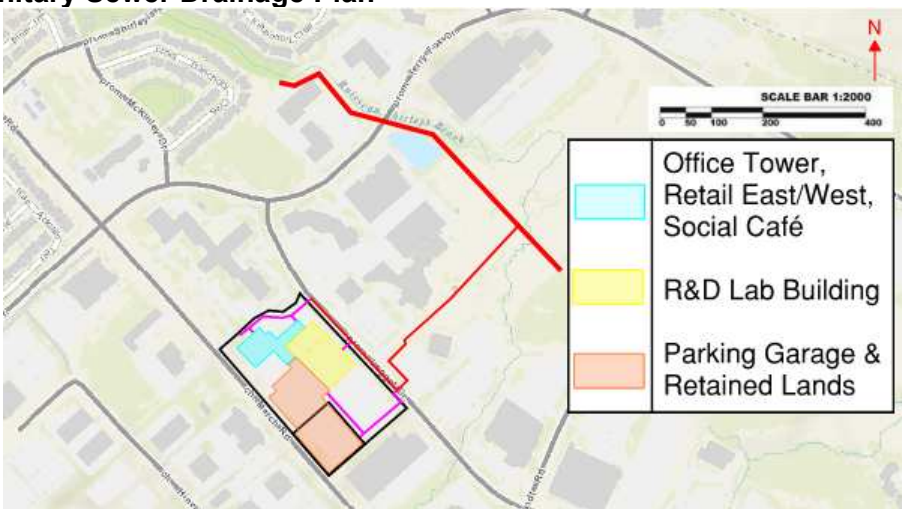
The City of Ottawa Servicing Study Guidelines for Development Applications requires that a Development Servicing Study Checklist be included in the report to confirm that each applicable item is deemed complete and ready for review by City of Ottawa Infrastructure Approvals. A completed checklist is enclosed in **Appendix B** of the report.

### 2.1 Sanitary Sewage

The proposed development will be serviced by extending a new 250mm dia. municipal sanitary sewer north along Legget Drive, as well as by extending private on-site sanitary sewers and building services. A private sewer is being proposed along the Lifestyle Street at the north end of the property to service the office tower and commercial/retail buildings (shown in BLUE); while another private sanitary sewer is required at the south end to service the parking garage and Retained Lands parcel (shown in ORANGE). The R&D Lab building (shown in YELLOW) will be serviced directly from the municipal sanitary sewer in Legget Drive. As the proposed use of the buildings will consist of office space, commercial retail, and lab uses (electrical/microelectronic research works), the Nokia Campus is not considered an industrial site as defined by O. Reg. 525/98. The proposed battery banks, lab generators, and hydro equipment located within the work yard will not contribute flows to the sanitary sewer system. All proposed sanitary service laterals will be equipped with a backflow preventer. Refer to **Figure 2** for details of the on-site sanitary sewer drainage plan.

All sanitary site flows will be directed to the 250mm dia. sanitary sewer routed through the KRP lands. This sewer currently outlets into the 750mm dia. March Trunk Sewer on the Marshes Golf Course. As indicated on the previously approved Sanitary Drainage Area Plan (98066-SAN) and described in the ‘Sanitary and Storm Trunk Sewer Design Brief – Kanata Research Park Lands’[3], prepared as part of the Sanmina development (located at 500 March Road), sanitary flows from the subject site were always intended to be directed into this municipal sanitary sewer system. An easement is already in place for the sanitary sewers located on the KRP lands.

**Figure 2: Sanitary Sewer Drainage Plan**




The 'Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus'[6] has been prepared as part of the proposed development to include anticipated sewage flows from the new Nokia campus and future development of the Retained Lands. An amendment to the existing Joint Use and Maintenance Agreement (JUMA) will also be required to account for these newly anticipated sanitary sewage flows. The Updated Sanitary and Storm Trunk Sewer Design Brief[6] also identifies the excess capacity available within the sanitary sewer system should it be required for a portion of the sewage flows from the 'future' mixed-use lands to the north (600 March Road), once the existing Nokia Office building is demolished.

### *2.1.1 Post-Development Sanitary Flows*

The City of Ottawa design criteria were used to calculate the theoretical sanitary flows for the proposed development. The following design criteria were taken from the City of Ottawa Sewer Design Guidelines and/or from subsequent Technical Bulletins:

Nokia Campus and Future Retained Lands - Commercial and/or Residential Uses

- Design Population (Employees): 700 office, 600 lab, and Gym/Café/Restaurant users
- Average Daily Sanitary Flows: 75 L/person/day (Office and Lab staff)
- Average Daily Sanitary Flows: 40 L/user/day (Gym + Showers)
- Average Daily Sanitary Flows: 125 L/seat/day (Café/Restaurant, Quick Service)
- Commercial Peaking Factor = 1.5
- Infiltration Allowance: 0.33 L/s/ha (ISTB-2018-01)

**Table 1** identifies the theoretical sanitary flows for the proposed development based on the above design criteria and breaks it down per sanitary connection point to the municipal sanitary sewer system in Legget Drive.

**Table 1**: **Theoretical Post-Development Sanitary Flows**

| Building ID | Use | Staff / Seats / Area | Average Flow (L/s) | Peaking Factor** | Peak Flow (L/s) *** |
|---|---|---|---|---|---|
| **Sewage Flows to Legget Sanitary Sewer via Sewer in Lifestyle Street** | | | | | |
| Office Tower | Office | 700 staff | 0.61 | 1.5 | 0.91 |
| Retail East | Gym + Showers | 200 users* | 0.19 | | 0.28 |
| Retail West | Café/Restaurant | 50 seats* | 0.22 | | 0.33 |
| Social Café | Quick Service | 50 seats* | 0.22 | | 0.33 |
| Bldg. Infiltration (ha) | - | 0.743 ha. | - | - | 0.24 |
| Lifestyle Street + Plaza Infiltration (ha) | - | 0.774 ha. | - | - | 0.25 |
| **Sub-Total** | - | - | **1.24** | - | **2.34** |
| **Sewage Flows Directly to Legget Sanitary Sewer** | | | | | |
| Lab | Lab | 600 staff | 0.52 | 1.5 | 0.78 |
| Bldg. Infiltration (ha) | - | 0.832 ha. | - | - | 0.27 |
| **Sub-Total** | - | - | **0.52** | - | **1.06** |
| **Sewage Flows to Legget Sanitary Sewer via Sewer in South Access Road** | | | | | |
| Parking Garage | Parking | - | - | - | - |
| Bldg. Infiltration (ha) | - | 0.953 ha. | - | - | 0.31 |
| **Sub-Total Parking Garage** | - | - | - | - | **0.31** |
| Retained Lands | Assumed Future Office Building | 500 staff | 0.43 | 1.5 | 0.65 |
| Bldg. Infiltration (ha) | - | 0.777 ha. | - | - | 0.26 |
| **Sub-Total Retained Lands** | - | - | 0.43 | - | **0.91** |
| Access Road + Workyard Infiltration (ha) | - | 1.199 ha. | - | - | 0.40 |
| **Sub-Total** | | - | **0.43** | - | **1.62** |
| **Total** | - | - | **2.19** | - | **5.02** |

*Total of 200 Gym users assumed 2 x per day and 50 Café/Quick Service seats assumed to be used 3 x per day.

**A peaking factor of 1.5 is appropriate for the intended use and is consistent with the previous design of the KRP sanitary trunk sewer system.

***Represents rounded values.

New 250mm dia. sanitary sewers are being proposed both along Legget Drive and along Lifestyle Street to match the size of the municipal sanitary sewer in Legget Drive and to maximize the conveyance capacity of the system. The sanitary sewer system (both private and public) will have more than sufficient capacity to service the proposed development, as demonstrated in the attached sanitary sewer design sheet, and will potentially provide excess capacity for future mixed-use lands to the north (once the existing Nokia Office building is demolished). The potential excess capacity for future mixed-use lands to the north cannot exceed the overall capacity of the downstream sewer system on KRP Lands. If additional capacity is required in the future to accommodate the future mixed-use lands to the north, it may be possible to upsize the downstream pipe segment(s) upstream of the connection to the municipal sanitary trunk sewer within the golf course. Additional analysis would need to be completed in the future.

At the client's request, a new 250mm dia. sanitary sewer is also being proposed along the south service road to provide flexibility for the future development of the Retained Lands parcel. This sewer will have sufficient capacity to service the proposed parking garage and future development on the Retained Lands.

This sanitary servicing approach is generally consistent with the approach outlined in the 'Assessment of Adequacy of Public Services Report'[4]. Refer to **Appendix C** for detailed sanitary sewage calculations and the sanitary sewer design sheet. Also refer to the 'Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus'[6] for further details.

## 2.2 Water for Domestic Use and Fire Protection

The subject site is located within the City of Ottawa 2W watermain pressure zone. Based on correspondence with the City of Ottawa, new connections to the 610mm dia. feedermain in Legget Drive will not be permitted. The proposed development will therefore be serviced by a new municipal watermain along Legget Drive up to the northern boundary of the subject site (to be extended south by the City in the future) as well as the extension of a new private looped watermain on site. Connections will be made to the 406mm dia. municipal watermain in Terry Fox and to the 203mm dia. watermain servicing the 515 Legget Drive property. The on-site looped watermain network will be extended from Legget Drive west along Lifestyle Street, south along the west property line, through the Retained Lands and out to Legget Drive along the south service road (all within an easement(s)). The proposed watermain configuration will ensure the proposed development has a looped system. Bulk water meter chambers will be provided at the property line, while valves will be provided along the municipal and private watermains and building services. Individual water meters will be located inside the respective buildings with remote water meters installed on the exterior face of the buildings. The proposed Nokia buildings, excluding the open-air parking garage, will be fully sprinklered with their respective fire department (siamese) connections located within 45m of a nearby fire hydrant.

This water servicing approach is generally consistent with the approach outlined in the 'Assessment of Adequacy of Public Services Report'[4].

### *2.2.1 Water Demands and Watermain Analysis*

The theoretical water demands for the proposed development are based on the design criteria from the City of Ottawa Water Distribution Guidelines and/or from subsequent Technical Bulletins. The Fire Underwriters Survey (FUS) method was used to calculate the fire flow requirements based on building information (i.e., building materials, occupancy hazards, etc.) provided by the architect. The water demands are calculated based on the following criteria:

<u>Nokia Campus and Future Retained Lands - Commercial and/or Residential Use</u>

- Design Population (Employees): 700 office, 600 lab, and Gym/Café/Restaurant users
- Average Daily Water Demands: 75 L/person/day (Office and Lab staff)
- Average Daily Water Demands: 40 L/user/day (Gym + Showers)
- Average Daily Water Demands: 125 L/seat/day (Café/Restaurant, Quick Service)
- Maximum Day Demand Peaking Factor = 1.5 x Avg. Day Demand (City Water Table 4.2)
- Peak Hour Demand Peaking Factor = 1.8 x Max. Day Demand (City Water Table 4.2)

**Table 2** identifies the theoretical domestic water demands and fire flow requirements for the development based on the above design criteria.

**Table 2**: **Theoretical Water Demand and FUS Fire Flows for Proposed Development**

| Building ID | Use | Staff / Seats / Area | Avg. Day Demand (L/s) | Max. Day Demand (L/s) | Peak Hour Demand (L/s)** | FUS Fire Flow (L/s) *** |
|---|---|---|---|---|---|---|
| **Water Supplied by (Looped) Watermain in Lifestyle Street** | | | | | | |
| Office Tower | Office | 700 staff | 0.61 | 0.91 | 1.64 | 117 |
| Retail East | Gym + Showers | 200 users* | 0.19 | 0.28 | 0.50 | 50 |
| Retail West | Café/Restaurant | 50 seats* | 0.22 | 0.33 | 0.59 | 100 |
| Social Café & Amenity | Quick Service Retail | 50 seats* | 0.22 | 0.33 | 0.59 | 117 |
| **Sub-Total** | - | - | **1.24** | **1.85** | **3.32** | - |
| **Water Supplied by (Looped) Watermain in Lifestyle Street** | | | | | | |
| Lab | Lab | 600 staff | 0.52 | 0.78 | 1.41 | 233 |
| **Sub-Total** | - | **600 staff** | **0.52** | **0.78** | **1.41** | **233** |
| **Water Supplied by (Looped or Separate) Watermain in South Service Road** | | | | | | |
| Parking Garage | Parking | - | - | - | - | 300 |
| Retained Lands | Assumed Future Office Building | 500 | 0.43 | 0.65 | 1.17 | 200 |
| **Sub-Total** | | - | **0.43** | **0.43** | **1.17** | - |
| **Total** | - | - | **2.18** | **3.27** | **5.89** | - |

*Total of 200 Gym users assumed 2 x per day and 50 Café/Quick Service seats assumed to be used 3 x per day.

**A peaking factor of **1.5 x Max Day** is appropriate for the intended use and is consistent with the previous design of the KRP sanitary trunk sewer system.

***FUS Fire Flow for Social Café is combined with the Office Tower FUS Fire Flow.

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 276 kPa (40 psi) under Peak Hour demands.
- Minimum system pressures are to be 140 kPa (20 psi) under Max Day + Fire Flow demands.

The size of the proposed municipal watermain in Legget Drive was determined to be 305mm dia. based on direction from the City of Ottawa to avoid connection implications to a 'large' diameter (>305mm dia.) watermain. The proposed on-site private watermain was determined to be 305mm dia. to maximize the water available to the Nokia campus, assuming a single feed interim scenario in the event the 600mm dia. feedermain in Legget Drive is shut down. This possible interim measure would only be applicable until such time as the new local municipal watermain is extended south. A private 300mm dia. watermain would also allow for a possible connection of the future mixed-use lands to the north. Any future connection to the private watermain will be contingent on modelling that demonstrates no negative impacts to the network.

Preliminary domestic water demands, and fire flow requirements were provided to the City of Ottawa to obtain municipal watermain boundary conditions. **Tables 2.1** and **2.2** summarize preliminary hydraulic analysis results based on municipal watermain boundary conditions provided by the City of Ottawa.

**Table 2.1: Hydraulic Boundary Conditions Provided by the City (Scenario 1)**

| Municipal Watermain Boundary Condition | Boundary Condition | Normal Operating Pressure Range (psi) | Anticipated WM Pressure (psi)* |
|---|---|---|---|
| **Connection #1 - 406mm dia. WM in Terry Fox Drive Right-of-Way (North of subject site)** | | | |
| Minimum HGL (Peak Hour Demand) | 126.3 m | 40 psi (min.) | ~ 71 psi |
| Maximum HGL (Max Day Demand) | 131.0 m | 50 - 70 psi | ~ 78 psi |
| HGL Max Day + Fire Flow (50-300 L/s) | 127.5 m to 120.3 m | 20 psi (min.) | ~ 63-73 psi |
| **Connection #2 - 203mm dia. WM servicing 515 Legget Drive (Southeast of subject site)** | | | |
| Minimum HGL (Peak Hour Demand) | 126.3 m | 40 psi (min.) | ~ 69 psi |
| Maximum HGL (Max Day Demand) | 131.0 m | 50 - 70 psi | ~ 76 psi |
| HGL Max Day + Fire Flow (50-300 L/s) | 127.5 m to 120.6 m | 20 psi (min.) | ~ 61-71 psi |

*Based on approximate watermain elevations of 75.8m at service connection location #1 (Terry Fox Drive) and 77.2 m at connection location #2 (515 Legget Drive). Design pressure = (HGL – watermain elevation) x 1.42197 PSI/m.

**Table 2.2: Hydraulic Boundary Conditions Provided by the City (Scenario 2)**

| Municipal Watermain Boundary Condition | Boundary Condition | Normal Operating Pressure Range (psi) | Anticipated WM Pressure (psi)* |
|---|---|---|---|
| **Connection #1 - 406mm dia. WM in Terry Fox Drive Right-of-Way (North of subject site)** | | | |
| Minimum HGL (Peak Hour Demand) | 125.6 m | 40 psi (min.) | ~ 70 psi |
| Maximum HGL (Max Day Demand) | 130.9 m | 50 - 70 psi | ~ 78 psi |
| HGL Max Day + Fire Flow (50-300 L/s) | 126.3 m to 107.6 m | 20 psi (min.) | ~ 45-71 psi |

*Based on approximate watermain elevation of 75.8m at service connection location (Terry Fox Drive). Design pressure = (HGL – watermain elevation) x 1.42197 PSI/m.

The hydraulic model EPANET was used to analyze the performance of the proposed watermain configuration for the following three (3) theoretical conditions under all three scenarios requested by the City of Ottawa, as described below:

- Maximum Day + Fire Flow Demand
- Peak Hour Demand
- Maximum HGL

At the request of the City of Ottawa, the hydraulic analysis is based on three (3) watermain scenarios:

- **Scenario 0** includes no future demands to the municipal water network and is used to determine the existing conditions for service to the 515 Legget Drive property.

- **Scenario 1** includes a looped watermain with two (2) feeds off the municipal watermain network (Connection #1 off the 406mm dia. watermain in Terry Fox Drive as well as Connection #2 off the 203mm dia. watermain servicing the 515 Legget Drive property, within the municipal ROW). The hydraulic analysis includes the 515 Legget Drive service to ensure that the proposed development would not cause negative impacts to the 515 Legget Drive service.

- **Scenario 2** includes Connection #1 off the 406 mm dia. watermain in Terry Fox Drive only, potentially simulating a closure of the 610m backbone watermain in Legget Drive.

A schematic representation of the hydraulic networks for each scenario depicts the node and pipe numbers used in the model. The model is based on hydraulic boundary conditions provided by the City of Ottawa. **Tables 2.3, 2.4** and **2.5** summarize the hydraulic model results under **Scenario 0**; while **Tables 2.6, 2.7,** and **2.8** summarize the hydraulic model results under **Scenario 1**; and **Tables 2.9, 2.10,** and **2.11** summarize the hydraulic model results under **Scenario 2**.

**Table 2.3: Maximum Day + Fire Flow Demand (Scenario 0 – Existing Conditions)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Max Day Demands:**<br>1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (515 Legget):**<br>133 L/s at J79 (Existing Private Hydrant) | Minimum system pressure of 40.2 psi is available at Node J79 (Existing Private Hydrant) | Maximum system pressure of 60.3 psi is available at Node J75 (Existing Valve at property line) |

**Table 2.4: Peak Hour Demand (Scenario 0 – Existing Conditions)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Peak Hour Demands:**<br>2.59 L/s at J80 (515 Legget Building) | Minimum system pressure of 70.0 psi is available at Nodes J78 and J79 (Existing Hydrant Tee and Private Hydrant) | Maximum system pressure of 71.2 psi is available at Node J80 (515 Legget Building) |

**Table 2.5: Maximum HGL (Scenario 0 – Existing Conditions)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Max Day Demands:**<br>1.44 L/s at J80 (515 Legget Building) | Minimum system pressure of 76.7 psi is available at Nodes J78 and J79 (Existing Hydrant Tee and Private Hydrant) | Maximum system pressure of 77.9 psi is available at Node J80 (515 Legget Building) |

The modelling results indicate that the existing watermain will provide adequate system flows and pressures to the 515 Legget Drive property during all conditions (i.e., Max Day + Fire Flow, Peak Hour and Max HGL) under **Scenario 0**. In some instances, the system pressures will be at the higher end of the normal operation pressure range.

**Table 2.6: Maximum Day + Fire Flow Demand (Scenario 1 – Two Watermain Feeds)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (Office & Link Building):**<br>59 L/s at J32 and J37 (Private Hydrants 3 and 4) | Minimum system pressure of 55.2 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 65.0 psi is available at Node J73 (Watermain just south of Connection #2) |
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (Retail East Building):**<br>50 L/s at J18 (Private Hydrant 2) | Minimum system pressure of 67.4 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 74.9 psi is available at Node J73 (Watermain just south of Connection #2) |

| | | |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (Retail West Building):**<br>50 L/s at J18 and J32 (Private Hydrants 2 and 3) | Minimum system pressure of 66.0 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 74.9 psi is available at Node J73 (Watermain just south of Connection #2) |
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (R&D Lab Building):**<br>95 L/s at J12, 75 L/s at J18, and J64 (Private Hydrants 1, 2, and 10).<br>Note: The calculations are based on providing fire protection off the private looped watermain only, however in the event of a fire, the fire department will most likely utilize the municipal hydrants fed off the 600mm dia. feedermain in Legget (not accounted for in these calculations). | Minimum system pressure of 55.0 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 64.7 psi is available at Node J73 (Watermain just south of Connection #2) |
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (Parking Garage):**<br>75 L/s at J37, J41, J43, and J62 (Private Hydrants 4, 5, 6, and 9) | Minimum system pressure of 50.1 psi is available at Node J37 (Private Hydrant 4) | Maximum system pressure of 64.2 psi is available at Node J73 (Watermain just south of Connection #2) |

| | | |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (Retained Lands – Future Development) if fed off looped watermain:**<br>61 L/s at J47, J53, and J62 (Future Private Hydrants 7 and 8, and Private Hyd. 9) | Minimum system pressure of 56.1 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 64.6 psi is available at Node J73 (Watermain just south of Connection #2) |
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building)<br>**Fire Flow Demand (515 Legget Building):**<br>133 L/s at J79 (Existing Private Hydrant) | Minimum system pressure of 40.1 psi is available at Node J79 (Existing Private Hydrant) | Maximum system pressure of 65.1 psi is available at Nodes J72 and J73 (Watermain just south of Connection #2) |

**Table 2.7: Peak Hour Demand (Scenario 1 – Two Watermain Feeds)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Peak Hour Demands:**<br>4.72 L/s at J24 (Office/Retail/Link/Lab Buildings), 1.17 L/s at J51 (Retained Lands – Future Development), 2.59 L/s at J80 (515 Legget Building) | Minimum system pressure of 66.0 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 73.2 psi is available at Nodes J25, J69, J70, J71, J72, and J73 (Watermain south and west of Connection #2) |

**Table 2.8: Maximum HGL (Scenario 1 – Two Watermain Feeds)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development), 1.44 L/s at J80 (515 Legget Building) | Minimum system pressure of 72.7 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 79.9 psi is available at Nodes J25, J69, J70, J71, J72, and J73 (Watermain south and west of Connection #2) |

The modelling results indicate that the looped watermain will provide adequate system flows and pressures during all conditions (i.e., Max Day + Fire Flow, Peak Hour and Max HGL). In some instances, the system pressures will be at the higher end of the normal operation pressure range. Furthermore, the 515 Legget Drive property will not be negatively affected by the proposed looped watermain (**Scenario 1**).

**Table 2.9: Maximum Day + Fire Flow Demand (Scenario 2 – Single Watermain Feed)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development)<br>**Fire Flow Demand (Office & Link Building):**<br>59 L/s at J32 and J37 (Private Hydrants 3 and 4) | Minimum system pressure of 33.1 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 44.2 psi is available at Node J1 (Municipal watermain near Connection #1) |
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development)<br>**Fire Flow Demand (Retail East Building):**<br>50 L/s at J18 (Private Hydrant 2) | Minimum system pressure of 65.1 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 71.5 psi is available at Node J4 (Municipal watermain near Connection #1) |

| | | |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development)<br>**Fire Flow Demand (Retail West Building):**<br>50 L/s at J18 and J32 (Private Hydrants 2 and 3) | Minimum system pressure of 62.1 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 70.9 psi is available at Node J1 (Municipal watermain near Connection #1) |
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development)<br>**Fire Flow Demand (R&D Lab Building) – <u>220 FF ONLY</u>:**<br>95 L/s at J12, 63 L/s at J18, and J64 (Private Hydrants 1, 2, and 10)<br>Note: The calculations are based on providing fire protection off the private watermain only, however in the event of a fire, the fire department will most likely utilize the municipal hydrants fed off the 600mm dia. feedermain in Legget (not accounted for in these calculations), unless these are not available. | Minimum system pressure of 27.4 psi is available at Node J44 (Watermain west of Retained Lands) | Maximum system pressure of 42.9 psi is available at Node J1 (Municipal watermain near Connection #1) |
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development)<br>**Fire Flow Demand (Parking Garage – <u>150 FF ONLY</u>):**<br>75 L/s at J43 and J62 (Private Hydrants 6 and 9) | Minimum system pressure of 26.3 psi is available at Node J62 (Private Hydrant 9) | Maximum system pressure of 43.9 psi is available at Node J1 (Municipal watermain near Connection #1) |

| | | |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development)<br>**Fire Flow Demand (Retained Lands – Future Development) if fed off private watermain – <u>150 FF ONLY</u>:**<br>75 L/s at J53, J62 (Future Private Hydrant 8 and Private Hydrant 9) | Minimum system pressure of 23.6 psi is available at Node J62 (Private Hydrant 9) | Maximum system pressure of 43.9 psi is available at Node J1 (Municipal watermain near Connection #1) |

The modelling results indicate that only a partial fire flow, approximately 150 L/s of the 300 L/s calculated using the FUS method, will be available for the Parking Garage during the Max Day + Fire Flow condition for **Scenario 2.** Similarly, the system will provide approximately 220 L/s of the calculated 233 L/s fire flow required for the R&D Lab. As discussed with City staff, this represents an improvement over existing conditions that do not provide any fire flow in the event of the shutdown of the 610mm dia. backbone watermain in Legget. Additionally, this arrangement would act as an interim condition until such a time that the proposed 305mm dia. municipal watermain is extended south along Legget Drive. Under **Scenario 2**, the maximum fire flow available for the future development of the Retained Land would be approximately 150 L/s of the calculated 183 L/s, however it is anticipated that the new 305mm dia. watermain in Legget Drive will be extended before the Retained Lands are developed. Therefore, it is anticipated that the fire flow requirements for the Retained Lands will be met in the future.

**Table 2.10: Peak Hour Demand (Scenario 2 – Single Watermain Feed)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Peak Hour Demands:**<br>4.72 L/s at J24 (Office/Retail/Link/Lab Buildings), 1.17 L/s at J51 (Retained Lands – Future Development) | Minimum system pressure of 65.0 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 70.91 psi is available at Nodes J4 and J5 (Municipal watermain near Connection #1) |

**Table 2.11: Maximum HGL (Scenario 2 – Single Watermain Feed)**

| Operating Condition | Minimum System Pressure | Maximum System Pressure |
|---|---|---|
| **Max Day Demands:**<br>2.62 L/s at J24 (Office/Retail/Link/Lab Buildings), 0.65 L/s at J51 (Retained Lands – Future Development) | Minimum system pressure of 72.5 psi is available at Node J32 (Private Hydrant 3) | Maximum system pressure of 78.4 psi is available at Nodes J4 and J5 (Municipal watermain near Connection #1) |

The modelling results indicate that the single feed watermain (**Scenario 2**) will provide adequate system flows and pressures during the domestic use demands and during the Max Day + Fire Flow conditions for certain buildings. However, although the fire flow conditions cannot be fully met for all on-site buildings, the partial fire flow would represent an improvement over existing conditions that do not provide any fire flow during a potential closure of the 610mm dia. backbone watermain in Legget Drive. Furthermore, this represents an interim condition until such time as the new 305mm dia. municipal watermain is extended south along Legget Drive. The modelling results also indicate that the system pressures will be at the higher end of the normal operation pressure range and as a result pressure reducing valves may be required. Booster pump(s) are anticipated to be required to provide adequate water pressure to the upper floors of the on-site building. Refer to **Appendix D** for City of Ottawa boundary conditions, the hydraulic modeling schematics, modeling results and correspondence from the City of Ottawa.

As indicated in the model, a multi-hydrant approach to firefighting will be required to supply adequate fire flow to the proposed development using new private on-site hydrants. There are several Class AA (blue bonnet) hydrants within 150m of the proposed development, including both municipal hydrants along Legget Drive and private hydrants fed off the proposed looped watermain. Based on the City of Ottawa Technical Bulletin ISTB-2018-02, Class AA (blue bonnet) hydrants within 75m of the site have a maximum capacity 95 L/s while hydrants between 75m and 150m of the site have a maximum capacity 63 L/s (at a pressure of 20 PSI). The combined maximum flow from the nearby hydrants will provide the Max Day + Fire Flow requirement for the proposed development assuming a looped system. **Table 2.12** summarizes the total theoretical combined fire flow available from the nearby fire hydrants (municipal and private) and compares it to the fire flow demands based on FUS calculations assuming a looped system.

**Table 2.12**: **Theoretical Fire Protection Summary Table**

| Building | Fire Flow Demand (L/s) | Fire Hydrant(s) within 75m (~ 95 L/s each) | Fire Hydrant(s) within 150m (~ 63 L/s each) | Theoretical Combined Available Fire Flow (L/s) |
|---|---|---|---|---|
| **Water Supplied by Hydrants in Lifestyle St., Legget Dr., March Rd., and/or Visitor Parking** | | | | |
| Office Tower + Social Cafe | 117 | 4 | 1 | >117 |
| Retail East | 50 | 2 | 2 | >50 |
| Retail West | 100 | 3 | 1 | >100 |
| **Water Supplied by Hydrants in Legget Drive and/or South Service Road** | | | | |
| Lab | 233 | 3 | 2 | >233 |
| **Water Supplied by Hydrants along March Rd., Visitor Parking and/or South Service Road** | | | | |
| Parking Garage | 300 | 4 | 3 | >300 |
| Retained Lands | 183 | 5 | 1 | >183 |

Refer to **Appendix D** for detailed calculations and correspondence from the City of Ottawa.

### *2.2.2 Water Age Analysis*

A cursory water age analysis was conducted for the watermain network, including the section of proposed 305mm dia. municipal watermain along Legget Drive that will be required to service the proposed development. The purpose of this analysis is to confirm that drinking water quality can be maintained under a dead-end watermain condition (**Scenario 2)**. The analysis only includes domestic demands from the proposed development on the 570 March Road property, as the timing of the future development of the 520 March Road property is unknown.

**Table 2.13** provides a summary of the water volume calculations for the proposed watermain network from the connection to the existing 406mm dia. watermain in Terry Fox Drive to the dead-end in Legget Drive, including the 305mm dia. looped private watermain, hydrant leads and stubs (for future connections).

**Table 2.13: Water Volume Calculations**

| Pipe Size / Material | Area of Pipe ($m^2$) | Length of Pipe (m) | Volume of Water* |
|---|---|---|---|
| 305mm dia. / PVC | 0.072 $m^2$ | 838 m | 61,226 L |
| 203mm dia. / PVC | 0.032 $m^2$ | 42 m | 1,359 L |
| 152mm dia. PVC | 0.018 $m^2$ | 37 m | 671 L |
| **TOTAL** | **-** | **-** | **63,256 L (or 63.3 $m^3$)** |

*Volumes are based on actual ID of pipes.

The average daily demand for the proposed Nokia development (570 March Road) is anticipated to be 1.75 L/s (151,200 L/day or 151 $m^3$/day). Section 4.1.2 of the City of Ottawa Water Distribution Design Guidelines requires a 5-day turnover rate for basic day demand conditions. Based on the values calculated above, the domestic water used by the Nokia development will turn over the volume of water within the watermain at least twice a day. As a result, there are no concerns that drinking water quality would be compromised.

## 2.3 Storm Drainage and Stormwater Management

On-site stormwater management will be required for the proposed development to meet the requirements of the City of Ottawa. The stormwater strategy for this development will be consistent with previously approved KRP SWM reports.

### *2.3.1 Pre-Development Conditions and Allowable Release Rate*

Under current conditions, stormwater runoff from the subject site is currently being discharged into two (2) separate storm sewer systems. Both sewer systems discharge into the existing stormwater management (SWM) Facility No. 1, located behind the Brookstreet Hotel on KRP lands. To maintain consistency with approved designs, the previous SMP KRP Reports were reviewed to determine existing stormwater management criteria including allowable release rates for the subject site. As indicated on the previously approved Storm Drainage Area Plan (98066-STM), stormwater runoff from the subject site (i.e., existing surface parking lots) flows into the two (2) distinct storm outlets as follows:

- The northern portion of the existing parking lot (Area “PRE-A”) currently flows into the northern storm sewer system located on the KRP lands directly across Legget Drive to the east. The maximum allowable release rate from this portion of the subject site into this sewer system is 63.8 L/s.

- The southern portion of the existing parking lot (Area “PRE-B1”) currently flows into the southern storm sewer system located on the KRP lands via the municipal storm sewer in Legget Drive. Most of the runoff from the undeveloped strip along the south property line (Area “PRE-B2”) currently sheet-drains uncontrolled into the Legget Drive municipal Right-of-Way or directly onto the adjacent Sanmina property (500 March Road) before flowing into the southern storm sewer system. The maximum allowable release rate from this portion of the subject site is 235.1 L/s (152 L/s + 83.1 L/s).

Refer to the enclosed Pre-Development Stormwater Management Plan (C-300) for sub-catchment areas, **Appendix J** for excerpts from the previously approved 'Stormwater Management Plan, Kanata Research Park'[2], and to **Appendix K** for a copy of the previously approved Storm Drainage Area Plan (98066-STM).

### *2.3.2 Stormwater Management Criteria and Objectives*

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

- Provide a dual drainage system (i.e., minor, and major system flows).
- Maintain consistency with the previously approved Kanata Research Park - Stormwater Management Plans and Reports, by providing the follows stormwater quantity and quality control measures:
    - Control post-development flows into the northern storm sewer system located on the KRP lands to a maximum allowable release rate of 63.8 L/s.
    - Control post-development flows into the southern storm sewer system located on the KRP lands to a maximum allowable release rate of 235.1 L/s.
    - Store and control post-development on-site runoff in excess of the allowable release rates specified above, prior to releasing flows into the downstream storm sewer systems. Provide on-site stormwater quantity control measures for storms up to and including the 100-year design event.
    - Provide on-site stormwater quality control equivalent to an "Enhanced" Level of Protection (i.e., minimum 80% TSS removal and 90% of annual runoff treated) via a "treatment train", combining raingardens, bioswales, and mechanical separators, prior to releasing flows from the site. The proposed on-site treatment train measures are in addition to the water quality treatment provided by the downstream stormwater management facility located on KRP Lands to the east.
    - Water temperature target mitigation measures as described in the previously approved Shirleys Brook Subwatershed report[1].
- Ensure that no surface ponding will occur on the paved surfaces (parking lots and drive aisles) during the 2-year storm event.
- Provide guidelines to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion a Sediment Control.

### *2.3.3 Post-Development Conditions*

Under post-development conditions, the proposed development, including the Nokia Campus and Retained Lands, will be serviced by extending new on-site storm sewer systems. Flows will be attenuated on-site prior to being directed to the existing stormwater management (SWM) Facility No. 1 on KRP lands, via the sewer systems on the north and south sides of the Brookstreet Hotel.

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 certain building roofs, using inlet control devices (ICD) within the on-site storm sewer system, and the internal SWM cistern of the R&D Lab building. Flows will be controlled for storms up to and including the 100-year design event. All proposed storm service laterals will be equipped with backflow prevention devices to

protect the buildings from any potential sewer back-ups. Due to the existing grades, runoff from a small portion of the site will drain uncontrolled off site.

On-site stormwater quality control will be achieved using a "treatment train", with flows being treated by a combination of rain gardens, bioswales, and oil and grit separator (OGS) units installed at the site's north and south stormwater outlets. Additional off-site stormwater quality treatment will be provided by the existing downstream stormwater management facility, as outlined in the previously approved 'Stormwater Management Plan, Kanata Research Park'[2]. This design is generally consistent with the MVCA's quality control recommendations, as outlined in the approved 'Assessment of Adequacy of Public Services Report'[4]. Refer to **Appendix A** for correspondence with the MVCA.

Stormwater runoff from the visitor parking area and central courtyard will be directed to nearby bioswales, thus eliminating the potential for stormwater management on the surface of large, paved parking lots prone to increase water temperatures. Furthermore, most of the on-site stormwater management (storage) will be provided within underground SWM storage chambers within an internal SWM cistern, or on light coloured (white) building roofs, thus providing thermal mitigation measures to meet water temperature targets. This design is consistent with the MVCA's recommendations to implement thermal mitigation measures in the overall SWM design, as outlined in the MVCA's Shirley's Brook 2016 Summary Report.

The two storm sewer outlets have limited conveyance capacity (maximum allowable release rate). As a result, drainage from the subject site will have to be split based on the relative size of the sub-catchment areas, the imperviousness of these areas, and potential on-site storage. In general, stormwater runoff from Lifestyle Street, Office Tower, Retail East/West building roofs will be directed to the northern storm sewer system located on KRP lands, while runoff from the remainder of the Nokia site, including the R&D Lab, parking garage, work yard, south service road, and Retained Lands will be directed to the southern storm sewer system on KRP lands. As indicated above, the stormwater management design for the proposed development will include on-site water quantity control prior to releasing flows from the site. Refer to the enclosed Post-Development Stormwater Management Plan (C-301) for sub-catchment areas and to **Appendix E** for detailed stormwater calculations and the storm sewer design sheets. Also refer to the 'Sanitary and Storm Trunk Sewer Design Brief – Nokia Ottawa Innovation Campus'[6] for further details.

### *2.3.4 Post-Development Flows to North Outlet Sewer*

To maintain consistency with the previously approved 'Stormwater Management Plan, Kanata Research Park Report'[2], post-development stormwater flows from sub-catchment Areas A-0 to A-6 will be controlled to a maximum release rate of 63.8 L/s, prior to being released into northern storm sewer system located on the KRP lands.

#### 2.3.4.1 Area A-0: Uncontrolled Runoff

The uncontrolled post-development flows from sub-catchment area A-0a, which sheet drain to the adjacent Nokia property (600 March Road), were calculated using the Rational Method to be approximately 1.7 L/s during the 2-year design event, 2.3 L/s during the 5-year design event and 5.0 L/s during the 100-year design event.

The uncontrolled post-development flows from sub-catchment area A-0b, which sheet drain directly to Legget Drive, were calculated using the Rational Method to be approximately 0.3 L/s during the 2-year design event, 0.4 L/s during the 5-year design event and 1.0 L/s during the 100-year design event. Refer to the Post-Development Stormwater Management Plan (C-301) and **Appendix E** for detailed SWM calculations.

#### 2.3.4.2 Area A-1 – Controlled Flow from Lifestyle Street – Upper End

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of STMMH 102. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

**Table 3.1** 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 100-year design events.

**Table 3.1: Stormwater Flows, ICD & Storage**

| Design Event | Controlled Site Flows from Area A-1 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type A ICD | 12.5 L/s | 0.00 m (80.35 m) | 6.3 L/s | 14.4 m³ | 55.4 m³ |
| 5-Year | | 13.7 L/s | 0.00 m (80.49 m) | 6.9 L/s | 21.7 m³ | |
| 100-Year | | 17.5 L/s | 0.00 m (81.02 m) | 8.8 L/s | 49.2 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

#### 2.3.4.3 Area A-2 – Controlled Flow from Lifestyle Street – Lower End

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 251. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

**Table 3.2** 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 100-year design events.

**Table 3.2: Stormwater Flows, ICD & Storage**

| Design Event | Controlled Site Flows from Area A-2 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type A ICD | 10.4 L/s | 0.00 m (78.54 m) | 5.2 L/s | 44.3 m³ | 134.0 m³ |
| 5-Year | | 12.1 L/s | 0.00 m (78.70 m) | 6.1 L/s | 62.6 m³ | |
| 100-Year | | 17.0 L/s | 0.00 m (79.32 m) | 8.5 L/s | 130.3 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

#### 2.3.4.4 Area A-3 – Controlled Flow from Retail West Roof

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) prior to being directed to the downstream storm sewer via the proposed building service.

**Table 3.3** 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 the 2-year, 5-year and 100-year design events.

**Table 3.3 - Controlled Flow Roof Drains**

| Roof Drain ID & Drainage Area (ha) | Number of Roof Drains | Watts Roof Drain Model ID (Weir Opening) | Controlled Flow per Drain (L/s) | | | Approximate Ponding Depth Above Drains (m) | | | Storage Volume Required (m³) | | | Max. Storage Available (m³) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | |
| A3-RD 1 | 1 | RD-100-A-ADJ (Fully Exposed) | 0.95 | 1.26 | 1.89 | 0.08 | 0.10 | 0.15 | 7.5 | 10.1 | 20.6 | 21.2 |
| A3-RD 2 | 1 | RD-100-A-ADJ (Fully Exposed) | 0.95 | 1.26 | 1.89 | 0.08 | 0.10 | 0.15 | 7.5 | 10.1 | 20.6 | 20.8 |
| **Total Roof (0.098 ha)** | **2** | **-** | **1.9*** | **2.5*** | **3.8*** | **-** | **-** | **-** | **14.9*** | **20.1*** | **41.2*** | **42.0*** |

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

#### 2.3.4.5 Area A-4 – Controlled Flow from Retail East Roof

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) prior to being directed to the downstream storm sewer via the proposed building service.

**Table 3.4** 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 the 2-year, 5-year and 100-year design events.

**Table 3.4: Controlled Flow Roof Drains**

| Roof Drain ID & Drainage Area (ha) | No. of Roof Drains | Watts Roof Drain Model ID (Weir Opening) | Controlled Flow per Drain (L/s) | | | Approximate Ponding Depth Above Drains (m) | | | Storage Volume Required ($m^3$) | | | Max. Storage Available ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | |
| A4-RD 1 | 1 | RD-100-A-ADJ (Fully Exposed) | 0.95 | 1.26 | 1.89 | 0.08 | 0.10 | 0.15 | 5.0 | 6.1 | 14.1 | 14.5 |
| A4-RD 2 | 1 | RD-100-A-ADJ (Fully Exposed) | 0.95 | 1.26 | 1.89 | 0.08 | 0.10 | 0.15 | 5.2 | 7.1 | 14.6 | 15.4 |
| **Total Roof (0.075 ha)** | **2** | **-** | **1.9*** | **2.5*** | **3.8*** | **-** | **-** | **-** | **10.2*** | **13.9*** | **28.7*** | **29.9*** |

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

#### 2.3.4.6 Area A-5 – Controlled Flow from Office Tower Roof

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) prior to being directed to the downstream storm sewer via the proposed building service.

**Table 3.5** 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 the 2-year, 5-year and 100-year design events.

**Table 3.5: Controlled Flow Roof Drains**

| Roof Drain ID & Drainage Area (ha) | No. of Roof Drains | Watts Roof Drain Model ID (Weir Opening) | Controlled Flow per Drain (L/s) | | | Approximate Ponding Depth Above Drains (m) | | | Storage Volume Required ($m^3$) | | | Max. Storage Available ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | |
| A5-RD 1 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 1.2 | 1.8 | 4.3 | 5.1 |
| A5-RD 2 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 1.9 | 2.9 | 6.6 | 7.1 |
| A5-RD 3 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.7 | 1.1 | 2.6 | 2.9 |
| A5-RD 4 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.6 | 1.0 | 2.4 | 2.8 |
| A5-RD 5 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.8 | 1.3 | 3.1 | 3.3 |

| Roof Drain ID & Drainage Area (ha) | No. of Roof Drains | Watts Roof Drain Model ID (Weir Opening) | Controlled Flow per Drain (L/s) | | | Approximate Ponding Depth Above Drains (m) | | | Storage Volume Required ($m^3$) | | | Max. Storage Available ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | |
| A5-RD 6 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.2 | 0.4 | 1.1 | 1.5 |
| A5-RD 7 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 1.5 | 2.3 | 5.3 | 5.7 |
| A5-RD 8 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 1.6 | 2.4 | 5.6 | 5.8 |
| A5-RD 9 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 1.3 | 2.0 | 4.8 | 5.0 |
| A5-RD 10 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 1.4 | 2.1 | 5.0 | 5.0 |
| A5-RD 11 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 2.3 | 3.4 | 7.8 | 8.7 |
| A5-RD 12 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 3.2 | 4.7 | 10.5 | 10.9 |
| A5-RD 13 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 2.2 | 3.3 | 7.4 | 8.4 |
| A5-RD 14 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 3.0 | 4.4 | 9.9 | 11.1 |
| A5-RD 15 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 2.2 | 3.3 | 7.5 | 8.4 |
| A5-RD 16 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 3.0 | 4.4 | 9.9 | 11.1 |
| A5-RD 17 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 3.7 | 5.4 | 12.0 | 12.1 |
| A5-RD 18 | 1 | RD-100-A-ADJ (1/2 Exposed) | 0.79 | 0.95 | 1.26 | 0.08 | 0.10 | 0.15 | 4.8 | 6.8 | 14.5 | 15.1 |
| **Total Roof (0.288 ha)** | **18** | **-** | **9.0*** | **9.7*** | **11.1*** | **-** | **-** | **-** | **35.8*** | **53.0*** | **120.6*** | **130.0*** |

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

### 2.3.4.7 Area A-6 – Controlled Flow from Social Café and Amenity Roof

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) prior to being directed to the downstream storm sewer via the proposed building service.

**Table 3.6** 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 the 2-year, 5-year and 100-year design events.

**Table 3.6: Controlled Flow Roof Drains**

| Roof Drain ID & Drainage Area (ha) | No. of Roof Drains | Watts Roof Drain Model ID (Weir Opening) | Controlled Flow per Drain (L/s) | | | Approximate Ponding Depth Above Drains (m) | | | Storage Volume Required ($m^3$) | | | Max. Storage Available ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | 2 Yr | 5 Yr | 100 Yr | |
| A6-RD 1 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 1.3 | 2.0 | 4.8 | 8.6 |
| A6-RD 2 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 4.1 | 5.9 | 13.0 | 16.6 |
| A6-RD 3 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.7 | 1.2 | 2.9 | 3.8 |
| A6-RD 4 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.7 | 1.1 | 2.8 | 3.8 |
| A6-RD 5 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.5 | 0.8 | 1.9 | 2.2 |
| A6-RD 6 | 1 | RD-100-A-ADJ (Closed) | 0.32 | 0.32 | 0.32 | 0.08 | 0.10 | 0.15 | 0.4 | 0.7 | 1.9 | 2.2 |
| A6-RD 7 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 2.7 | 4.0 | 9.0 | 9.2 |
| A6-RD 8 | 1 | RD-100-A-ADJ (1/4 Exposed) | 0.71 | 0.79 | 0.95 | 0.08 | 0.10 | 0.15 | 2.7 | 3.9 | 8.9 | 9.3 |
| **Total Roof (0.117 ha)** | **8** | **-** | **3.7*** | **4.0*** | **4.5*** | **-** | **-** | **-** | **13.2*** | **19.6*** | **45.1*** | **55.7*** |

*Table represents rounded values

Refer to **Appendix E** for detailed SWM calculations and **Appendix G** for the control flow roof drain information.

#### 2.3.4.8 Summary of Post- Development Flows to North Storm Outlet

As indicated in **Tables 3.1** to **3.6**, the respective sub-catchment areas will provide sufficient storage for the 2-year, 5-year and 100-year design events, whether underground, on the surface, or on the building roofs. The site has also been designed to ensure that no stormwater will pond on the paved surfaces during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test.

**Table 3.7** compares the post-development site flows from the proposed development to the maximum allowable release rate for the 2-year, 5-year, and the 100-year design events.

**Table 3.7: Stormwater Flow Comparison Table**

| Design Event | Pre-Development Conditions | Drainage Areas A-0 to A-6 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Post-Development Conditions | | | | | | | |
| | Max Release Rate (L/s) | A-0 Flow (L/s) | A-1 Flow (L/s) | A-2 Flow (L/s) | A-3 Flow (L/s) | A-4 Flow (L/s) | A-5 Flow (L/s) | A-6 Flow (L/s) | Total Flow (L/s) |
| 2-Yr | **63.8** | 2.0 | 12.5 | 10.4 | 1.9 | 1.9 | 9.0 | 3.7 | **41.4** |
| 5-Yr | | 2.8 | 13.7 | 12.1 | 2.5 | 2.5 | 9.7 | 4.0 | **47.3** |
| 100-Yr | | 5.9 | 17.5 | 17.0 | 3.8 | 3.8 | 11.1 | 4.5 | **63.6** |

As indicated in the table above, the 2-year, 5-year and 100-year post-development flows will be less than the maximum allowable release rate for this portion of the site. Refer to **Appendix E** for detailed SWM calculations.

### *2.3.5 Post-Development Flows to South Outlet Sewer*

To maintain consistency with the previously approved 'Stormwater Management Plan, Kanata Research Park Report'[2], post-development stormwater flows from sub-catchment Areas B-0 to B4 (570 March Road) and C-0 to C-2 (520 March Road) will be controlled to a maximum release rate of 235.1 L/s, prior to being released into southern storm sewer system located on the KRP lands.

#### 2.3.5.1 Area B-0 – Uncontrolled Direct Runoff

The uncontrolled post-development flows from sub-catchment area B-0a, which sheet drain to Legget Drive, were calculated using the Rational Method to be approximately 2.0 L/s during the 2-year design event, 2.7 L/s during the 5-year design event and 5.7 L/s during the 100-year design event.

The uncontrolled post-development flows from sub-catchment area B-0b, which sheet drain to the adjacent Sanmina property (500 March Road), per existing conditions and to prevent impacts on the mature trees along the common property line, were calculated using the Rational Method to be approximately 3.0 L/s during the 2-year design event, 4.1 L/s during the 5-year design event and 8.8 L/s during the 100-year design event. Refer to the Post-Development Stormwater Management Plan (C-301) and **Appendix E** for detailed SWM calculations.

#### 2.3.5.2 Area B-1 – Controlled Flow from R&D Lab Building

The post-development flow from this sub-catchment area will be captured by the Lab Building and Loading Dock roof drains and directed to an internal SWM storage tank. Stormwater collected within the internal SWM cistern will be controlled prior to being discharged into the existing 525mm dia. storm sewer in Legget Drive, via the storm service lateral. The post-development flows will be attenuated by an ICD installed in the outlet pipe of CBMH 266, which will also act as the emergency overflow from the tank to the surface outside the building. The internal plumbing is to be pressure rated piping specified by the mechanical engineer.

**Table 3.8** 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 100-year design events.

**Table 3.8: Stormwater Flows, ICD & Storage**

| Design Event | Controlled Site Flows from Area B-1 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type D ICD | 22.5 L/s | 0.00 m (78.30 m) | 11.3 L/s | 135.8 m³ | ~400 m³ |
| 5-Year | | 27.2 L/s | 0.00 m (78.42 m) | 13.6 L/s | 188.4 m³ | |
| 100-Year | | 41.0 L/s | 0.00 m (78.90 m) | 20.5 L/s | 380.0 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

#### 2.3.5.3 Area B-2 – Controlled Flow from Plaza and Entrance Dropoff

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 260. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and within the landscaped bioswales prior to being discharged into the downstream storm sewer system. CSP culverts are also being proposed in the swale under the pedestrian walkways connecting the parking structure to the municipal sidewalk along March Road. A 500mm dia. CSP culvert with a 90% relative flow depth at a slope of 1.0% has a conveyance capacity of approximately 261.6 L/s and will therefore have adequate capacity to convey theoretical stormwater flows through the proposed swale. Refer to **Appendix E** for supporting calculations.

**Table 3.9** 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 100-year design events.

**Table 3.9: Stormwater Flows, ICD & Underground and Surface Storage**

| Design Event | Controlled Site Flows from Area B-2 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type D ICD | 31.9 L/s | 0.00 m (79.81 m) | 16.0 L/s | 48.3 m³ | ~163 m³ |
| 5-Year | | 35.8 L/s | 0.00 m (80.00 m) | 17.9 L/s | 71.2 m³ | |
| 100-Year | | 48.0 L/s | 0.00 m (80.73 m) | 24.0 L/s | 159.1 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

#### 2.3.5.4 Area B-3 – Controlled Flow from Parking Structure and Driveway

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of STMMH 110. Stormwater runoff from this sub-catchment area will be

temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

**Table 3.10** 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 100-year design events.

**Table 3.10: Stormwater Flows, ICD & Underground and Surface Storage**

| Design Event | Controlled Site Flows from Area B-3 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type D ICD | 23.7 L/s | 0.00 m (78.64 m) | 11.9 L/s | 222.2 m³ | ~607 m³ |
| 5-Year | | 29.8 L/s | 0.00 m (78.79 m) | 14.9 L/s | 303.3 m³ | |
| 100-Year | | 46.0 L/s | 0.0 m (79.36 m) | 23.0 L/s | 603.6 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

#### 2.3.5.5 Area B-4 – Controlled Flow from South Access Route

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of STMMH 116. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

**Table 3.11** 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 100-year design events.

**Table 3.11: Stormwater Flows, ICD & Underground and Surface Storage**

| Design Event | Controlled Site Flows from Area B-4 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type C ICD | 19.6 L/s | 0.00 m (78.11 m) | 9.8 L/s | 127.4 m³ | 365 m³ |
| 5-Year | | 23.7 L/s | 0.00 m (78.26 m) | 11.9 L/s | 176.5 m³ | |
| 100-Year | | 35.0 L/s | 0.00 m (78.83 m) | 17.5 L/s | 358.0 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

#### 2.3.5.6 Area C-0 – Uncontrolled Direct Runoff from Access Route

The uncontrolled post-development flow from sub-catchment area C-0, which sheet drains to the adjacent Sanmina property (500 March Road) per existing conditions and to prevent impacts on the mature trees along the common property line, were calculated using the Rational Method to be approximately 2.7 L/s during the 2-year design event, 3.7 L/s during the 5-year design event and 7.9 L/s during the 100-year design event. Refer to the Post-Development Stormwater Management Plan (C-301) and **Appendix E** for detailed SWM calculations.

#### 2.3.5.7 Area C-1 – Controlled Flow from the Retained Lands

The post-development flows from this sub-catchment area under interim conditions will be attenuated by an ICD installed in the outlet pipe of CB 208 and temporarily stored on the surface, prior to being discharged into the downstream storm sewer system. When the property is fully developed in the future, flows from this sub-catchment area must match the pre-development allotted release rate specified in this report.

**Table 3.12** summarizes the temporary 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 100-year design events.

**Table 3.12: Stormwater Flows, ICD & Internal SWM Storage**

| Design Event | Controlled Site Flows from Area C-1 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type B ICD | 26.1 L/s | 0.17 m (80.17 m) | 13.1 L/s | 8.6 m³ | 65.5 m³ |
| 5-Year | | 26.5 L/s | 0.21 m (80.21 m) | 13.3 L/s | 15.0 m³ | |
| 100-Year | | 27.0 L/s | 0.30 m (80.30 m) | 13.5 L/s | 49.6 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and **Appendix F** for ICD information.

#### 2.3.5.8 Area C-2 – Controlled Flow from the Retained Lands ROW

The post-development flow from this sub-catchment area will be attenuated by an ICD installed in the outlet pipe of CBMH 261. Stormwater runoff from this sub-catchment area will be temporarily stored in underground stormwater storage chambers, within the storm sewer system, and potentially on the surface prior to being discharged into the downstream storm sewer system.

**Table 3.13** 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 100-year design events.

**Table 3.13: Stormwater Flows, ICD & Internal SWM Storage**

| Design Event | Controlled Site Flows from Area C-2 | | | | | |
|---|---|---|---|---|---|---|
| | ICD Type | Peak Flow | Ponding Depth/Elev. | ~Average Flow (50% Qpeak) | Storage Vol. Required* | Max Storage Provided |
| 2-Year | Tempest HF Type A ICD | 8.3 L/s | 0.00 m (78.59 m) | 4.2 L/s | 6.7 m³ | ~23.8 m³ |
| 5-Year | | 10.5 L/s | 0.00 m (78.74 m) | 5.3 L/s | 9.5 m³ | |
| 100-Year | | 15.0 L/s | 0.00 m (79.38 m) | 7.5 L/s | 21.1 m³ | |

*Storage volumes are based on the 50% Qpeak flow rates, which generally represents the average flow.

Refer to **Appendix E** for detailed SWM calculations and to **Appendix F** for ICD information.

#### 2.3.5.9 Summary of Post- Development Flows to South Stormwater Outlet

As indicated in **Tables 3.8** to **3.13**, the respective sub-catchment areas will provide sufficient storage for the 2-year, 5-year and 100-year design events, whether underground or on the grassed surface of the Retained Lands. The site has also been designed to ensure that no stormwater will pond on the paved surfaces during the 2-year storm event. Furthermore, the site grading design will ensure that surface ponding depths will not touch the building envelope or lowest building openings during the 100-year+20% stress test.

**Table 3.14** compares the post-development site flows from the proposed development to the maximum allowable release rate for the 2-year, 5-year, and the 100-year design events.

**Table 3.14: Stormwater Flow Comparison Table**

| Design Event | Pre-Dev. Conditions | Drainage Areas B and C | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Post-Development Conditions | | | | | | | | |
| | Max Release Rate (L/s) | B-0 Flow (L/s) | B-1 Flow (L/s) | B-2 Flow (L/s) | B-3 Flow (L/s) | B-4 Flow (L/s) | C-0 Flow (L/s) | C-1 Flow (L/s) | C-2 Flow (L/s) | Total Flow (L/s) |
| 2-Yr | **235.1 L/s** | 5.0 | 22.5 | 31.9 | 23.7 | 19.6 | 2.7 | 26.1 | 8.3 | **139.8** |
| 5-Yr | | 6.8 | 27.2 | 35.8 | 29.8 | 23.7 | 3.7 | 26.5 | 10.5 | **164.0** |
| 100-Yr | | 14.5 | 41.0 | 48.0 | 46.0 | 35.0 | 7.9 | 27.0 | 15.0 | **234.4** |

As indicated in the table above, the 2-year, 5-year and 100-year post-development flows will be less than the maximum allowable release rate for this portion of the site. Refer to **Appendix E** for detailed SWM calculations.

### *2.3.6 Stormwater Quality Control*

Typically, stormwater quality control measures are required for drive aisles and paved parking areas. Building roofs and landscaped areas are generally considered clean for the purposes of water quality and aquatic habitat protection. The building roofs and landscaped areas comprise approximately 86% of the total site area. Nevertheless, on-site stormwater quality control will be provided based on recommendations from the MVCA.

On-site stormwater quality control will be achieved using a "treatment train", with flows being treated by a combination of rain gardens in landscaped areas, bioswales in the front entrance and courtyard, and oil and grit separator (OGS) units installed at the site's north and south stormwater outlets. Flows entering the municipal storm sewer system from the R&D Lab building will not require on-site stormwater quality control, as runoff from buildings roofs are deemed clean from a water quality perspective. Additional stormwater quality treatment will be provided by the existing downstream SWM Facility located on adjacent KRP lands, as outlined in the previously approved 'Stormwater Management Plan, Kanata Research Park'[2]. This design is consistent with the MVCA's quality control recommendations, as outlined in the approved 'Assessment of Adequacy of Public Services Report'[4]. Refer to **Appendix A** for correspondence with the MVCA, and to **Appendix I** for the OGS unit design parameters, sizing analysis, and annual TSS removal efficiency rates.

Most of the on-site parking will be provided within the 3-storey parking structure and stormwater runoff from the upper level of the parking garage and other paved areas, including the driveways, south service road and Lifestyle Street will be stored within underground SWM storage chambers. Stormwater runoff from the visitor parking area and central courtyard will be directed to nearby bioswales, thus eliminating the potential for stormwater management on the surface of paved parking lots prone to increase water temperatures. Furthermore, runoff from the R&D Lab roof will be directed to an internal SWM cistern. As a result, many thermal mitigation measures will be implemented into the overall SWM design per the recommendations outlined in the MVCA's Shirley's Brook 2016 Summary Report.

## 3.0 ANTICIPATED SITE SERVICING EASEMENTS & JOINT USE MAINTENANCE AGREEMENTS

Easement(s) and Joint Use Maintenance Agreement(s) (JUMA) are anticipated to be required for the following site servicing infrastructure; however, the details remain to be finalized:

### Sanitary Sewers

- The proposed sanitary sewer between SANMH 7a and the property line east of SANMH 11 will require an easement over the Nokia Campus and a JUMA to service the future development of the Retained Lands (520 March Road), as there is no existing sanitary sewer in March Road, along the frontage of the 520 March Road property.
- Should the future development of the mixed-use lands to the north (600 March Road) require a connection to the sanitary sewer in Lifestyle Street (due to the excess capacity available as described in Section 2.1.1 above), then an easement and updated JUMA would be required between SANMH 1 and the property line just east of SANMH 5a.

### Watermain

- As discussed with City staff, the proposed private 305mm dia. watermain will require an easement over the 520 Legget Drive property to facilitate a looped watermain network that is necessary to service the Nokia campus (570 March Road).
- An easement and a JUMA between the west property line of the Nokia campus (570 March Road) and the east property line of the Retained Lands (520 March Road) will be required to facilitate a watermain feed for the Retained Lands as there is no existing watermain in March Road, along the frontage of the 520 March Road property.
- Should the future development of the mixed-use lands to the north (600 March Road) require a connection to the private watermain network within the Lifestyle Street (as described in

Section 2.2.1 above), then an easement over the Nokia Campus and a JUMA would be required.

**Storm Sewers**

- The proposed storm sewer between the property line south of STMMH 107 and the property line east of STMMH 109 will require an easement over the Retained Lands (520 March Road) property to convey flows from the Nokia entrance drop-off and plaza area to the existing storm sewer in Legget Drive.
- The proposed storm sewer segments between the property line east of STMMH 109 & CBMH 261 and the property line east of OGS Unit 2 will require an easement(s) over the Nokia Campus (570 March Road) and a JUMA to convey stormwater flows from the Retained Lands (520 March Road) to the existing storm sewer in Legget Drive. As indicated on the previously approved Storm Drainage Area Plan (98066-STM), the intent was always to convey flows from this area to the storm sewer system on KRP lands via the municipal storm sewer in Legget Drive.
- There is no excess capacity within the proposed storm sewer in Lifestyle Street to allow for possible flows from the future development of the mixed-use lands to the north (600 March Road). As a result, there would be no need for a future easement or JUMA for the storm sewers within Lifestyle Street.

## 4.0 SITE GRADING

The existing site generally slopes in a northeastern direction from March Road down to Legget Drive. Under post-development conditions, the proposed Lifestyle Street ROW will slope down along the northwest property line from 82.63m at March Road to 79.81m at Legget Drive. The proposed service road at the south end of the subject site will drop from approximately 81.20m at March Road to 79.45m at Legget Drive. The finished floor elevations (FFE) of the proposed buildings have been set based on the existing topography and elevation of the internal roadways and will range from 82.50m (Office Tower, Parking Structure, Central Link and Courtyard), 82.25m (Retail West), 82.00m (R&D Lab Building) and 81.65m (Retail East). The major overland flow route is shown on the enclosed Grading and ESC Plan (C-200).

## 5.0 GEOTECHNICAL INVESTIGATIONS

The Geotechnical Investigation and Hydrogeological Assessment (No.: PG12646241-RPT-2), dated February 7, 2025, has been prepared by GHD for the proposed development. Groundwater levels were measured at depths ranging from 0.78-6.02 meters below ground surface. All proposed sewers and maintenance holes installed lower than 0.6m below the Seasonally High Groundwater Table have been designed to minimize infiltration in accordance with the MECP Guidelines for Sewers Installed Below Seasonally High Groundwater Table. Several water-tight measures have been implemented in the servicing design per recommendations from this report, including water-tight pipe joints, water-tight manhole frame and covers, non-woven geotextile around underground SWM tanks, and pipeline/chamber buoyancy mitigation measures where required. Refer to the Geotechnical Report[5] for subsurface conditions, construction recommendations and geotechnical inspection requirements.

## 6.0 EROSION AND SEDIMENT CONTROL

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

- Filter bags / catch basin inserts (sediment sacks) will be placed under the grates of nearby catchbasins and manholes and will remain in place until vegetation has been established and construction is completed.
- Silt fencing will be placed per OPSS 577 and OPSD 219.110 along the surrounding construction limits.
- Mud mats will be installed at the site entrances.
- Street sweeping and cleaning will be performed, as required, to suppress dust and to provide safe and clean roadways adjacent to the construction site.
- On-site dewatering is to be directed to a sediment trap and/or gravel splash pad and discharged safely to an approved outlet as directed by the engineer.
- Any stockpiled material will be properly managed to prevent those materials from entering the sewer system and/or the downstream ditch or watercourse.

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

## 7.0 CONCLUSION

This report has been prepared in support of a Site Plan Control application for the proposed Nokia Ottawa Innovation Campus located at 570 March Road.

The conclusions are as follows:

- Sanitary flows from the buildings will be directed to the private sanitary sewers and/or directly to the municipal sanitary sewer in Legget Drive. This will be facilitated by extending the 250mm dia. sanitary sewer along Legget Drive and installing new private 250mm dia. sanitary sewers in the proposed Lifestyle Street and south service road.
- The proposed watermain extension along Legget Drive will provide water service to the site and allow for the creation of a looped watermain network on-site, with the second connection being made to the 203mm dia. water service that currently services the 515 Legget Drive property. The looped watermain network will provide the necessary building service redundancy and will allow for system maintenance without service disruption. Adequate water and system pressures will exist throughout the watermain network under the specified ‘Max Day + Fire Flow’ and ‘Peak Hour’ conditions’ under **Scenario 1**. Although the fire flow conditions cannot be fully met for all buildings under **Scenario 2**, the partial fire flow would represent an improvement over existing conditions that do not provide any fire flow during the potential closure of the 610mm dia. backbone watermain in Legget Drive and is considered an interim measure until such time as the 305mm dia. municipal watermain is extended south along Legget Drive.
- The proposed Nokia buildings, excluding the open-air parking garage, will be fully sprinklered.

- The proposed stormwater design control measures will reduce peak flows into the storm sewer system.
    - Post-development flow from sub-catchment areas A-1 and A-2 will be controlled by inlet control devices (ICD) installed within the on-site storm sewer system, while flows from the building roofs area A-3 to A-6 will be attenuated by control flow roof drains.
    - Post-development flow from sub-catchment area B-1 will be directed to an internal SWM tank and controlled prior to being discharged into the 525mm dia. municipal storm sewer in Legget Drive, via the building service.
    - Post-development flow from sub-catchment areas B-1 to B-4 and C-1 to C-2 will be controlled by ICDs installed within the on-site storm sewer system.
    - The total post-development flow from the northern portion of the subject site will be approximately 41.4 L/s during the 2-year design event, 47.3 L/s during the 5-year event and 63.6 L/s during the 100-year event, all less than the maximum allowable release rate of 63.8 L/s.
    - The total post-development flow from the southern portion of the subject site will be approximately 139.8 L/s during the 2-year design event, 164.0 L/s during the 5-year event and 234.4 L/s during the 100-year event, all less than the maximum allowable release rate of 235.1 L/s. All post-development flows are also significantly reduced when compared to current uncontrolled conditions.
- Regular inspection and maintenance of the storm sewer system, including the inlet control devices, control flow roof drains, internal SWM cistern and oil and grit separator (OGS) water quality treatment units is recommended to ensure that the storm drainage system is clean and operational.
- On-site stormwater quality control will be achieved using a “treatment train”, with flows being treated by a combination of rain gardens in landscaped areas, bioswales in the front entrance and courtyard, and OGS units installed at the site’s north and south stormwater outlets. Additional stormwater quality treatment will be provided by the existing downstream SWM Facility located on adjacent KRP lands.
- All proposed sewers and maintenance holes installed lower than 0.6m below the Seasonally High Groundwater Table have been designed to minimize infiltration through the implementation of water-tight measures outlined in the Geotechnical Report.
- Erosion and sediment controls are to be provided during construction.

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

**NOVATECH**

Prepared by: 

Reviewed by: 


Kynan D’sa, B.A.Sc.
Design Technologist

François Thauvette, P. Eng.
Senior Project Manager

# APPENDIX A

## Project Correspondence

# Pre-Application Consultation
## Site Plan Control

**570 March Road** Meeting Date: 2023.02.08

| | | | |
|---|---|---|---|
| **Owner:** | Nokia Canada Inc. | **Ward:** | 4 – Kanata North |
| **Applicant:** | Peter Henley, First Gulf | **Councillor:** | Cathy Curry |

**Proposal Summary:** To permit the development of the new Nokia Canada corporate headquarters and office.

| **Attendees:** | **Internal** | **External** |
|---|---|---|
| | Krishon Walker, Planner II, Economic Development Services | Peter Henley, Development Manager, First Gulf |
| | Nader Kadri, Planner II, Public Realm and Urban Design | Peter Nikolakakos, EVP, Development & Planning, First Gulf |
| | Max Walker, Sr. Project Manager, Transportation Planning | Andrew Srgo, Director, Development at First Gulf Corporation |
| | Mike Giampa, Sr. Transportation Project Manager, Planning Services | Aaron Clodd, Director, Development Management, Colliers |
| | Adwoa Achireko, Planner (*coop*), Planning Services | |
| | Samuel Farkas, Planner (*coop*), Planning Services | |

### Meeting Notes

**Planning Comments (Provided by Krishon Walker)**

- The site is located within the City's Suburban Transect as outlined on Schedule A – Transect Policy Areas of the Official Plan, is designated Kanata North Economic District on Schedule B5 – Suburban (West) Transect of the Official Plan (the Plan) and is along the March Road Mainstreet Corridor. The Kanata North Economic District is one of two Special Economic Districts identified in the Plan and is intended to support the City's economic development and growth.
- The site is currently zoned as Mixed-Use Centre Zone, Urban Exception 2816, Holding Provision (MC[2816]-h) and is currently subject to a Zoning By-law Amendment application which is scheduled to be considered by the Planning and Housing Committee on February 27, 2023, and City Council on March 8, 2023. Please ensure that your proposal complies with all applicable provisions under the Zoning By-law.
- Given that the proposed site redevelopment is a significant development initiative that support the City's Economic Development Strategy and city building priorities and has identified by the as a High Economic Impact Project (HEIP). As such, it will be managed by the Economic Development Services team.
- Please ensure that Site Plan clearly show:
  - Title, location and date of the project. The title and location referenced on plans and studies should be consistent.

- The name and address of the owner and applicant, architect(s), designer(s), engineer(s) and surveyor(s) with their full address including Postal Code and telephone number.
- Legend (including bar scale and written ratio scale in metric, and any graphic symbols used) on the plan.
- North arrow (orientated to the top of the page).
- Area of site, and bearings and lengths of all property lines.
- Clear delineation of limit of site development and existing features within 5 metres of limit. This includes the retained parcel along March Road as a driveway is proposed to run across that site.
- Location of buildings, site features and landscape elements on adjacent land and in the public right-of ways.
- Existing features to be retained, removed or relocated.
- Areas labelled by function or type (landscape areas, parking areas, access points, etc.).
- Proposed fire route and fire route sign locations.
- Dimensions of all proposed buildings, roads, radii of turns, overhead clearances, parking areas with defined parking spaces, steps, terraces, fences, walks, aisles and private approaches (driveways).
- Dimensions required for zoning compliance.
- Gross floor area of all buildings.
- Location of snow storage. Storage shall not interfere with approved grading and drainage patterns or servicing. If snow is to be removed from the site, then please make a note of that on the Site Plan and include where the snow will be placed in the interim. Temporary snow storage areas should not conflict with utility box, landscaping, required parking, and site circulation.
- Waste management and recycling enclosure location and design details
- Pedestrian walking areas and surface treatment/materials

▪ Please ensure that Landscape Plan clearly show:

- Title, location and date of the project. The title and location referenced on plans and studies should be consistent.
- The name and address of the owner and applicant, architect(s), designer(s), engineer(s) and surveyor(s) with their full address including Postal Code and telephone number.
- Legend (including bar scale and written ratio scale in metric, and any graphic symbols used) on the plan.
- North arrow (orientated to the top of the page).
- Existing plant material to be retained, removed or relocated on site and within the road allowance:
  - In a table, include species type, size and condition of all existing plant material.
  - Describe and/or illustrate the conservation methods during and after construction.
- Proposed vegetation – trees, shrubs, ground covers to be planted on site and within the road allowance:
  - In a table, list each species including its common and botanical names, size, total quantity, and its condition or special requirements (example - bare root, 4" pot, 2-year old stock etc.).
- Location of existing and proposed site features including, electrical transformer boxes, utility pedestals, light standards, overhead wires, or below grade services, mail boxes, bus stops, snow storage areas, waste management and recycling enclosure, or other features that may impact on the location of landscape elements.
- Location, materials, dimensions and design details of existing and proposed landscape elements such as retaining walls, railings, site furniture, decorative and acoustical fencing, gateways features, signs, etc.

- Location of buildings, site features and landscaping on adjacent land and in the public right-of ways.
- Note and/or dimension any offsets from site features and landscape elements required for technical reasons or zoning compliance.
- Turf areas noting seed, sod or other treatments.
- Pedestrian walking areas and surface treatment/materials.

- As you are proposing to have a driveway across the retained parcel along March Road, you will need to establish an easement across the site. Please consider reorienting that driveway so that it does not run across the entire frontage of that site, limiting access via March Road.

Feel free to contact Krishon Walker at Krishon.Walker@ottawa.ca for follow-up questions.

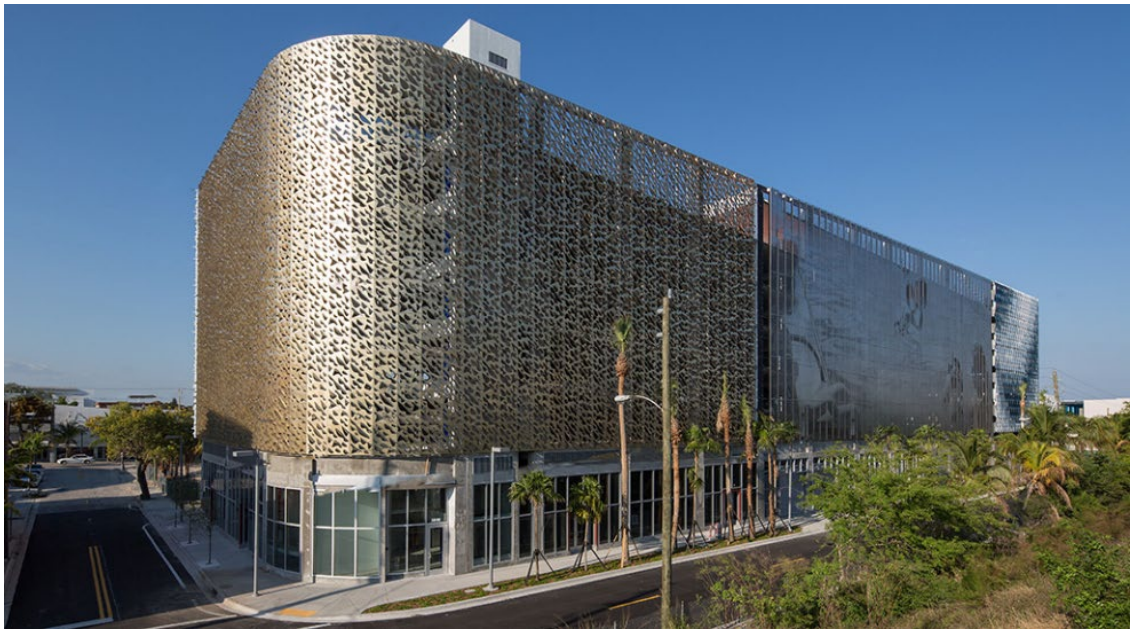
**Urban Design Comments (Provided by Nader Kadri)**

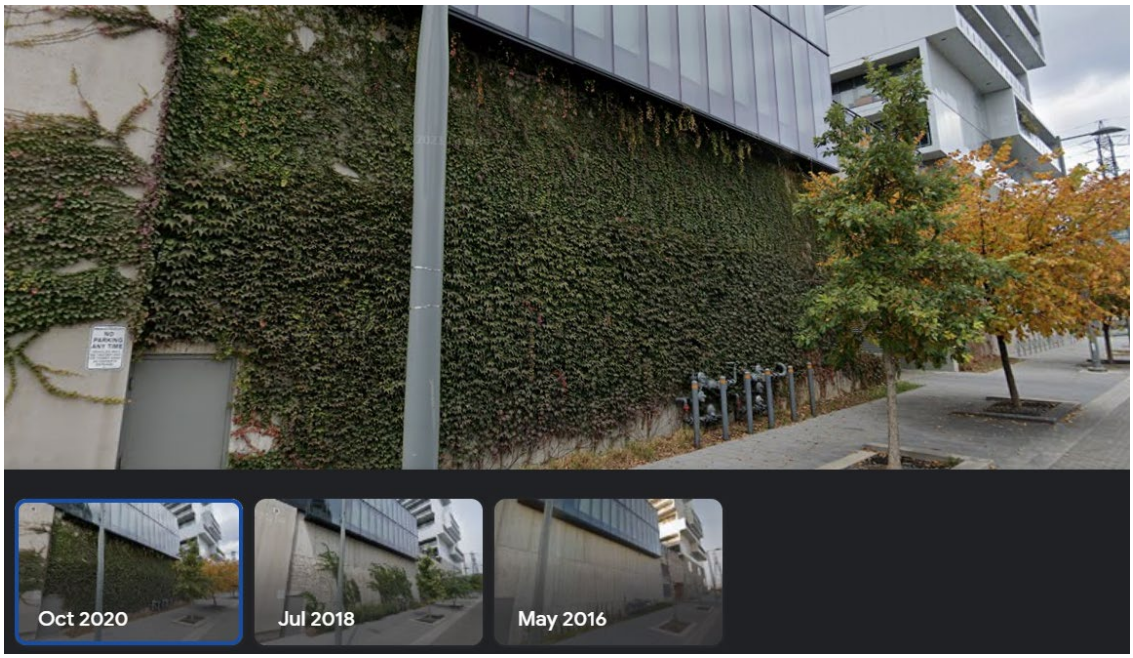
General Comment

- The site is with a Design Priority Area. You are encouraged visit to the UDRP even though a visit to the UDRP is not required for properties within the Kanata North Economic District.
- A Design Brief required. Please refer to the attached Terms of Reference.

Public Realm

- Treatment of the building along proposed "lifestyle street" appropriate. Would like additional details on how the lifestyle street, including cross sections and paver treatment patterns.
- Per the criteria in OP, there needs to be more consideration to how the development interacts with the existing public streets. As proposed, the development turns it back on March Road and Legget Drive. Recommend at-grade retail or non-residential uses (amenity for office users). For areas where this is not possible, consider green walls and murals. See examples below:






- Public realm treatment needed – please refer to criteria in the OP for March Road and Legget Drive.
  - Sidewalk details needed – please go beyond the 2 metre minimum.
  - The March Road connection is especially important in the context of the Phase 2 commercial parcel.
  - Recommend heavy planting between the building and the sidewalk in addition to the double alley of trees contemplated through the OPA.
- Per the OP, surface parking in and around the pick-up drop off area along March Road needs to be removed. This area should be treated like a woonerf.
- Details on the equipment yard, and its relationship to Legget Drive are needed.

Public Realm

- Appreciate the three dimensionality of the façades.
- Please detail sustainability strategy as part of your formal submission.
- Explore the potential for additional green roofs.

Feel free to contact Nader Kadri at Nader.Kadri@ottawa.ca for follow-up questions.

**Transportation Comments (Provided by Mike Giampa)**

- An updated TIA is required.

Feel free to contact Mike Giampa at Mike.Giampa@ottawa.ca for follow-up questions.

**Transportation Planning Comments (Provided by Max Walker)**

- By over-providing parking spaces and a full-access intersection along March Road, we continue to encourage vehicular usage and maintain the existing transportation equilibrium rather than supporting the City's investment in transit, i.e. the March Rd BRT. By increasing the friction and cost of driving at the source, i.e. reduced parking spaces and convenience of vehicular use, we are working toward achieving a balance between modes of transportation and providing an incentive to reduce the total travel time of journeys, help create a city of proximity, reduce the equity gap and minimize the ecological footprint of transportation.

- We look forward to reviewing an updated TIA to better understand the site's mobility patterns. For the area within 600m of transit stations, it is suggested that they proceed with typical TOD modal shares(15% Auto; 5% Auto Passenger, 65 %Transit, 15% Other).
- To support the shift towards sustainable transportation modes and build healthy communities, we must also provide positive incentives to encourage the adoption of a car-free lifestyle. This could mean breaking up the superblocks on both sides of the street through an active transportation connection and ensuring the continuity of the 'lifestyle street'.

Feel free to contact Max Walker at Max.Walker@ottawa.ca for follow-up questions.

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*Application Submission Information*

Application Type**: Complex – Manager's Approval**

Site plan control application approval timelines vary based on the development complexity, scale, the quality of the submission and public consultation process if applicable. The legislated timeline under the Planning Act is 60 days. 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

Prior to submitting a formal application, it is recommended that you pre-consult with the Ward Councillor, Cathy Curry.

For information on application fees, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/fees-and-funding-programs/development-application-fees

To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre: InformationCentre@ottawa.ca or (613) 580-2424 ext. 44455

*Application Submission Requirements*

For information on the preparation of Studies and Plans and the City's requirements, please visit: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

**Please provide electronic copies (PDF) of all plans and studies required. Hard copies are not required at this time.**

**Note that many of the plans and studies collected with this application must be signed, sealed and dated by a qualified engineer, architect, surveyor, planner or designated specialist.**

## Francois Thauvette

**From:** Andrew Sgro <asgro@firstgulf.com>
**Sent:** Tuesday, November 7, 2023 11:45 AM
**To:** Francois Thauvette
**Cc:** Peter Henley; Peter Nikolakakos
**Subject:** Nokia - Updated Municipal Pre-Con Comments

Francois – see below for the updated comments from the City:

Apologies, there seemed to be some confusion between sites.

The watermain pre-consultation notes should have been in keeping with the February 2, 2022 Notes, and the following would apply to water:

a) A new local watermain will be required on Legget Drive. Connection to the 610mm diameter transmission watermain will not be permitted. A water boundary condition request is needed for any new water connection to the City main.
b) Existing watermain connections may be considered for interim phasing. Further comments to be provided at the Site Plan Control stage.
c) As per Section 4.4.7.2 of the Ottawa Design Guidelines – Water Distribution, a DMA (District Metering Area) chamber will be required for private developments serviced by a connection 150mm or larger.
d) Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development.

Sanitary should have read:

Sanitary Infrastructure:

a) A new local sanitary sewer will be required on Legget Drive. The 750 mm sanitary sewer on Legget Drive, south of Solandt Road, should have capacity to accommodate this redevelopment. Additional information on sewer capacity will be available once the Wastewater Master Plan is complete (anticipated June 2022).
b) Existing sanitary connections may be considered for interim phasing. Further comments to be provided at the Site Plan Control stage.
c) The City would not accept a development of this scale to outlet to the private sanitary sewer that currently exists east of Legget Drive, through the Kanata Research Park lands.

Stormwater Management Criteria:

For the subject site, is to be based on the following: a) Please refer to following background reports: Planning, Infrastructure and Economic Development Department Services de la planification, de l'infrastructure et du développement économique a. Shirley's Brook and Watts Creek Subwatershed Study, prepared by Dillon Consulting Ltd., 1999 b. Kanata Research Park, Storm Water Management Report, prepared by Novatech, dated June 1987 c. Stormwater Management Plan, Kanata Research Park, City of Kanata, prepared by Novatech, dated April 2000 d. Kanata Research Park Subdivision Design Brief, prepared by Novatech, dated August 2000 The stormwater management criteria shall be in

accordance with the minor and major system storm allocations presented in the above mentioned reports.
b) If the capacity of the receiving storm sewer is in question, over-controlling may be required, in which case all runoff must be controlled to the 2-year predevelopment level, and all flow depth must be controlled on-site. In such a case the pre-development condition will be determined using the smaller of a runoff coefficient of 0.5 or the actual existing site runoff coefficient.
c) Quality control to be provided as specified by the MVCA. d) Review of the existing legal agreements related to the private SWM pond outlet located to the east on KRP lands will be reviewed at the Site Plan Control stage.

Sorry for the confusion, the notes provided had been miss-filed.
Thanks,
Eric Surprenant, CET
Sr, Project Manager, Infrastructure Projects, West
Planning, Real Estate & Economic Development
613 580-2424 ext.: 27794

FIRST GULF

**Andrew Sgro**
Director Development

T: 416.773.7140 C: 437.223.6027
351 King Street East, 13th Floor
Toronto, ON, Canada M5A 0L6

*Please do not feel obliged to reply to this email outside of your normal working hours.*

## Jaymeson Adams

**From:** Tim Kennedy
**Sent:** April 25, 2022 10:29 AM
**To:** Jaymeson Adams
**Cc:** Gavin Joseph
**Subject:** FW: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

File: A001218

Hi Jaymeson,

Please see below from MVCA and ensure one of you gets this added to the appendices and the body of the report as required.

Thanks,
Tim

**TIM KENNEDY,** P.Eng.
Senior Project Manager / Infrastructure

**T** 613-860-2462 ext. 6620 **M** 613-462-3627 **F** 613-860-1870
110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA

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**From:** Erica Ogden <eogden@mvc.on.ca>
**Sent:** Monday, April 25, 2022 9:59 AM
**To:** Tim Kennedy <Tim.Kennedy@cima.ca>
**Cc:** Matt Craig <mcraig@mvc.on.ca>
**Subject:** RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

EXTERNAL EMAIL

Hello Tim,

Our engineering staff would have to review the particular approach proposed, but we have previously accepted a combination of approaches to meet the water quality requirements.

Thank you,

**Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority**
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |c. 613 451 0463 |o. 613 253 0006 ext. 229| eogden@mvc.on.ca

---

**From:** Tim Kennedy <Tim.Kennedy@cima.ca>
**Sent:** April 25, 2022 9:50 AM
**To:** Erica Ogden <eogden@mvc.on.ca>
**Cc:** Matt Craig <mcraig@mvc.on.ca>
**Subject:** RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

Hi Erica,

Thanks for getting back to me.

We are certain the south cell of the pond can provide the 80% TSS removal from previous reports (this was built more recently).

For the area released to the north cell we would look at adding a mechanical separator (and possibly LID's) to achieve the 80% TSS removal.

Would this approach meet the requirements of the MVCA for water quality control?

Thanks again!
Tim

---

**TIM KENNEDY,** P.Eng.
Senior Project Manager / Infrastructure

**T** 613-860-2462 ext. 6620 **M** 613-462-3627 **F** 613-860-1870
110–240 Catherine Street, Ottawa, ON K2P 2G8 CANADA




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---

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**From:** Erica Ogden <eogden@mvc.on.ca>
**Sent:** Monday, April 25, 2022 9:28 AM
**To:** Tim Kennedy <Tim.Kennedy@cima.ca>
**Cc:** Matt Craig <mcraig@mvc.on.ca>
**Subject:** RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

EXTERNAL EMAIL

Good Morning Tim,

My apologies for the delay in responding. MVCA has reviewed the subject properties and offer the following comments. The subject properties are not regulated by MVCA under Ontario Regulation 153/06.

We do not have information available to confirm the water quality treatment provided by the existing pond. An enhanced level of water quality treatment (80% TSS Removal) is recommended for the site. Please review the Shirley's Brook and Watts Creek Subwatershed Study for further information regarding Shirley's Brook.

MVCA completed a Catchment Report for Shirley's Brook in 2016 as a part of the City Stream Watch program which may also provide some relevant background materials.

I also recommend you contact the City of Ottawa to discuss the proposed development, as they may have additional requirements or restrictions.

If you have any questions, please feel free to contact me.

Thank you,

**Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority**
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |c. 613 451 0463 |o. 613 253 0006 ext. 229| eogden@mvc.on.ca

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**From:** Matt Craig <mcraig@mvc.on.ca>
**Sent:** April 20, 2022 3:46 PM
**To:** Erica Ogden <eogden@mvc.on.ca>
**Subject:** FW: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

---

**From:** Tim Kennedy <Tim.Kennedy@cima.ca>
**Sent:** April 20, 2022 3:05 PM
**To:** Matt Craig <mcraig@mvc.on.ca>
**Subject:** RE: 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

Hi Matt,

Just wanted to follow up on the email below.

Did you get a chance to look at this one? We are hoping to wrap up our report this week. Let me know if we should have a quick meeting to discuss.

Thanks,
Tim

**TIM KENNEDY,** P.Eng.
Senior Project Manager / Infrastructure

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**From:** Tim Kennedy
**Sent:** Thursday, April 14, 2022 12:22 PM
**To:** mcraig@mvc.on.ca
**Cc:** Jaymeson Adams <Jaymeson.Adams@cima.ca>; Gavin Joseph <Gavin.Joseph@cima.ca>
**Subject:** 570 & 600 March Road - MVCA Pre-Consultation - SWM Criteria

Good afternoon Matt,

We are working on a development project in the City of Ottawa and I wanted to get your input on Natural Heritage/Hazards features that may impact the development as well as any Storm Water Management Criteria for the site and required approvals/permits. Note that this file is sensitive in nature and we appreciate your discretion on this one.

The proposed development will be split into two areas as follows:

- North Site Area - Approximately 9 residential buildings are proposed to the north, ranging in height from 7 to 29 storeys. Approximately 1900 residential units are proposed. Retail uses are proposed on the ground floor of a number of the buildings, with a total floor area of approximately 8,250 m2. Approximately 1900 residential parking spaces are planned and 250 retail parking spaces. Most of the parking would be located in underground parking garage but some is also expected along the proposed private roadway.
- South Site Area - The current Nokia office/lab space will be relocated to the south end of the site. Three new buildings are proposed with a total floor area of 49,100 m2, which includes the laboratory, office and parking garage, with interconnecting podium and ground floor retail of 3,100 m2. Approximately 1344 parking spaces are planned within an above grade parking garage.

I have attached a key plan with the site location as well as the flow path for the storm sewers currently servicing the site. Currently the north site area drains to the north cell of the pond shown in the attached sketches, while the south area drains to the south cell of the pond. The ponds outlet to Shirley's Brook before making it's way to the Ottawa River, approximately 3.0 km northeast of the subject site.

Currently quality control of stormwater runoff for each site area is addressed off site in the existing ponds behind the Brook Street Hotel (see attached sketch for location) and as follows for additional information:

- North Site Area – The north site area currently flows to the north cell of the pond. Major and minor system flows will be limited to those flows currently sent to the pond. I have not been able to confirm the level of treatment in this cell of the pond from the available reports which are quite old. Can you confirm if the existing pond would still be sufficient in terms of quality control or if additional measures would be required?
- South Site Area – The south site area currently flows to the south cell of the pond. Again major and minor system flows would be limited to those flows currently sent to the pond from our site area. Section 3.0 and 3.2.2 of the attached

report identify that the south cell (Pond 1) will provide 80% TSS removal for this area of our site. I expect this would be sufficient.

Hoping to have a response rather quickly on this one in order to wrap up our report next week. Apologies for the late request.

If you need anything further please let me know. Feel free to call me on my cell if you would like to discuss or we could set up a Teams meeting.

Thanks and have a great long weekend!
Tim

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**TIM KENNEDY,** P.Eng.
Senior Project Manager / Infrastructure

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# APPENDIX B

## Development Servicing Study Checklist

# Servicing study guidelines for development applications

## 4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

### 4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☒ 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.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ 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.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☒ 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).
- ☒ 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 neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ 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.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

### 4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☒ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ 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.
☒ 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.
☒ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☒ Address reliability requirements such as appropriate location of shut-off valves
☐ Check on the necessity of a pressure zone boundary modification.
☒ 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

- ☒ 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.
- ☐ 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.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

### 4.3 Development Servicing Report: Wastewater

- ☒ 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).
- ☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☒ 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.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☐ 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)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ 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).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

### 4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ 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.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ 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.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☒ 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.
- ☒ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☐ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ 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.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

### 4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ 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.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

### 4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☐ 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.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

# APPENDIX C

## Sanitary Sewage Calculations, Sanitary Sewer Design Sheet

# 570 & 520 March Road - Nokia Innovation Campus
## Summary
## SANITARY SEWAGE ANALYSIS

| Nokia Campus Peak Sanitary Flow | | |
|---|---|---|
| 8-Storey Office Tower | 1.01 | L/s |
| 1-Storey Retail West | 0.37 | L/s |
| **Subtotal - Retail West Outlet** | 1.38 | L/s |
| 1-Storey Retail East | 0.30 | L/s |
| 2-Storey Social Café | 0.41 | L/s |
| **Subtotal - Retail East Outlet** | 0.71 | L/s |
| 5-Storey R&D Lab Building | 1.06 | L/s |
| **Subtotal - R&D Lab Outlet** | 1.06 | L/s |
| 3-Storey Parking Garage | 0.31 | L/s |
| **Subtotal - Parking Garage Outlet** | 0.31 | L/s |
| Assumed Future 8-Storey Office Building | 0.91 | L/s |
| **Subtotal - Retained Lands Outlet** | 0.91 | L/s |
| Right-of-Ways | 0.65 | L/s |
| **Subtotal - Other Site Infiltration** | 0.65 | L/s |
| **Total Peak Sanitary Flow** | **5.01** | **L/s** |

# 570 March Road - Nokia Innovation Campus
## 8-Storey Office Tower
## SANITARY SEWAGE ANALYSIS

| **Nokia Campus - Office Tower** | | |
|---|---|---|
| Office Design Population | 700 | |
| Average Daily Sanitary Flows | 75 | L/person/day |
| Peaking Factor | 1.50 | |
| **Peak Office Flows** | **0.91** | L/s |
| **Extraneous Flow** | | |
| Area | 0.285 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | 0.09 | L/s |
| **Total Peak Sanitary Flow** | **1.01** | **L/s** |

# 570 March Road - Nokia Innovation Campus
## 1-Storey Retail West
## SANITARY SEWAGE ANALYSIS

| **Nokia Campus - Retail West Commericial** | | |
|---|---|---|
| Quick Service Design Population | 50 | seats (used 3x/day) |
| Average Daily Sanitary Flows | 125 | L/seat/day |
| Peaking Factor | 1.5 | |
| **Peak Commericial Flows** | **0.33** | L/s |
| **Extraneous Flow** | | |
| Area | 0.135 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | 0.04 | L/s |
| **Total Peak Sanitary Flow** | **0.37** | **L/s** |

# 570 March Road - Nokia Innovation Campus
## 1-Storey Retail East
## SANITARY SEWAGE ANALYSIS

| **Nokia Campus - Retail East Commericial** | | |
|---|---|---|
| Gym Design Population | 200 | Users (2x day) |
| Average Daily Sanitary Flows | 40 | L/user/day |
| Peaking Factor | 1.5 | |
| **Peak Commericial Flows** | **0.28** | L/s |
| **Extraneous Flow** | | |
| Area | 0.073 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | 0.02 | L/s |
| **Total Peak Sanitary Flow** | **0.30** | **L/s** |

# 570 March Road - Nokia Innovation Campus
## 2-Storey Social Café
## SANITARY SEWAGE ANALYSIS

| **Nokia Campus - Social Café** | | |
|---|---|---|
| Quick Service Design Population | 50 | seats (used 3x/day) |
| Average Daily Sanitary Flows | 125 | L/seat/day |
| Peaking Factor | 1.5 | |
| **Peak Commericial Flows** | **0.33** | L/s |
| **Extraneous Flow** | | |
| Area | 0.250 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | 0.08 | L/s |
| **Total Peak Sanitary Flow** | **0.41** | **L/s** |

# 570 March Road - Nokia Innovation Campus
## 5-Storey R&D Lab Building
## SANITARY SEWAGE ANALYSIS

| **R&D Lab Building** | | |
|---|---|---|
| Design Population | 600 | |
| Average Daily Sanitary Flows | 75 | L/person/day |
| Peaking Factor | 1.50 | |
| **Peak Office Flows** | **0.78** | L/s |
| **Extraneous Flow** | | |
| Area | 0.832 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | 0.27 | L/s |
| **Total Peak Sanitary Flow** | **1.06** | **L/s** |

# 570 March Road - Nokia Innovation Campus
## 3-Storey Parking Garage
## SANITARY SEWAGE ANALYSIS

| **Extraneous Flow** | | |
|---|---|---|
| Area | 0.953 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | **0.31** | L/s |
| **Total Peak Sanitary Flow** | **0.31** | **L/s** |

# 570 March Road - Nokia Innovation Campus
## Right-of-Ways
## SANITARY SEWAGE ANALYSIS

| **Upper Lifestyle Street + Plaza ROW** | | |
|---|---|---|
| Area | 0.590 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | **0.19** | L/s |
| **Lower Lifestyle Street ROW** | | |
| Area | 0.184 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | **0.06** | L/s |
| **Access Road + Workyard** | | |
| Area | 1.199 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | **0.40** | L/s |
| **Total Peak Sanitary Flow** | **0.65** | **L/s** |

# 520 March Road - Retained Lands
# Assumed Future 8-Storey Office Building
# SANITARY SEWAGE ANALYSIS

| **Retained Lands - Assumed Future Office Building** | | |
|---|---|---|
| Office Design Population | 500 | |
| Average Daily Sanitary Flows | 75 | L/person/day |
| Peaking Factor | 1.50 | |
| **Peak Office Flows** | **0.65** | L/s |
| **Extraneous Flow** | | |
| Area | 0.777 | ha |
| Infiltration Allowance | 0.33 | L/s/ha |
| **Peak Extraneous Flows** | 0.26 | L/s |
| **Total Peak Sanitary Flow** | **0.91** | **L/s** |

# SANITARY TRUNK SEWER
## Sanitary Sewer Design Sheet

PROJECT : 123043
DESIGNED BY: KD
CHECKED BY: FST
DATE: 2/7/2025

NOVATECH
Engineers, Planners & Landscape Architects

| LOCATION | | | INDIVIDUAL | | CUMULATIVE | | PEAK FLOWS | | | | PROPOSED SEWER | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AREA | FROM MH | TO MH | FLOW RATE (L/s) | Infiltration Area (ha) | FLOW RATE (L/s) | Infiltration Area (ha) | PEAK FACTOR M | PEAK FLOW Q (p) (L/s) | PEAK EXTRAN.FLOW Q(i) (L/s) | ***PEAK DESIGN FLOW Q (d) (L/s)*** | LENGTH (m) | PIPE SIZE (mm) | TYPE OF PIPE | GRADE % | CAPACITY (L/s) | FULL FLOW VELOCITY (m/s) | $Q/Q_{full}$ |
| Lifestyle Street | SAN MH 1 | SAN MH 2 | 0.00 | 0.00 | 0.00 | 0.00 | 1.5 | 0.00 | 0.00 | ***0.00*** | 23.2 | 250 | PVC | 0.35 | 36.70 | 0.72 | 0.00% |
| Office Tower + Retail West | NOKIA-1 | SAN MH 2 | 0.83 | 0.42 | 0.83 | 1.01 | 1.5 | 1.24 | 0.33 | ***1.57*** | 10.0 | 200 | PVC | 1.00 | 34.22 | 1.06 | 4.59% |
| Upper Lifestyle Street + Plaza | | | 0.00 | 0.59 | | | | | | | | | | | | | |
| Lifestyle Street | SAN MH 2 | SAN MH 3 | 0.00 | 0.00 | 0.83 | 1.01 | 1.5 | 1.24 | 0.33 | ***1.57*** | 13.5 | 250 | PVC | 0.35 | 36.70 | 0.72 | 4.28% |
| | SAN MH 3 | SAN MH 4 | 0.00 | 0.00 | 0.83 | 1.01 | 1.5 | 1.24 | 0.33 | ***1.57*** | 37.6 | 250 | PVC | 0.35 | 36.70 | 0.72 | 4.28% |
| | SAN MH 4 | SAN MH 5 | 0.00 | 0.00 | 0.83 | 1.01 | 1.5 | 1.24 | 0.33 | ***1.57*** | 18.5 | 250 | PVC | 0.35 | 36.70 | 0.72 | 4.28% |
| Social Café + Retail East | NOKIA-2 | SAN MH 5 | 0.40 | 0.32 | 0.40 | 0.51 | 1.5 | 0.60 | 0.17 | ***0.77*** | 12.6 | 200 | PVC | 1.00 | 34.22 | 1.06 | 2.25% |
| Lower Lifestye Street | | | 0.00 | 0.19 | | | | | | | | | | | | | |
| Lifestyle Street | SAN MH 5 | SAN MH 5a | 0.00 | 0.00 | 1.23 | 1.52 | 1.5 | 1.84 | 0.50 | ***2.34*** | 37.2 | 250 | PVC | 0.35 | 36.70 | 0.72 | 6.39% |
| | SAN MH 5a | SAN MH 6 | 0.00 | 0.00 | 1.23 | 1.52 | 1.5 | 1.84 | 0.50 | ***2.34*** | 13.8 | 250 | PVC | 0.35 | 36.70 | 0.72 | 6.39% |
| Legget-1 | SAN MH 6 | EX SAN MH A | 0.00 | 0.34 | 1.23 | 1.86 | 1.5 | 1.84 | 0.61 | ***2.46*** | 113.2 | 250 | PVC | 0.35 | 36.70 | 0.72 | 6.69% |
| R&D Lab | NOKIA-3 | SAN MH 12 | 0.52 | 0.83 | 0.52 | 0.83 | 1.5 | 0.78 | 0.27 | ***1.06*** | 1.2 | 200 | PVC | 1.00 | 34.22 | 1.06 | 3.09% |
| | SAN MH 12 | EX SAN MH A | 0.00 | 0.83 | 0.52 | 0.83 | 1.5 | 0.78 | 0.27 | ***1.06*** | 13.8 | 200 | PVC | 1.00 | 34.22 | 1.06 | 3.09% |
| Legget-2 | EX SAN MH A | EX SAN MH B | 0.00 | 0.15 | 1.75 | 2.85 | 1.5 | 2.62 | 0.94 | ***3.56*** | 60.2 | 250 | PVC | 0.30 | 33.98 | 0.67 | 10.48% |
| Legget-3 | EX SAN MH B | EX SAN MH C | 0.00 | 0.17 | 1.75 | 3.02 | 1.5 | 2.62 | 1.00 | ***3.62*** | 68.0 | 250 | PVC | 0.29 | 33.41 | 0.66 | 10.83% |
| Parking Garage | NOKIA-4 | SAN MH 7 | 0.00 | 0.95 | 0.00 | 2.15 | 1.5 | 0.00 | 0.71 | ***0.71*** | 3.9 | 200 | PVC | 2.00 | 54.10 | 1.67 | 1.31% |
| Access Road + Workyard | | | 0.00 | 1.20 | | | | | | | | | | | | | |
| Access Road | SAN MH 7 | SAN MH 8 | 0.00 | 0.00 | 0.00 | 2.15 | 1.5 | 0.00 | 0.71 | ***0.71*** | 73.5 | 200 | PVC | 2.50 | 54.10 | 1.67 | 1.31% |
| Retained Lands | RET LANDS | SAN MH 7a | 0.43 | 0.78 | 0.43 | 0.78 | 1.5 | 0.65 | 0.26 | ***0.91*** | 3.0 | 200 | PVC | 1.00 | 34.22 | 1.06 | 2.65% |
| Access Road | SAN MH 7a | SAN MH 8 | 0.00 | 0.00 | 0.43 | 0.78 | 1.5 | 0.65 | 0.26 | ***0.91*** | 20.1 | 200 | PVC | 0.35 | 20.24 | 1.06 | 4.48% |
| South Access Road | SAN MH 8 | SAN MH 9 | 0.00 | 0.00 | 0.43 | 2.93 | 1.5 | 0.65 | 0.97 | ***1.62*** | 11.9 | 250 | PVC | 0.50 | 43.87 | 0.87 | 3.69% |
| | SAN MH 9 | SAN MH 10 | 0.00 | 0.00 | 0.43 | 2.93 | 1.5 | 0.65 | 0.97 | ***1.62*** | 52.8 | 250 | PVC | 0.50 | 43.87 | 0.87 | 3.69% |
| | SAN MH 10 | SAN MH 11 | 0.00 | 0.00 | 0.43 | 2.93 | 1.5 | 0.65 | 0.97 | ***1.62*** | 27.8 | 250 | PVC | 0.35 | 36.70 | 0.72 | 4.41% |
| | SAN MH 11 | EX SAN MH C | 0.00 | 0.00 | 0.43 | 2.93 | 1.5 | 0.65 | 0.97 | ***1.62*** | 16.1 | 250 | PVC | 0.35 | 36.70 | 0.72 | 4.41% |
| Sanmina (500 March Road) | EX SAN MH | EX. SAN MH D | 0.35 | 2.20 | 0.35 | 2.20 | 5.7 | 2.00 | 0.72 | ***2.72*** | 25.4 | 250 | PVC | 0.50 | 43.87 | 0.87 | 6.20% |
| Legget-4 | EX. SAN MH D | EX. SAN MH C | 0.00 | 0.17 | 0.35 | 2.37 | 5.7 | 2.00 | 0.78 | ***2.78*** | 55.1 | 250 | PVC | 0.33 | 35.64 | 0.70 | 7.79% |
| Legget Drive | EX. SAN MH C | EX SAN MH E | 0.00 | 0.00 | 2.53 | 8.31 | 1.5 | 3.80 | 2.74 | ***6.54*** | 26.7 | 250 | PVC | 0.34 | 36.17 | 0.71 | 18.09% |
| KRP Site | EX SAN MH E | EX. SAN MH F | 0.00 | 0.00 | 2.53 | 8.31 | 1.5 | 3.80 | 2.74 | ***6.54*** | 50.4 | 250 | PVC | 0.50 | 43.87 | 0.87 | 14.92% |
| | EX SAN MH F | EX SAN MH G | 0.00 | 0.00 | 2.53 | 8.31 | 1.5 | 3.80 | 2.74 | ***6.54*** | 44.0 | 250 | PVC | 0.50 | 43.87 | 0.87 | 14.92% |
| | EX SAN MH G | EX. SAN MH H | 0.00 | 0.00 | 2.53 | 8.31 | 1.5 | 3.80 | 2.74 | ***6.54*** | 9.1 | 250 | PVC | 1.00 | 62.04 | 1.22 | 10.55% |
| KRP Site (Tower C) | TOWER C | EX. SAN MH H | 0.65 | 1.24 | 0.65 | 1.24 | 3.5 | 2.29 | 0.41 | ***2.70*** | 114.3 | 250 | PVC | 0.40 | 39.24 | 0.77 | 6.87% |
| KRP Site | EX. SAN MH H | EX. SAN MH I | 0.00 | 0.00 | 3.18 | 9.55 | 1.5 | 4.77 | 3.15 | ***7.93*** | 9.5 | 250 | PVC | 1.00 | 62.04 | 1.22 | 12.78% |
| | EX. SAN MH I | EX. SAN MH J | 0.00 | 0.00 | 3.18 | 9.55 | 1.5 | 4.77 | 3.15 | ***7.93*** | 48.1 | 250 | PVC | 0.67 | 50.78 | 1.00 | 15.61% |
| KRP Site (Tower D) | TOWER D | EX. SAN MH J | 0.96 | 3.37 | 0.96 | 3.37 | 1.5 | 1.44 | 1.11 | ***2.55*** | 34.0 | 200 | PVC | 1.30 | 39.01 | 1.20 | 6.55% |
| KRP Site | EX. SAN MH J | EX. SAN MH K | 0.00 | 0.00 | 4.14 | 12.92 | 1.5 | 6.22 | 4.26 | ***10.48*** | 61.9 | 250 | PVC | 0.35 | 36.70 | 0.72 | 28.55% |
| KRP Site (Brookstreet Hotel) | HOTEL | EX. SAN MH K | 2.21 | 4.38 | 2.21 | 4.38 | 1.0 - 3.8 | 6.80 | 1.45 | ***8.25*** | 22.0 | 200 | PVC | 0.90 | 32.46 | 1.00 | 25.40% |
| KRP Site | EX. SAN MH K | EX. SAN MH L | 0.00 | 0.00 | 6.35 | 17.30 | 1.5 | 9.53 | 5.71 | ***15.24*** | 21.0 | 250 | PVC | 0.38 | 38.24 | 0.75 | 39.85% |
| KRP Site (Parking Structure) | PARKING | FUTURE SAN MH 3 | 0.00 | 1.07 | 0.00 | 1.07 | 1.5 | 0.00 | 0.35 | ***0.35*** | 13.7 | 250 | PVC | 0.40 | 39.24 | 0.77 | 0.90% |
| Future Brookstreet Apts. | FUTURE APTS. | FUTURE SANMH 1 | 1.80 | 0.39 | 1.80 | 0.39 | 1.0-3.4 | 5.39 | 0.13 | ***5.52*** | 6.1 | 250 | PVC | 2.00 | 87.74 | 1.73 | 6.29% |
| KRP Site | FUTURE SANMH 1 | FUTURE SANMH 2 | 0.00 | 0.00 | 1.80 | 0.39 | 1.0-3.4 | 5.39 | 0.13 | ***5.52*** | 24.0 | 250 | PVC | 0.50 | 43.87 | 0.87 | 12.58% |
| | FUTURE SANMH 2 | FUTURE SANMH 3 | 0.00 | 0.00 | 1.80 | 0.39 | 1.0-3.4 | 5.39 | 0.13 | ***5.52*** | 35.9 | 250 | PVC | 0.50 | 43.87 | 0.87 | 12.58% |
| KRP Site | FUTURE SANMH 3 | EX. SAN MH L | 0.00 | 0.00 | 1.80 | 1.46 | 1.0-3.4 | 5.39 | 0.48 | ***5.87*** | 77.4 | 250 | PVC | 0.40 | 39.24 | 0.77 | 14.96% |
| KRP Site | EX. SAN MH L | EX. SAN MH M | 0.00 | 0.00 | 8.15 | 18.76 | 1.5 | 12.23 | 6.19 | ***18.42*** | 88.9 | 250 | PVC | 0.38 | 38.24 | 0.75 | 48.17% |
| KRP Site | EX. SAN MH M | EX. 750 TRUNK | 0.00 | 0.00 | 8.15 | 18.76 | 1.5 | 12.23 | 6.19 | ***18.42*** | 100.1 | 250 | PVC | 0.52 | 44.74 | 0.88 | 41.18% |

Notes:
1. Q(d) = Q(p) + Q(i) , where
   Q(d) = Design Flow (L/sec)
   Q(p) = Population Flow (L/sec)
   Q(i) = Extraneous Flow (L/sec)
2. Q(i) = 0.33 L/sec/ha
3. Daily Sanitary Flows from Residential Development = 280L/person/day (Section 4, Ottawa Sewer Design Guidelines)
4. Daily Sanitary Flows from Office Towers = 75 L/person/day (Appendix 4-A, Ottawa Sewer Design Guidelines)
5. Residential Peaking Factor: Harmon Equation (Maximum Peaking Factor = 3.8)
6. Commercial Peaking Factor = 1.5 (Figure 4.3 Ottawa Sewer Design Guidelines)
7. Sanmina (500 March Road) Peaking Factor = 5.7 (Appendix 4-B Ottawa Sewer Design Guidelines)
8. Refer to Sanitary Drainage Area Plan (C400) for details of drainage areas and sanitary manhole number designation.
9. Refer to the 'Sanitary and Storm Sewer Design Brief - Kanata Research Park Lands' for a breakdown of Daily Sewage Flow components and applicable peaking factors from the KRP lands.

Sanitary sewer flows from Nokia and Retained Lands properties to Legget sanitary sewer.
Extension of sanitary sewer in Legget Drive.
Sanitary drainage area design based on future residential redevelopment.
Sanitary sewer segment with least available excess capacity.

# APPENDIX D

## Water Demands, FUS Calculations, Watermain Boundary Conditions, Schematic of the Hydraulic Model, Modelling Results and Correspondence from the City of Ottawa

# 570 & 520 March Road - Nokia Campus
## Summary
## WATER ANALYSIS

### DOMESTIC WATER DEMANDS

| Commercial, Office, Retail and Other Uses | Average Day Demand (L/s) | Maximum Day Demand (L/s) | Peak Hour Demand (L/s) |
|---|---|---|---|
| Office Tower | 0.61 | 0.91 | 1.64 |
| East Retail Building (Gym with Showers) | 0.19 | 0.28 | 0.50 |
| West Retail Building (Quick Food Service) | 0.22 | 0.33 | 0.59 |
| Social Café & Link (Quick Service Retail) | 0.22 | 0.33 | 0.59 |
| R&D Lab Building | 0.52 | 0.78 | 1.41 |
| Open Air Parking Garage | 0.00 | 0.00 | 0.00 |
| 520 March Road (Assumed Future Development) | 0.43 | 0.65 | 1.17 |
| **Total** | **2.18** | **3.27** | **5.89** |

### BOUNDARY CONDITIONS (CONNECTION #1 - 406mm dia. WM IN TERRY FOX DRIVE ROW)

| | | |
|---|---|---|
| **Minimum HGL (Peak Hour) =** | **126.3** | **m** |
| **Maximum HGL =** | **131.0** | **m** |
| **Max Day + Fire Flow =** | **120.3** | **m** |

### BOUNDARY CONDITIONS (CONNECTION #2 - 203mm dia. WM SERVICING 515 LEGGET DRIVE)

| | | |
|---|---|---|
| **Minimum HGL (Peak Hour) =** | **126.3** | **m** |
| **Maximum HGL =** | **131.0** | **m** |
| **Max Day + Fire Flow =** | **120.6** | **m** |

### PRESSURE TESTS

| | CONNECTION #1 | CONNECTION #2 | UNITS |
|---|---|---|---|
| Existing watermain elevation at connection | **75.8** | **77.2** | **m** |

| | | | |
|---|---|---|---|
| **Low Pressure Pressure =(Min. HGL - (Existing Ground Elevation - Watermain Elevation) ) x 1.42 PSI/m (should be > 40 PSI)** | **71.0** | **69.0** | **PSI** |
| **High Pressure Pressure = (Max HGL - (Existing Ground Elevation - Watermain Elevation) ) x 1.42 PSI/m (should be between 50- 70 PSI)** | **78.0** | **76.0** | **PSI** |
| **Max Day + Fire Flow Pressure = (Max Day + Fire Flow - (Existing Ground Elevation -Watermain Elevation) ) x 1.42 PSI/m (should be > 20 PSI)** | **63.0** | **61.0** | **PSI** |

To convert Head(m) to PSI: multiply by 1.42

| PSI | m OF HEAD |
|---|---|
| 1.42197 | 1 |

# 570 March Road - Nokia Campus
# 8-Storey Office Tower
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Office Use | Post-Development | |
|---|---|---|
| Office Tower | 700 | Staff |
| **Average Day Demand (75 L/staff/day)** | **0.61** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **0.91** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **1.64** | **L/s** |
| **Total Average Day Demand** | **0.61** | **L/s** |
| **Total Maximum Day Demand** | **0.91** | **L/s** |
| **Total Peak Hour Demand** | **1.64** | **L/s** |

# 570 March Road - Nokia Campus
# 1-Storey Retail East
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Commercial Use | Post-Development | |
|---|---|---|
| East Retail Building (Gym with Showers) | 200 | Users (2x per day) |
| **Average Day Demand (40 L/User/day)** | **0.19** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **0.28** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **0.50** | **L/s** |
| **Total Average Day Demand** | **0.19** | **L/s** |
| **Total Maximum Day Demand** | **0.28** | **L/s** |
| **Total Peak Hour Demand** | **0.50** | **L/s** |

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# 570 March Road - Nokia Campus
# 1-Storey Retail West
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Commercial Use | Post-Development | |
|---|---|---|
| West Retail Building (Quick Food Service) | 50 | Seats (3x per day) |
| **Average Day Demand (125 L/seat/day)** | **0.22** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **0.33** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **0.59** | **L/s** |
| **Total Average Day Demand** | **0.22** | **L/s** |
| **Total Maximum Day Demand** | **0.33** | **L/s** |
| **Total Peak Hour Demand** | **0.59** | **L/s** |

# 570 March Road - Nokia Campus
# 2-Storey Social Café/Link
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Commercial and Other Uses | Post-Development | |
|---|---|---|
| Social Café & Link (Quick Service Retail) | 50 | Seats (3x per day) |
| **Average Day Demand (125 L/seat/day)** | **0.22** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **0.33** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **0.59** | **L/s** |
| **Total Average Day Demand** | **0.22** | **L/s** |
| **Total Maximum Day Demand** | **0.33** | **L/s** |
| **Total Peak Hour Demand** | **0.59** | **L/s** |

# 570 March Road - Nokia Campus
# 5-Storey R&D Lab Building
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Office and Other Uses | Post-Development | |
|---|---|---|
| R&D Lab Building | 600 | Employees |
| **Average Day Demand (75 L/employee/day)** | **0.52** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **0.78** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **1.41** | **L/s** |
| **Total Average Day Demand** | **0.52** | **L/s** |
| **Total Maximum Day Demand** | **0.78** | **L/s** |
| **Total Peak Hour Demand** | **1.41** | **L/s** |

# 570 March Road - Nokia Campus
# 3-Storey Open Air Parking Garage
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Parking Garage for Office and Commercial Uses | Post-Development | |
|---|---|---|
| Open Air Parking Garage | 900 | people |
| **Average Day Demand (0 L/User/day)** | **0.00** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **0.00** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **0.00** | **L/s** |
| **Total Average Day Demand** | **0.00** | **L/s** |
| **Total Maximum Day Demand** | **0.00** | **L/s** |
| **Total Peak Hour Demand** | **0.00** | **L/s** |

# 520 March Road - Retained Lands
# Assumed Future 8-Storey Office Tower
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Office Use | Post-Development | |
|---|---|---|
| Office Tower (Assumed Future Development) | 500 | Staff |
| **Average Day Demand (75 L/staff/day)** | **0.43** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **0.65** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **1.17** | **L/s** |
| **Total Average Day Demand** | **0.43** | **L/s** |
| **Total Maximum Day Demand** | **0.65** | **L/s** |
| **Total Peak Hour Demand** | **1.17** | **L/s** |

# FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** 570 & 520 March Road
**Date:** 8/19/2024
**Input By:** K. D'sa
**Reviewed By:** F. Thauvette

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

**Building Description:** 8-Storey Office Building and Social Café
**Type II - Non-combustible construction**

| Step | | | Choose | | Value Used | Total Fire Flow (L/min) |
|---|---|---|---|---|---|---|
| **Base Fire Flow** | | | | | | |
| 1 | **Construction Material** | | | **Multiplier** | | |
| | **Coefficient related to type of construction C** | Type V - Wood frame | | 1.5 | 0.8 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | Yes | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Podium Level Footprint ($m^2$) | 5348 | | | |
| | | Total Floors/Storeys (Podium) | 3 | | | |
| | | Tower Footprint ($m^2$) | 2910 | | | |
| | | Total Floors/Storeys (Tower) | 5 | | | |
| | | Protected Openings (1 hr) | Yes | | | |
| | | A, Total Effective Floor Area ($m^2$) | | | **8,022** | |
| | **F** | **Base fire flow without reductions** | | | | **16,000** |
| | | $F = 220\ C\ (A)^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | -15% | **13,600** |
| | | Limited combustible | Yes | -15% | | |
| | | Combustible | | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-6,800** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 30594 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge per** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | 2Hr Firewall | | 0% | **0** |
| | | East Side | 2Hr Firewall | | 0% | |
| | | South Side | 2Hr Firewall | | 0% | |
| | | West Side | >30m | | 0% | |
| | | | | **Cumulative Total** | **0%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **7,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **117** |
| | | | | or | USGPM | 1,849 |

# FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** 570 & 520 March Road
**Date:** 8/19/2024
**Input By:** K. D'sa
**Reviewed By:** François Thauvette

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

**Building Description:** 1-Storey Retail East Building
**Type II - Non-combustible construction**

| Step | | | Choose | | Value Used | Total Fire Flow (L/min) |
|---|---|---|---|---|---|---|
| **Base Fire Flow** | | | | | | |
| 1 | **Construction Material** | | | **Multiplier** | | |
| | **Coefficient related to type of construction** **C** | Type V - Wood frame | | 1.5 | 0.8 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | Yes | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 740 | | | |
| | | Number of Floors/Storeys | 1 | | | |
| | | Protected Openings (1 hr) if C<1.0 | | | | |
| | | Area of structure considered ($m^2$) | | | **740** | |
| | **F** | **Base fire flow without reductions** | | | | **5,000** |
| | | **F** = 220 **C** (**A**)$^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | 0% | **5,000** |
| | | Limited combustible | | -15% | | |
| | | Combustible | Yes | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-2,500** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 740 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | 20.1 - 30 m | | 10% | **500** |
| | | East Side | >30m | | 0% | |
| | | South Side | 2Hr Firewall | | 0% | |
| | | West Side | 2Hr Firewall | | 0% | |
| | | | | **Cumulative Total** | **10%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **3,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **50** |
| | | | | or | USGPM | 793 |

# FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** 570 & 520 March Road
**Date:** 8/19/2024
**Input By:** K. D'sa
**Reviewed By:** François Thauvette

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

**Building Description:** 1-Storey Retail West Building
**Type II - Non-combustible construction**

| Step | | | Choose | | Value Used | Total Fire Flow (L/min) |
|---|---|---|---|---|---|---|
| **Base Fire Flow** | | | | | | |
| 1 | **Construction Material** | | | **Multiplier** | | |
| | **Coefficient related to type of construction** **C** | Type V - Wood frame | | 1.5 | 0.8 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | Yes | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 1430 | | | |
| | | Number of Floors/Storeys | 1 | | | |
| | | Protected Openings (1 hr) if C<1.0 | | | | |
| | | Area of structure considered ($m^2$) | | | **1,430** | |
| | **F** | **Base fire flow without reductions** | | | | **7,000** |
| | | **F** = 220 **C** (**A**)$^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | 0% | **7,000** |
| | | Limited combustible | | -15% | | |
| | | Combustible | Yes | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-3,500** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 1,430 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | 20.1 - 30 m | | 10% | **2,100** |
| | | East Side | 3.1 - 10 m | | 20% | |
| | | South Side | 2Hr Firewall | | 0% | |
| | | West Side | >30m | | 0% | |
| | | | | **Cumulative Total** | **30%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **6,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **100** |
| | | | | or | USGPM | 1,585 |

# FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** 570 & 520 March Road
**Date:** 8/19/2024
**Input By:** K. D'sa
**Reviewed By:** François Thauvette

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

**Building Description:** 5-Storey R&D Lab Building
**Type II - Non-combustible construction**

| Step | | | Choose | | Value Used | Total Fire Flow (L/min) |
|---|---|---|---|---|---|---|
| **Base Fire Flow** | | | | | | |
| 1 | **Construction Material** | | | **Multiplier** | | |
| | **Coefficient related to type of construction** **C** | Type V - Wood frame | | 1.5 | 0.8 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | Yes | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 7345 | | | |
| | | Number of Floors/Storeys | 5 | | | |
| | | Protected Openings (1 hr) if C<1.0 | | | | |
| | | Area of structure considered ($m^2$) | | | **25,708** | |
| | **F** | **Base fire flow without reductions** | | | | **28,000** |
| | | **F** = 220 **C** (**A**)$^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | 0% | **28,000** |
| | | Limited combustible | | -15% | | |
| | | Combustible | Yes | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-14,000** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | Yes | -10% | -10% | |
| | | | | **Cumulative Sub-Total** | **-50%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 36,725 | 100% | | |
| | | | | **Cumulative Total** | **-50%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 5** | | **Surcharge** | |
| | **(3)** | North Side | 2Hr Firewall | | 0% | **0** |
| | | East Side | >30m | | 0% | |
| | | South Side | >30m | | 0% | |
| | | West Side | 2Hr Firewall | | 0% | |
| | | | | **Cumulative Total** | **0%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **14,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **233** |
| | | | | or | USGPM | 3,699 |

# FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** 570 & 520 March Road
**Date:** 10/18/2024
**Input By:** K. D'sa
**Reviewed By:** François Thauvette

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

**Building Description:** 3-Storey Open Air Parking Garage
**Type II - Non-combustible construction**

| Step | | | Choose | | Value Used | Total Fire Flow (L/min) |
|---|---|---|---|---|---|---|
| **Base Fire Flow** | | | | | | |
| 1 | **Construction Material** | | | **Multiplier** | | |
| | **Coefficient related to type of construction** **C** | Type V - Wood frame | | 1.5 | 0.8 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | Yes | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 9450 | | | |
| | | Number of Floors/Storeys | 1 | | | |
| | | Protected Openings (1 hr) if C<1.0 | | | | |
| | | Area of structure considered ($m^2$) | | | **9,450** | |
| | **F** | **Base fire flow without reductions** | | | | **17,000** |
| | | **F** = 220 **C** (**A**)$^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | 0% | **17,000** |
| | | Limited combustible | | -15% | | |
| | | Combustible | Yes | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | | -30% | | **0** |
| | | Standard Water Supply | | -10% | | |
| | | Fully Supervised System | | -10% | | |
| | | | | **Cumulative Sub-Total** | **0%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | | 0% | | |
| | | | | **Cumulative Total** | **0%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 6** | | **Surcharge** | |
| | **(3)** | North Side | 2Hr Firewall | | 0% | **1,360** |
| | | East Side | 2Hr Firewall | | 0% | |
| | | South Side | 10.1 - 20 m | | 8% | |
| | | West Side | >30m | | 0% | |
| | | | | **Cumulative Total** | **8%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **18,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **300** |
| | | | | or | USGPM | 4,756 |

# FUS - Fire Flow Calculations

NOVATECH
Engineers, Planners & Landscape Architects

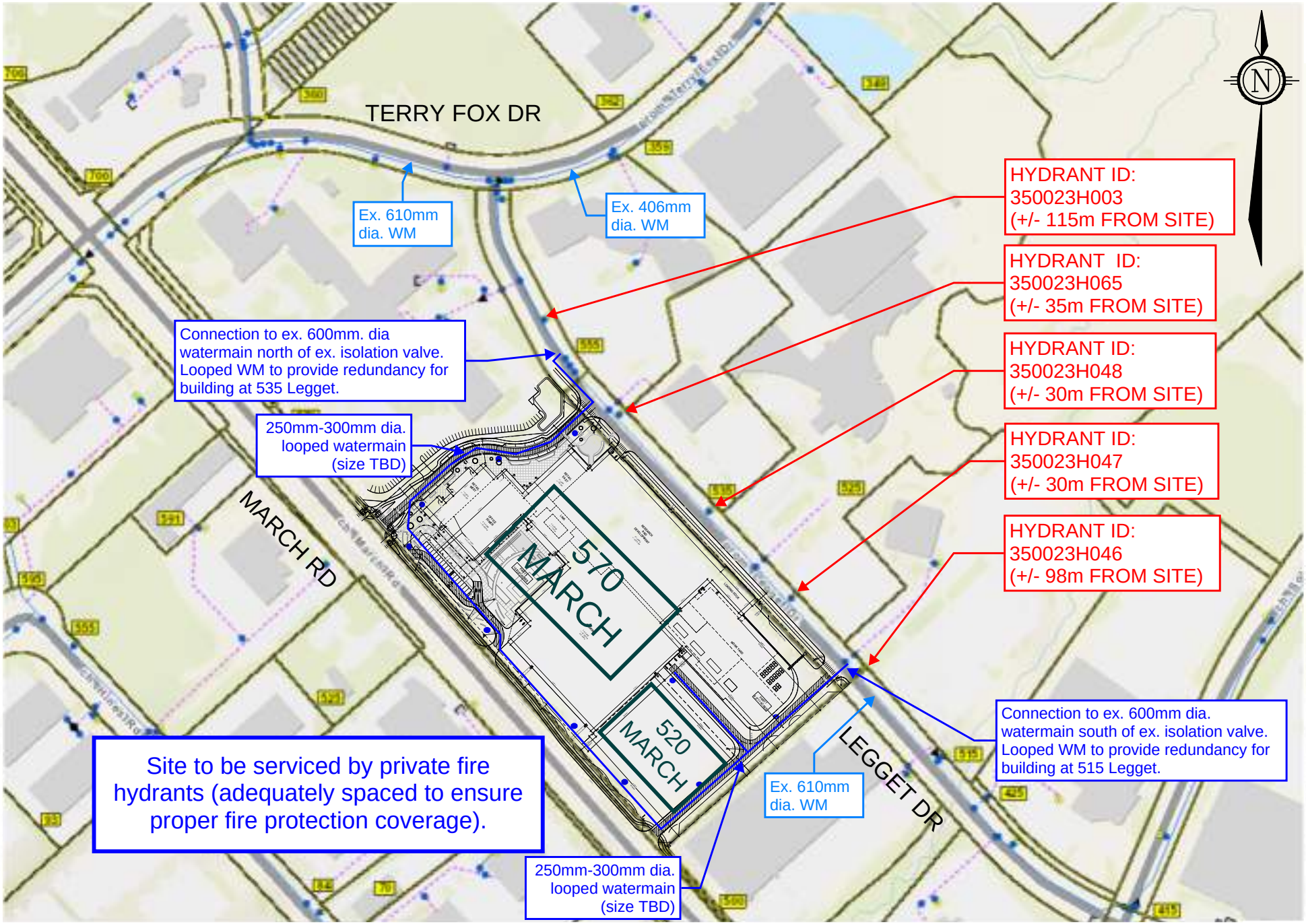
**Novatech Project #:** 123043
**Project Name:** 570 & 520 March Road
**Date:** 10/18/2024
**Input By:** K. D'sa
**Reviewed By:** François Thauvette

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

**Building Description:** Retained Lands: 8-Storey Office Building (Assumed Future Development)
**Type II - Non-combustible construction**

| Step | | | Choose | | Value Used | Total Fire Flow (L/min) |
|---|---|---|---|---|---|---|
| **Base Fire Flow** | | | | | | |
| 1 | **Construction Material** | | | **Multiplier** | | |
| | **Coefficient related to type of construction** **C** | Type V - Wood frame | | 1.5 | 0.8 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | Yes | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 2350 | | | |
| | | Number of Floors/Storeys | 8 | | | |
| | | Protected Openings (1 hr) if C<1.0 | | | | |
| | | Area of structure considered ($m^2$) | | | **11,750** | |
| | **F** | **Base fire flow without reductions** | | | | **19,000** |
| | | **F** = 220 **C** (**A**)$^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | -15% | **16,150** |
| | | Limited combustible | Yes | -15% | | |
| | | Combustible | | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-6,460** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | | -10% | | |
| | | | | **Cumulative Sub-Total** | **-40%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 18,800 | 100% | | |
| | | | | **Cumulative Total** | **-40%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 6** | | **Surcharge** | |
| | **(3)** | North Side | 10.1 - 20 m | | 8% | **1,292** |
| | | East Side | >30m | | 0% | |
| | | South Side | >30m | | 0% | |
| | | West Side | >30m | | 0% | |
| | | | | **Cumulative Total** | **8%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **11,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **183** |
| | | | | or | USGPM | 2,906 |

# FIRE HYDRANT SKETCH AND WATERMAIN INFRSTRUCTURE



## Kynan Dsa

**From:** Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
**Sent:** Monday, August 26, 2024 11:32 AM
**To:** Francois Thauvette
**Cc:** Kynan Dsa; Walker, Krishon; Brault, Ryan
**Subject:** RE: 570 and 520 March Road - Nokia - Request for Municipal WM boundary conditions (123043)

Hi Francois,

As discussed over the phone this morning, the City will not allow the new Nokia Innovation Campus located at 570 March Road to connect to the existing 600mm dia. backbone watermain located on Legget Drive. This watermain is a 610mm concrete pressure pipe (C-301) that is periodically isolated by the City for structural inspections. The City does not want to bring additional connections to the backbone watermain – directly or indirectly.

The City's position on this is that a local watermain will need to be built on Legget Drive by the developer(s) from Terry Fox Drive to Solandt Road in order to service this site. It is our understanding that this discussion has been initiated with the developer at 535 Legget Drive already. We can provide contact information from this development if needed.

Please let us know if you have any questions or concerns and we can schedule a meeting.

Best Regards,

**Jean-Miguel Roy**
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department
Services de la planification, Direction générale de la planification, de l'immobilier et du développement économique
110 Laurier Avenue West | 110 avenue Laurier Ouest
City of Ottawa | Ville d'Ottawa
613.580.2424 x 27566

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**From:** Kynan Dsa <k.dsa@novatech-eng.com>
**Sent:** August 21, 2024 10:07 AM
**To:** Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
**Cc:** Francois Thauvette <f.thauvette@novatech-eng.com>
**Subject:** 570 and 520 March Road - Nokia - Request for Municipal WM boundary conditions (123043)

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Hi Jean-Miguel,

The purpose of this email is to request municipal watermain boundary conditions to complete a hydraulic network analysis to support the proposed development of the new Nokia Innovation Campus located at 570 March Road (southern portion of the recently severed larger Nokia property). The proposed service would provide water services to the Nokia campus (570 March Road), future

development on the severed parcel at 520 March Road , and redundancy for the buildings at 515 and 535 Legget Drive. Please refer to the attached sketch that identifies the existing water infrastructure along Legget Drive, as well as the proposed looped watermain network and hydrants. The sketch also identifies the two (2) proposed connection locations along Legget Drive. The northern segment of the waterloop proposes a standard connection to the existing 600mm dia. watermain north of the existing isolation valve. The southern segment of the waterloop proposes a standard connection to the existing 600mm dia. watermain south of the existing isolation valve. This watermain configuration will allow the proposed development to have a looped system that can adequately service the proposed development on the subject lands. The size of the private watermain and spacing of the on-site hydrants will be based on the fire flow requirements (calculated per FUS guidelines) and modeling results. The total anticipated water demands for the proposed development are as follows:

- Average Day Demand = 2.18 L/s
- Maximum Day Demand = 3.27 L/s
- Peak Hour Demand = 5.89 L/s
- Maximum Fire Flow Demand Range = 50-333 L/s

See attached calculation sheets for details.

Please review and let me know if you require any additional information.

Thanks,

**Kynan D'sa**, B.A.Sc. (Engineering) (He/Him)
**NOVATECH**
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6
Tel: 613.254.9643 Ext. 276 | Cell: 705.821.2278
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## Kynan Dsa

**From:** Walker, Krishon <krishon.walker@ottawa.ca>
**Sent:** Wednesday, November 20, 2024 9:48 AM
**To:** Greg Winters; James Ireland; Francois Thauvette
**Cc:** Roy, Jean-Miguel; Brault, Ryan; Bougadis, John
**Subject:** Servicing Approach for 570 March Road

**Importance:** High

Hi all,

I hope that you are well. I wanted to provide you with an update on where things are for this file. Following our internal discussions, we have come up with a solution to service Nokia's site. As mentioned earlier, the site requires two service connections, and connecting to the backbone watermain along Legget Drive is not a viable option. The City recognizes the need to build a new local watermain along Legget Drive and is prepared to invest in this infrastructure. However, the timeline required for the City to design and construct this watermain would not align with Nokia's redevelopment schedule.

To address this, we propose the following approach:

1. **First Connection Point:**
    - The City will permit Nokia to design and construct a local watermain along Legget Drive, extending from Terry Fox to the northern boundary of their site at 570 March Road.
    - City staff will prepare a report to Council in Q1 2025 to request approval for reimbursing Nokia for the costs of these works. We will recommend that the funds be approved in conjunction with this report. Once the watermain is commissioned and accepted by the City, reimbursement will be made in accordance with the terms approved.
    - Nokia will be responsible for a standard connection fee to the new watermain, based on a Special Area Charge (if implemented by Council) or the fee outlined in the Water By-law.
2. **Second Connection Point:**
    - Nokia will connect to the 203 mm valve currently linked to the backbone watermain servicing 515 Legget Drive. Nokia will need to confirm that this connection will not negatively impact service to 515 Legget Drive.
    - Should this be the case, Nokia will be required to extend the local watermain to the southern boundary of their site at 570 March Road. The City would then commit funding for this extension through the Q1 2025 report to Council.
    - The City will complete the remaining portion of the local watermain to Solandt Drive. Other property owners will be responsible for a standard connection fee to the new watermain, based on a Special Area Charge (if implemented by Council) or the fee outlined in the Water By-law.

We will include a condition of approval in the Site Plan agreement requiring Nokia to enter into a Third-Party Infrastructure Agreement with the City for this work. Once the report is approved by Council, we will begin drafting the agreement. We believe this approach is fair to Nokia and aligns with their redevelopment timelines. This information has been communicated to Andy Thompson at Nokia.

We are working through reviewing your submission for completeness and will provide you with an update by tomorrow but given this information, at the very least, your servicing report would need to be updated. You might want to get started on this work.

Please let me know if you have any questions or if you would like to discuss, either today or tomorrow. Thanks!

**Krishon Walker, MCIP, RPP, PMP**
Planner II | Urbaniste II
Economic Development Services | Services de développement économique
Strategic Initiatives Department | Direction générale des initiatives stratégiques

City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West | 110, avenue Laurier Ouest
Ottawa, Ontario, K1P 1J1
T. 613-580-2424 ext. | poste 24161

*My pronouns are he/him | Mes pronoms sont il / lui*

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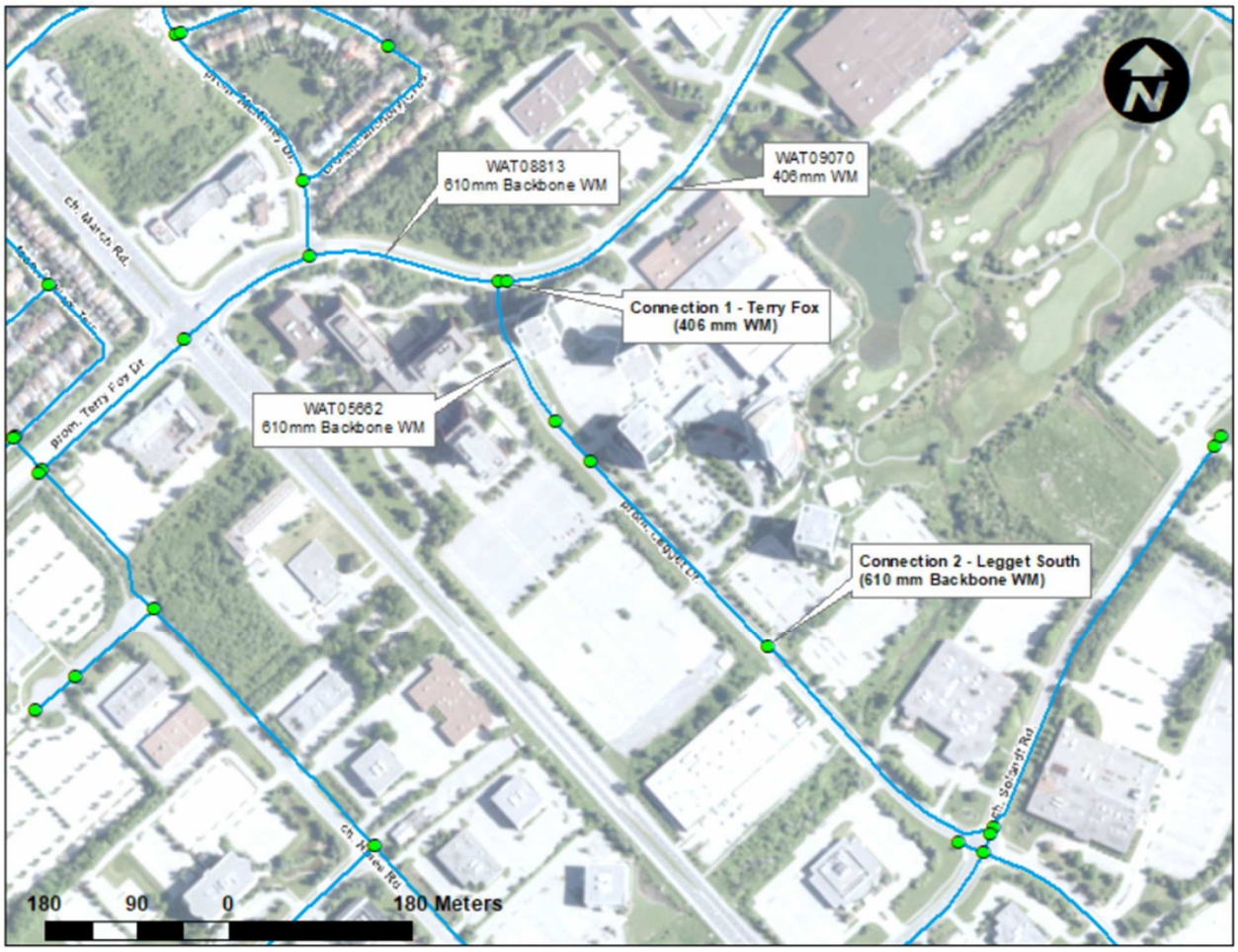
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# Boundary Conditions
## 570 March Road

**Provided Information**

| Scenario | Demand | |
|---|---|---|
| | L/min | L/s |
| Average Daily Demand | 131 | 2.18 |
| Maximum Daily Demand | 196 | 3.27 |
| Peak Hour | 353 | 5.89 |
| Fire Flow Demand #1 | 3,000 | 50.00 |
| Fire Flow Demand #2 | 18,000 | 300.00 |
| Fire Flow Demand #3 | 20,000 | 333.33 |

**Location**



**Results**

## Scenario 0 – Existing conditions (No future demands)

**Connection 2 – Legget South**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 131.1 | 74.3 |
| Peak Hour | 126.4 | 67.7 |
| [1] Ground Elevation = | 78.8 | m |

## Scenario 1 – Looping from 406mm watermain to 610mm backbone watermain

**Connection 1 – Terry Fox**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 131.0 | 75.3 |
| Peak Hour | 126.3 | 68.6 |
| Max Day plus Fire Flow 1 | 127.5 | 70.3 |
| Max Day plus Fire Flow 2 | 120.3 | 60.2 |
| Max Day plus Fire Flow 3 | 119.0 | 58.3 |
| [1] Ground Elevation = | 78.0 | m |

**Connection 2 – Legget South**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 131.0 | 74.2 |
| Peak Hour | 126.3 | 67.5 |
| Max Day plus Fire Flow 1 | 127.5 | 69.2 |
| Max Day plus Fire Flow 2 | 120.6 | 59.3 |
| Max Day plus Fire Flow 3 | 119.3 | 57.5 |
| [1] Ground Elevation = | 78.8 | m |

## Operational Scenario 2 – Closure of 610mm backbone watermain along Legget Drive

**Connection 1 – Terry Fox**

| Demand Scenario | Head (m) | Pressure[1] (psi) |
|---|---|---|
| Maximum HGL | 130.9 | 75.1 |
| Peak Hour | 125.6 | 67.6 |
| Max Day plus Fire Flow 1 | 126.3 | 68.7 |
| Max Day plus Fire Flow 2 | 107.6 | 42.0 |
| Max Day plus Fire Flow 3 | 103.8 | 36.7 |
| [1] Ground Elevation = | 78.0 | m |

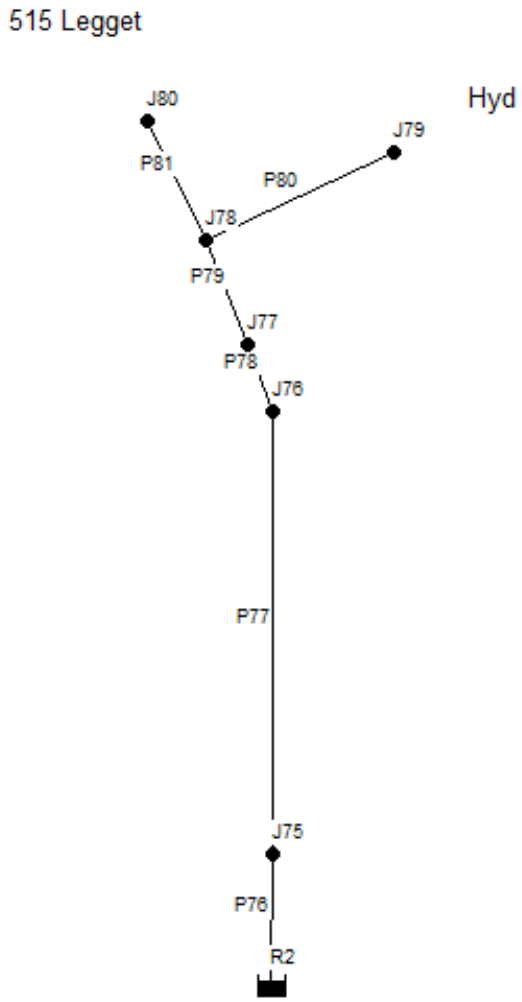
**Notes**

1. *Considering scenario 1: any connection to a watermain 400 mm or larger should be approved by DWS as per the Water Design Guidelines Section 2.4 Review by Drinking Water Services.*
2. *Considering operational scenario 2: Same conditions as scenario 1, except for closure of the 610mm backbone WM (WAT08813 & WAT05662) during modelling.*

**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.*

Scenario 0 - Existing Conditions




Legget Dr

# 515 Legget Drive
# Existing 10-Storey Office Tower
# WATER ANALYSIS

## DOMESTIC WATER DEMANDS

| Office Use | Post-Development | |
|---|---|---|
| Office Tower | ±1110 | Staff |
| **Average Day Demand (Based on Avg. Daily Sanitary Flows)*** | **0.96** | **L/s** |
| **Maximum Day Demand (1.5 x avg. day)** | **1.44** | **L/s** |
| **Peak Hour Demand (1.8 x max. day)** | **2.59** | **L/s** |
| **Total Average Day Demand** | **0.96** | **L/s** |
| **Total Maximum Day Demand** | **1.44** | **L/s** |
| **Total Peak Hour Demand** | **2.59** | **L/s** |

*0.96 L/s Average Daily Sanitary Flows (Taken from San Trunk Sheet)

# FUS - Fire Flow Calculations

Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** 570 March Road
**Date:** 2/1/2025
**Input By:** K. D'sa
**Reviewed By:** François Thauvette

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

**Building Description:** 515 Legget Drive - Existing 10-Storey Office Building
**Type II - Non-combustible construction**

| Step | | | Choose | | Value Used | Total Fire Flow (L/min) |
|---|---|---|---|---|---|---|
| **Base Fire Flow** | | | | | | |
| 1 | **Construction Material** | | | **Multiplier** | | |
| | **Coefficient related to type of construction** **C** | Type V - Wood frame | | 1.5 | 0.8 | |
| | | Type IV - Mass Timber | | Varies | | |
| | | Type III - Ordinary construction | | 1 | | |
| | | Type II - Non-combustible construction | Yes | 0.8 | | |
| | | Type I - Fire resistive construction (2 hrs) | | 0.6 | | |
| 2 | **Floor Area** | | | | | |
| | **A** | Building Footprint ($m^2$) | 1330 | | | |
| | | Number of Floors/Storeys | 10 | | | |
| | | Protected Openings (1 hr) if C<1.0 | | | | |
| | | Area of structure considered ($m^2$) | | | **7,980** | |
| | **F** | **Base fire flow without reductions** | | | | **16,000** |
| | | **F** = 220 **C** (**A**)$^{0.5}$ | | | | |
| **Reductions or Surcharges** | | | | | | |
| 3 | **Occupancy hazard reduction or surcharge** | | **FUS Table 3** | **Reduction/Surcharge** | | |
| | **(1)** | Non-combustible | | -25% | -15% | **13,600** |
| | | Limited combustible | Yes | -15% | | |
| | | Combustible | | 0% | | |
| | | Free burning | | 15% | | |
| | | Rapid burning | | 25% | | |
| 4 | **Sprinkler Reduction** | | **FUS Table 4** | **Reduction** | | |
| | **(2)** | Adequately Designed System (NFPA 13) | Yes | -30% | -30% | **-5,440** |
| | | Standard Water Supply | Yes | -10% | -10% | |
| | | Fully Supervised System | | -10% | | |
| | | | | **Cumulative Sub-Total** | **-40%** | |
| | | **Area of Sprinklered Coverage ($m^2$)** | 13,300 | 100% | | |
| | | | | **Cumulative Total** | **-40%** | |
| 5 | **Exposure Surcharge** | | **FUS Table 6** | | **Surcharge** | |
| | **(3)** | North Side | 20.1 - 30 m | | 1% | **136** |
| | | East Side | >30m | | 0% | |
| | | South Side | >30m | | 0% | |
| | | West Side | >30m | | 0% | |
| | | | | **Cumulative Total** | **1%** | |
| **Results** | | | | | | |
| 6 | **(1) + (2) + (3)** | **Total Required Fire Flow, rounded to nearest 1000L/min** | | | **L/min** | **8,000** |
| | | (2,000 L/min < Fire Flow < 45,000 L/min) | | or | L/s | **133** |
| | | | | or | USGPM | 2,114 |

# 515 Legget Drive - Existing Office Tower
# Water Model Results

Max Day + Fire Flow Demand
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J75 | 77.14 | 0.00 | 119.54 | 42.40 | 415.94 | 60.33 |
| Junc J76 | 76.70 | 0.00 | 112.14 | 35.44 | 347.67 | 50.42 |
| Junc J77 | 76.85 | 0.00 | 111.49 | 34.64 | 339.82 | 49.29 |
| Junc J78 | 77.15 | 0.00 | 109.53 | 32.38 | 317.65 | 46.07 |
| Junc J79 | 77.15 | 133.00 | 105.40 | 28.25 | 277.13 | 40.19 |
| Junc J80 | 76.32 | 1.44 | 109.53 | 33.21 | 325.79 | 47.25 |
| Resvr R2 | 120.60 | -134.44 | 120.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 40.19 |
| Max= | 60.33 |

Max Day + Fire Flow Demand
Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P76 | 9.7 | 200 | 110 | 134.44 | 4.28 | 109.17 |
| Pipe P77 | 67.76 | 200 | 110 | 134.44 | 4.28 | 109.17 |
| Pipe P78 | 6 | 200 | 110 | 134.44 | 4.28 | 109.17 |
| Pipe P79 | 17.92 | 200 | 110 | 134.44 | 4.28 | 109.17 |
| Pipe P80 | 7.97 | 150 | 100 | -133 | 7.53 | 518.4 |
| Pipe P81 | 1.85 | 200 | 110 | 1.44 | 0.05 | 0.03 |

# 515 Legget Drive - Existing Office Tower
# Water Model Results

Peak Hour Demand
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J75 | 77.14 | 0.00 | 126.40 | 49.26 | 483.24 | 70.09 |
| Junc J76 | 76.70 | 0.00 | 126.39 | 49.69 | 487.46 | 70.70 |
| Junc J77 | 76.85 | 0.00 | 126.39 | 49.54 | 485.99 | 70.49 |
| Junc J78 | 77.15 | 0.00 | 126.39 | 49.24 | 483.04 | 70.06 |
| Junc J79 | 77.15 | 0.00 | 126.39 | 49.24 | 483.04 | 70.06 |
| Junc J80 | 76.32 | 2.59 | 126.39 | 50.07 | 491.19 | 71.24 |
| Resvr R2 | 127.50 | -2.59 | 126.40 | 0 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 70.06 |
| Max= | 71.24 |

Peak Hour Demand
Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P76 | 9.70 | 200 | 110 | 2.59 | 0.08 | 0.07 |
| Pipe P77 | 67.76 | 200 | 110 | 2.59 | 0.08 | 0.07 |
| Pipe P78 | 6.00 | 200 | 110 | 2.59 | 0.08 | 0.07 |
| Pipe P79 | 17.92 | 200 | 110 | 2.59 | 0.08 | 0.07 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0.00 |
| Pipe P81 | 1.85 | 200 | 110 | 2.59 | 0.08 | 0.07 |

# 515 Legget Drive - Existing Office Tower
# Water Model Results

Maximum HGL
Network Table - Nodes

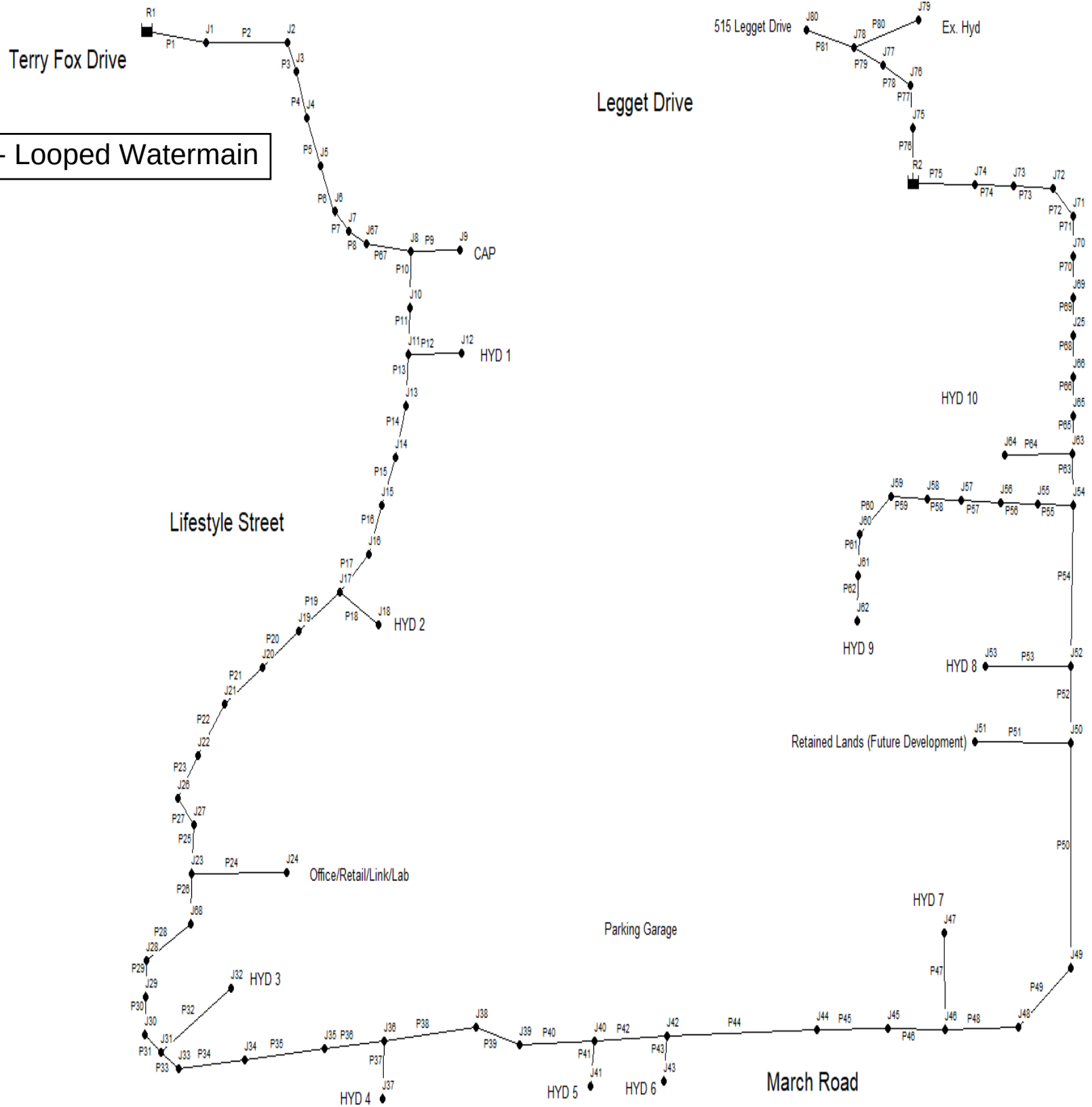
| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J75 | 77.14 | 0.00 | 131.10 | 53.96 | 529.35 | 76.78 |
| Junc J76 | 76.70 | 0.00 | 131.10 | 54.40 | 533.66 | 77.40 |
| Junc J77 | 76.85 | 0.00 | 131.10 | 54.25 | 532.19 | 77.19 |
| Junc J78 | 77.15 | 0.00 | 131.10 | 53.95 | 529.25 | 76.76 |
| Junc J79 | 77.15 | 0.00 | 131.10 | 53.95 | 529.25 | 76.76 |
| Junc J80 | 76.32 | 1.44 | 131.10 | 54.78 | 537.39 | 77.94 |
| Resvr R2 | 131.10 | -1.44 | 131.10 | 0 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 76.76 |
| Max= | 77.94 |

Maximum HGL
Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P76 | 9.70 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6.00 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0.00 |
| Pipe P81 | 1.85 | 200 | 110 | 1.44 | 0.05 | 0.03 |

Scenario 1 - Looped Watermain



# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Office & Link Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 120.19 | 44.09 | 432.52 | 62.73 |
| Junc J2 | 77.10 | 0.00 | 119.96 | 42.86 | 420.46 | 60.98 |
| Junc J3 | 77.10 | 0.00 | 119.94 | 42.84 | 420.26 | 60.95 |
| Junc J4 | 75.75 | 0.00 | 119.92 | 44.17 | 433.31 | 62.85 |
| Junc J5 | 75.75 | 0.00 | 119.89 | 44.14 | 433.01 | 62.80 |
| Junc J6 | 77.10 | 0.00 | 119.88 | 42.78 | 419.67 | 60.87 |
| Junc J7 | 77.10 | 0.00 | 119.87 | 42.77 | 419.57 | 60.85 |
| Junc J8 | 76.86 | 0.00 | 119.74 | 42.88 | 420.65 | 61.01 |
| Junc J9 | 76.80 | 0.00 | 119.74 | 42.94 | 421.24 | 61.10 |
| Junc J10 | 76.90 | 0.00 | 119.71 | 42.81 | 419.97 | 60.91 |
| Junc J11 | 77.10 | 0.00 | 119.67 | 42.57 | 417.61 | 60.57 |
| Junc J12 | 77.20 | 0.00 | 119.67 | 42.47 | 416.63 | 60.43 |
| Junc J13 | 77.40 | 0.00 | 119.60 | 42.20 | 413.98 | 60.04 |
| Junc J14 | 77.50 | 0.00 | 119.58 | 42.08 | 412.80 | 59.87 |
| Junc J15 | 78.60 | 0.00 | 119.56 | 40.96 | 401.82 | 58.28 |
| Junc J16 | 78.70 | 0.00 | 119.54 | 40.84 | 400.64 | 58.11 |
| Junc J17 | 78.90 | 0.00 | 119.50 | 40.60 | 398.29 | 57.77 |
| Junc J18 | 78.90 | 0.00 | 119.50 | 40.60 | 398.29 | 57.77 |
| Junc J19 | 79.00 | 0.00 | 119.46 | 40.46 | 396.91 | 57.57 |
| Junc J20 | 79.40 | 0.00 | 119.46 | 40.06 | 392.99 | 57.00 |
| Junc J21 | 79.50 | 0.00 | 119.43 | 39.93 | 391.71 | 56.81 |
| Junc J22 | 79.50 | 0.00 | 119.41 | 39.91 | 391.52 | 56.78 |
| Junc J23 | 79.50 | 0.00 | 119.35 | 39.85 | 390.93 | 56.70 |
| Junc J24 | 79.60 | 2.62 | 119.35 | 39.75 | 389.95 | 56.56 |
| Junc J26 | 79.50 | 0.00 | 119.37 | 39.87 | 391.12 | 56.73 |
| Junc J27 | 79.50 | 0.00 | 119.37 | 39.87 | 391.12 | 56.73 |
| Junc J28 | 79.66 | 0.00 | 119.30 | 39.64 | 388.87 | 56.40 |
| Junc J29 | 79.80 | 0.00 | 119.27 | 39.47 | 387.20 | 56.16 |
| Junc J30 | 79.80 | 0.00 | 119.24 | 39.44 | 386.91 | 56.12 |
| Junc J31 | 79.84 | 0.00 | 119.24 | 39.40 | 386.51 | 56.06 |
| Junc J32 | 79.88 | 59.00 | 118.72 | 38.84 | 381.02 | 55.26 |
| Junc J33 | 79.84 | 0.00 | 119.24 | 39.40 | 386.51 | 56.06 |
| Junc J34 | 79.71 | 0.00 | 119.24 | 39.53 | 387.79 | 56.24 |
| Junc J35 | 79.56 | 0.00 | 119.24 | 39.68 | 389.26 | 56.46 |
| Junc J36 | 79.55 | 0.00 | 119.24 | 39.69 | 389.36 | 56.47 |
| Junc J37 | 79.59 | 59.00 | 118.80 | 39.21 | 384.65 | 55.79 |
| Junc J38 | 79.51 | 0.00 | 119.29 | 39.78 | 390.24 | 56.60 |
| Junc J39 | 79.51 | 0.00 | 119.34 | 39.83 | 390.73 | 56.67 |
| Junc J40 | 79.45 | 0.00 | 119.43 | 39.98 | 392.20 | 56.88 |
| Junc J41 | 79.47 | 0.00 | 119.43 | 39.96 | 392.01 | 56.86 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 119.60 | 40.27 | 395.05 | 57.30 |
| Junc J43 | 79.35 | 0.00 | 119.60 | 40.25 | 394.85 | 57.27 |
| Junc J44 | 79.21 | 0.00 | 119.78 | 40.57 | 397.99 | 57.72 |
| Junc J45 | 78.75 | 0.00 | 119.79 | 41.04 | 402.60 | 58.39 |
| Junc J46 | 78.75 | 0.00 | 119.84 | 41.09 | 403.09 | 58.46 |
| Junc J47 | 78.77 | 0.00 | 119.84 | 41.07 | 402.90 | 58.44 |
| Junc J48 | 78.75 | 0.00 | 119.86 | 41.11 | 403.29 | 58.49 |
| Junc J49 | 78.72 | 0.00 | 119.87 | 41.15 | 403.68 | 58.55 |
| Junc J50 | 77.64 | 0.00 | 120.05 | 42.41 | 416.04 | 60.34 |
| Junc J51 | 77.74 | 0.65 | 120.05 | 42.31 | 415.06 | 60.20 |
| Junc J52 | 77.57 | 0.00 | 120.08 | 42.51 | 417.02 | 60.48 |
| Junc J53 | 77.64 | 0.00 | 120.08 | 42.44 | 416.34 | 60.38 |
| Junc J54 | 77.45 | 0.00 | 120.12 | 42.67 | 418.59 | 60.71 |
| Junc J55 | 77.44 | 0.00 | 120.12 | 42.68 | 418.69 | 60.73 |
| Junc J56 | 76.90 | 0.00 | 120.12 | 43.22 | 423.99 | 61.49 |
| Junc J57 | 76.90 | 0.00 | 120.12 | 43.22 | 423.99 | 61.49 |
| Junc J58 | 77.70 | 0.00 | 120.12 | 42.42 | 416.14 | 60.36 |
| Junc J59 | 77.70 | 0.00 | 120.12 | 42.42 | 416.14 | 60.36 |
| Junc J60 | 77.70 | 0.00 | 120.12 | 42.42 | 416.14 | 60.36 |
| Junc J61 | 77.70 | 0.00 | 120.12 | 42.42 | 416.14 | 60.36 |
| Junc J62 | 77.72 | 0.00 | 120.12 | 42.40 | 415.94 | 60.33 |
| Junc J63 | 77.10 | 0.00 | 120.24 | 43.14 | 423.20 | 61.38 |
| Junc J64 | 77.18 | 0.00 | 120.24 | 43.06 | 422.42 | 61.27 |
| Junc J65 | 76.80 | 0.00 | 120.35 | 43.55 | 427.23 | 61.96 |
| Junc J66 | 76.80 | 0.00 | 120.35 | 43.55 | 427.23 | 61.96 |
| Junc J67 | 77.10 | 0.00 | 119.84 | 42.74 | 419.28 | 60.81 |
| Junc J68 | 79.50 | 0.00 | 119.32 | 39.82 | 390.63 | 56.66 |
| Junc J25 | 74.80 | 0.00 | 120.37 | 45.57 | 447.04 | 64.84 |
| Junc J69 | 74.80 | 0.00 | 120.40 | 45.60 | 447.34 | 64.88 |
| Junc J70 | 74.80 | 0.00 | 120.43 | 45.63 | 447.63 | 64.92 |
| Junc J71 | 74.80 | 0.00 | 120.45 | 45.65 | 447.83 | 64.95 |
| Junc J72 | 74.80 | 0.00 | 120.48 | 45.68 | 448.12 | 64.99 |
| Junc J73 | 74.80 | 0.00 | 120.51 | 45.71 | 448.42 | 65.04 |
| Junc J74 | 77.00 | 0.00 | 120.57 | 43.57 | 427.42 | 61.99 |
| Junc J75 | 77.14 | 0.00 | 120.60 | 43.46 | 426.34 | 61.84 |
| Junc J76 | 76.70 | 0.00 | 120.60 | 43.90 | 430.66 | 62.46 |
| Junc J77 | 76.85 | 0.00 | 120.60 | 43.75 | 429.19 | 62.25 |
| Junc J78 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J79 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J80 | 76.32 | 1.44 | 120.60 | 44.28 | 434.39 | 63.00 |
| Resvr R1 | 120.30 | -60.35 | 120.30 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 120.60 | -62.36 | 120.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 55.26 |
| Max= | 65.04 |

Max Day + Fire Flow Demand (Office & Link Building) - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P2 | 76.4 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P3 | 9 | 300 | 120 | 60.35 | 0.85 | 2.92 |
| Pipe P4 | 6.2 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P5 | 8 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P6 | 6.2 | 300 | 120 | 60.35 | 0.85 | 2.92 |
| Pipe P7 | 2 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P8 | 11.8 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P11 | 13.3 | 300 | 120 | 60.35 | 0.85 | 2.92 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P14 | 6 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P15 | 5.3 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P16 | 8.9 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P17 | 14.2 | 300 | 120 | 60.35 | 0.85 | 2.92 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P20 | 1.8 | 300 | 120 | 60.35 | 0.85 | 2.92 |
| Pipe P21 | 8.6 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P22 | 6.3 | 300 | 120 | 60.35 | 0.85 | 2.92 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P28 | 9.6 | 300 | 120 | 57.73 | 0.82 | 2.69 |
| Pipe P29 | 10.9 | 300 | 120 | 57.73 | 0.82 | 2.69 |
| Pipe P30 | 8.8 | 300 | 120 | 57.73 | 0.82 | 2.69 |
| Pipe P31 | 1.6 | 300 | 120 | 57.73 | 0.82 | 2.7 |
| Pipe P32 | 4.5 | 150 | 100 | 59 | 3.34 | 115.06 |
| Pipe P33 | 12 | 300 | 120 | -1.27 | 0.02 | 0 |
| Pipe P34 | 18.8 | 300 | 120 | -1.27 | 0.02 | 0 |
| Pipe P35 | 50 | 300 | 120 | -1.27 | 0.02 | 0 |
| Pipe P36 | 6 | 300 | 120 | -1.27 | 0.02 | 0 |
| Pipe P37 | 3.8 | 150 | 100 | 59 | 3.34 | 115.06 |
| Pipe P38 | 15.9 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P39 | 19.6 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P40 | 30.4 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P45 | 4.1 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P46 | 19.3 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P49 | 2.9 | 300 | 120 | -60.27 | 0.85 | 2.92 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -60.27 | 0.85 | 2.92 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | -60.92 | 0.86 | 2.98 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -60.92 | 0.86 | 2.98 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | -60.92 | 0.86 | 2.98 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -60.92 | 0.86 | 2.98 |
| Pipe P66 | 2 | 300 | 120 | -60.92 | 0.86 | 2.98 |
| Pipe P67 | 34.1 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P23 | 12.8 | 300 | 120 | 60.35 | 0.85 | 2.92 |
| Pipe P25 | 6.2 | 300 | 120 | 60.35 | 0.85 | 2.93 |
| Pipe P26 | 9.8 | 300 | 120 | 57.73 | 0.82 | 2.69 |
| Pipe P68 | 4.7 | 300 | 120 | -60.92 | 0.86 | 2.98 |
| Pipe P69 | 12 | 300 | 120 | -60.92 | 0.86 | 2.98 |
| Pipe P70 | 1 | 200 | 110 | 60.92 | 1.94 | 25.2 |
| Pipe P71 | 1 | 200 | 110 | -60.92 | 1.94 | 25.21 |
| Pipe P72 | 1.2 | 200 | 110 | 60.92 | 1.94 | 25.2 |
| Pipe P73 | 1.1 | 200 | 110 | 60.92 | 1.94 | 25.2 |
| Pipe P74 | 2.5 | 200 | 110 | 60.92 | 1.94 | 25.2 |
| Pipe P75 | 1 | 200 | 110 | -60.92 | 1.94 | 25.2 |
| Pipe P76 | 9.7 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.03 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Retail East Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 127.46 | 51.36 | 503.84 | 73.08 |
| Junc J2 | 77.10 | 0.00 | 127.39 | 50.29 | 493.34 | 71.55 |
| Junc J3 | 77.10 | 0.00 | 127.39 | 50.29 | 493.34 | 71.55 |
| Junc J4 | 75.75 | 0.00 | 127.38 | 51.63 | 506.49 | 73.46 |
| Junc J5 | 75.75 | 0.00 | 127.37 | 51.62 | 506.39 | 73.45 |
| Junc J6 | 77.10 | 0.00 | 127.37 | 50.27 | 493.15 | 71.53 |
| Junc J7 | 77.10 | 0.00 | 127.37 | 50.27 | 493.15 | 71.53 |
| Junc J8 | 76.86 | 0.00 | 127.32 | 50.46 | 495.01 | 71.80 |
| Junc J9 | 76.80 | 0.00 | 127.32 | 50.52 | 495.60 | 71.88 |
| Junc J10 | 76.90 | 0.00 | 127.31 | 50.41 | 494.52 | 71.72 |
| Junc J11 | 77.10 | 0.00 | 127.30 | 50.20 | 492.46 | 71.43 |
| Junc J12 | 77.20 | 0.00 | 127.30 | 50.10 | 491.48 | 71.28 |
| Junc J13 | 77.40 | 0.00 | 127.28 | 49.88 | 489.32 | 70.97 |
| Junc J14 | 77.50 | 0.00 | 127.27 | 49.77 | 488.24 | 70.81 |
| Junc J15 | 78.60 | 0.00 | 127.27 | 48.67 | 477.45 | 69.25 |
| Junc J16 | 78.70 | 0.00 | 127.26 | 48.56 | 476.37 | 69.09 |
| Junc J17 | 78.90 | 0.00 | 127.25 | 48.35 | 474.31 | 68.79 |
| Junc J18 | 78.90 | 50.00 | 127.05 | 48.15 | 472.35 | 68.51 |
| Junc J19 | 79.00 | 0.00 | 127.25 | 48.25 | 473.33 | 68.65 |
| Junc J20 | 79.40 | 0.00 | 127.25 | 47.85 | 469.41 | 68.08 |
| Junc J21 | 79.50 | 0.00 | 127.26 | 47.76 | 468.53 | 67.95 |
| Junc J22 | 79.50 | 0.00 | 127.26 | 47.76 | 468.53 | 67.95 |
| Junc J23 | 79.50 | 0.00 | 127.26 | 47.76 | 468.53 | 67.95 |
| Junc J24 | 79.60 | 2.62 | 127.26 | 47.66 | 467.54 | 67.81 |
| Junc J26 | 79.50 | 0.00 | 127.26 | 47.76 | 468.53 | 67.95 |
| Junc J27 | 79.50 | 0.00 | 127.26 | 47.76 | 468.53 | 67.95 |
| Junc J28 | 79.66 | 0.00 | 127.27 | 47.61 | 467.05 | 67.74 |
| Junc J29 | 79.80 | 0.00 | 127.28 | 47.48 | 465.78 | 67.56 |
| Junc J30 | 79.80 | 0.00 | 127.28 | 47.48 | 465.78 | 67.56 |
| Junc J31 | 79.84 | 0.00 | 127.28 | 47.44 | 465.39 | 67.50 |
| Junc J32 | 79.88 | 0.00 | 127.28 | 47.40 | 464.99 | 67.44 |
| Junc J33 | 79.84 | 0.00 | 127.28 | 47.44 | 465.39 | 67.50 |
| Junc J34 | 79.71 | 0.00 | 127.29 | 47.58 | 466.76 | 67.70 |
| Junc J35 | 79.56 | 0.00 | 127.31 | 47.75 | 468.43 | 67.94 |
| Junc J36 | 79.55 | 0.00 | 127.31 | 47.76 | 468.53 | 67.95 |
| Junc J37 | 79.59 | 0.00 | 127.31 | 47.72 | 468.13 | 67.90 |
| Junc J38 | 79.51 | 0.00 | 127.32 | 47.81 | 469.02 | 68.03 |
| Junc J39 | 79.51 | 0.00 | 127.33 | 47.82 | 469.11 | 68.04 |
| Junc J40 | 79.45 | 0.00 | 127.34 | 47.89 | 469.80 | 68.14 |
| Junc J41 | 79.47 | 0.00 | 127.34 | 47.87 | 469.60 | 68.11 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 127.36 | 48.03 | 471.17 | 68.34 |
| Junc J43 | 79.35 | 0.00 | 127.36 | 48.01 | 470.98 | 68.31 |
| Junc J44 | 79.21 | 0.00 | 127.39 | 48.18 | 472.65 | 68.55 |
| Junc J45 | 78.75 | 0.00 | 127.39 | 48.64 | 477.16 | 69.21 |
| Junc J46 | 78.75 | 0.00 | 127.40 | 48.65 | 477.26 | 69.22 |
| Junc J47 | 78.77 | 0.00 | 127.40 | 48.63 | 477.06 | 69.19 |
| Junc J48 | 78.75 | 0.00 | 127.40 | 48.65 | 477.26 | 69.22 |
| Junc J49 | 78.72 | 0.00 | 127.40 | 48.68 | 477.55 | 69.26 |
| Junc J50 | 77.64 | 0.00 | 127.42 | 49.78 | 488.34 | 70.83 |
| Junc J51 | 77.74 | 0.65 | 127.42 | 49.68 | 487.36 | 70.69 |
| Junc J52 | 77.57 | 0.00 | 127.43 | 49.86 | 489.13 | 70.94 |
| Junc J53 | 77.64 | 0.00 | 127.43 | 49.79 | 488.44 | 70.84 |
| Junc J54 | 77.45 | 0.00 | 127.43 | 49.98 | 490.30 | 71.11 |
| Junc J55 | 77.44 | 0.00 | 127.43 | 49.99 | 490.40 | 71.13 |
| Junc J56 | 76.90 | 0.00 | 127.43 | 50.53 | 495.70 | 71.90 |
| Junc J57 | 76.90 | 0.00 | 127.43 | 50.53 | 495.70 | 71.90 |
| Junc J58 | 77.70 | 0.00 | 127.43 | 49.73 | 487.85 | 70.76 |
| Junc J59 | 77.70 | 0.00 | 127.43 | 49.73 | 487.85 | 70.76 |
| Junc J60 | 77.70 | 0.00 | 127.43 | 49.73 | 487.85 | 70.76 |
| Junc J61 | 77.70 | 0.00 | 127.43 | 49.73 | 487.85 | 70.76 |
| Junc J62 | 77.72 | 0.00 | 127.43 | 49.71 | 487.66 | 70.73 |
| Junc J63 | 77.10 | 0.00 | 127.45 | 50.35 | 493.93 | 71.64 |
| Junc J64 | 77.18 | 0.00 | 127.45 | 50.27 | 493.15 | 71.53 |
| Junc J65 | 76.80 | 0.00 | 127.46 | 50.66 | 496.97 | 72.08 |
| Junc J66 | 76.80 | 0.00 | 127.47 | 50.67 | 497.07 | 72.09 |
| Junc J67 | 77.10 | 0.00 | 127.35 | 50.25 | 492.95 | 71.50 |
| Junc J68 | 79.50 | 0.00 | 127.27 | 47.77 | 468.62 | 67.97 |
| Junc J25 | 74.80 | 0.00 | 127.47 | 52.67 | 516.69 | 74.94 |
| Junc J69 | 74.80 | 0.00 | 127.47 | 52.67 | 516.69 | 74.94 |
| Junc J70 | 74.80 | 0.00 | 127.48 | 52.68 | 516.79 | 74.95 |
| Junc J71 | 74.80 | 0.00 | 127.48 | 52.68 | 516.79 | 74.95 |
| Junc J72 | 74.80 | 0.00 | 127.48 | 52.68 | 516.79 | 74.95 |
| Junc J73 | 74.80 | 0.00 | 127.49 | 52.69 | 516.89 | 74.97 |
| Junc J74 | 77.00 | 0.00 | 127.50 | 50.50 | 495.41 | 71.85 |
| Junc J75 | 77.14 | 0.00 | 127.50 | 50.36 | 494.03 | 71.65 |
| Junc J76 | 76.70 | 0.00 | 127.50 | 50.80 | 498.35 | 72.28 |
| Junc J77 | 76.85 | 0.00 | 127.50 | 50.65 | 496.88 | 72.07 |
| Junc J78 | 77.15 | 0.00 | 127.50 | 50.35 | 493.93 | 71.64 |
| Junc J79 | 77.15 | 0.00 | 127.50 | 50.35 | 493.93 | 71.64 |
| Junc J80 | 76.32 | 1.44 | 127.50 | 51.18 | 502.08 | 72.82 |
| Resvr R1 | 127.50 | -32.22 | 127.50 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 127.50 | -22.49 | 127.50 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 67.44 |
| Max= | 74.97 |

Max Day + Fire Flow Demand (Retail East Building) - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P2 | 76.4 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P3 | 9 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P4 | 6.2 | 300 | 120 | 32.22 | 0.46 | 0.92 |
| Pipe P5 | 8 | 300 | 120 | 32.22 | 0.46 | 0.92 |
| Pipe P6 | 6.2 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P7 | 2 | 300 | 120 | 32.22 | 0.46 | 0.92 |
| Pipe P8 | 11.8 | 300 | 120 | 32.22 | 0.46 | 0.92 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P11 | 13.3 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P14 | 6 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P15 | 5.3 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P16 | 8.9 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P17 | 14.2 | 300 | 120 | 32.22 | 0.46 | 0.92 |
| Pipe P18 | 2.3 | 150 | 100 | 50 | 2.83 | 84.68 |
| Pipe P19 | 12 | 300 | 120 | -17.78 | 0.25 | 0.3 |
| Pipe P20 | 1.8 | 300 | 120 | -17.78 | 0.25 | 0.3 |
| Pipe P21 | 8.6 | 300 | 120 | -17.78 | 0.25 | 0.3 |
| Pipe P22 | 6.3 | 300 | 120 | -17.78 | 0.25 | 0.3 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.08 |
| Pipe P27 | 2.8 | 300 | 120 | -17.78 | 0.25 | 0.31 |
| Pipe P28 | 9.6 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P29 | 10.9 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P30 | 8.8 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P31 | 1.6 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P34 | 18.8 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P35 | 50 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P36 | 6 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P39 | 19.6 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P40 | 30.4 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P45 | 4.1 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P46 | 19.3 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P49 | 2.9 | 300 | 120 | -20.4 | 0.29 | 0.39 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | -21.05 | 0.3 | 0.42 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -21.05 | 0.3 | 0.42 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | -21.05 | 0.3 | 0.42 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -21.05 | 0.3 | 0.42 |
| Pipe P66 | 2 | 300 | 120 | -21.05 | 0.3 | 0.42 |
| Pipe P67 | 34.1 | 300 | 120 | 32.22 | 0.46 | 0.91 |
| Pipe P23 | 12.8 | 300 | 120 | -17.78 | 0.25 | 0.3 |
| Pipe P25 | 6.2 | 300 | 120 | -17.78 | 0.25 | 0.3 |
| Pipe P26 | 9.8 | 300 | 120 | -20.4 | 0.29 | 0.39 |
| Pipe P68 | 4.7 | 300 | 120 | -21.05 | 0.3 | 0.42 |
| Pipe P69 | 12 | 300 | 120 | -21.05 | 0.3 | 0.42 |
| Pipe P70 | 1 | 200 | 110 | 21.05 | 0.67 | 3.52 |
| Pipe P71 | 1 | 200 | 110 | -21.05 | 0.67 | 3.53 |
| Pipe P72 | 1.2 | 200 | 110 | 21.05 | 0.67 | 3.53 |
| Pipe P73 | 1.1 | 200 | 110 | 21.05 | 0.67 | 3.52 |
| Pipe P74 | 2.5 | 200 | 110 | 21.05 | 0.67 | 3.52 |
| Pipe P75 | 1 | 200 | 110 | -21.05 | 0.67 | 3.53 |
| Pipe P76 | 9.7 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.02 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Retail West Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 127.38 | 51.28 | 503.06 | 72.96 |
| Junc J2 | 77.10 | 0.00 | 127.16 | 50.06 | 491.09 | 71.23 |
| Junc J3 | 77.10 | 0.00 | 127.13 | 50.03 | 490.79 | 71.18 |
| Junc J4 | 75.75 | 0.00 | 127.11 | 51.36 | 503.84 | 73.08 |
| Junc J5 | 75.75 | 0.00 | 127.09 | 51.34 | 503.65 | 73.05 |
| Junc J6 | 77.10 | 0.00 | 127.07 | 49.97 | 490.21 | 71.10 |
| Junc J7 | 77.10 | 0.00 | 127.06 | 49.96 | 490.11 | 71.08 |
| Junc J8 | 76.86 | 0.00 | 126.93 | 50.07 | 491.19 | 71.24 |
| Junc J9 | 76.80 | 0.00 | 126.93 | 50.13 | 491.78 | 71.33 |
| Junc J10 | 76.90 | 0.00 | 126.90 | 50.00 | 490.50 | 71.14 |
| Junc J11 | 77.10 | 0.00 | 126.86 | 49.76 | 488.15 | 70.80 |
| Junc J12 | 77.20 | 0.00 | 126.86 | 49.66 | 487.16 | 70.66 |
| Junc J13 | 77.40 | 0.00 | 126.79 | 49.39 | 484.52 | 70.27 |
| Junc J14 | 77.50 | 0.00 | 126.77 | 49.27 | 483.34 | 70.10 |
| Junc J15 | 78.60 | 0.00 | 126.75 | 48.15 | 472.35 | 68.51 |
| Junc J16 | 78.70 | 0.00 | 126.73 | 48.03 | 471.17 | 68.34 |
| Junc J17 | 78.90 | 0.00 | 126.69 | 47.79 | 468.82 | 68.00 |
| Junc J18 | 78.90 | 50.00 | 126.49 | 47.59 | 466.86 | 67.71 |
| Junc J19 | 79.00 | 0.00 | 126.68 | 47.68 | 467.74 | 67.84 |
| Junc J20 | 79.40 | 0.00 | 126.68 | 47.28 | 463.82 | 67.27 |
| Junc J21 | 79.50 | 0.00 | 126.68 | 47.18 | 462.84 | 67.13 |
| Junc J22 | 79.50 | 0.00 | 126.68 | 47.18 | 462.84 | 67.13 |
| Junc J23 | 79.50 | 0.00 | 126.68 | 47.18 | 462.84 | 67.13 |
| Junc J24 | 79.60 | 2.62 | 126.68 | 47.08 | 461.85 | 66.99 |
| Junc J26 | 79.50 | 0.00 | 126.68 | 47.18 | 462.84 | 67.13 |
| Junc J27 | 79.50 | 0.00 | 126.68 | 47.18 | 462.84 | 67.13 |
| Junc J28 | 79.66 | 0.00 | 126.68 | 47.02 | 461.27 | 66.90 |
| Junc J29 | 79.80 | 0.00 | 126.68 | 46.88 | 459.89 | 66.70 |
| Junc J30 | 79.80 | 0.00 | 126.68 | 46.88 | 459.89 | 66.70 |
| Junc J31 | 79.84 | 0.00 | 126.68 | 46.84 | 459.50 | 66.64 |
| Junc J32 | 79.88 | 50.00 | 126.30 | 46.42 | 455.38 | 66.05 |
| Junc J33 | 79.84 | 0.00 | 126.69 | 46.85 | 459.60 | 66.66 |
| Junc J34 | 79.71 | 0.00 | 126.72 | 47.01 | 461.17 | 66.89 |
| Junc J35 | 79.56 | 0.00 | 126.80 | 47.24 | 463.42 | 67.21 |
| Junc J36 | 79.55 | 0.00 | 126.81 | 47.26 | 463.62 | 67.24 |
| Junc J37 | 79.59 | 0.00 | 126.81 | 47.22 | 463.23 | 67.19 |
| Junc J38 | 79.51 | 0.00 | 126.83 | 47.32 | 464.21 | 67.33 |
| Junc J39 | 79.51 | 0.00 | 126.86 | 47.35 | 464.50 | 67.37 |
| Junc J40 | 79.45 | 0.00 | 126.90 | 47.45 | 465.48 | 67.51 |
| Junc J41 | 79.47 | 0.00 | 126.90 | 47.43 | 465.29 | 67.48 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 126.99 | 47.66 | 467.54 | 67.81 |
| Junc J43 | 79.35 | 0.00 | 126.99 | 47.64 | 467.35 | 67.78 |
| Junc J44 | 79.21 | 0.00 | 127.08 | 47.87 | 469.60 | 68.11 |
| Junc J45 | 78.75 | 0.00 | 127.08 | 48.33 | 474.12 | 68.76 |
| Junc J46 | 78.75 | 0.00 | 127.11 | 48.36 | 474.41 | 68.81 |
| Junc J47 | 78.77 | 0.00 | 127.11 | 48.34 | 474.22 | 68.78 |
| Junc J48 | 78.75 | 0.00 | 127.12 | 48.37 | 474.51 | 68.82 |
| Junc J49 | 78.72 | 0.00 | 127.13 | 48.41 | 474.90 | 68.88 |
| Junc J50 | 77.64 | 0.00 | 127.22 | 49.58 | 486.38 | 70.54 |
| Junc J51 | 77.74 | 0.65 | 127.22 | 49.48 | 485.40 | 70.40 |
| Junc J52 | 77.57 | 0.00 | 127.23 | 49.66 | 487.16 | 70.66 |
| Junc J53 | 77.64 | 0.00 | 127.23 | 49.59 | 486.48 | 70.56 |
| Junc J54 | 77.45 | 0.00 | 127.26 | 49.81 | 488.64 | 70.87 |
| Junc J55 | 77.44 | 0.00 | 127.26 | 49.82 | 488.73 | 70.88 |
| Junc J56 | 76.90 | 0.00 | 127.26 | 50.36 | 494.03 | 71.65 |
| Junc J57 | 76.90 | 0.00 | 127.26 | 50.36 | 494.03 | 71.65 |
| Junc J58 | 77.70 | 0.00 | 127.26 | 49.56 | 486.18 | 70.51 |
| Junc J59 | 77.70 | 0.00 | 127.26 | 49.56 | 486.18 | 70.51 |
| Junc J60 | 77.70 | 0.00 | 127.26 | 49.56 | 486.18 | 70.51 |
| Junc J61 | 77.70 | 0.00 | 127.26 | 49.56 | 486.18 | 70.51 |
| Junc J62 | 77.72 | 0.00 | 127.26 | 49.54 | 485.99 | 70.49 |
| Junc J63 | 77.10 | 0.00 | 127.32 | 50.22 | 492.66 | 71.45 |
| Junc J64 | 77.18 | 0.00 | 127.32 | 50.14 | 491.87 | 71.34 |
| Junc J65 | 76.80 | 0.00 | 127.37 | 50.57 | 496.09 | 71.95 |
| Junc J66 | 76.80 | 0.00 | 127.37 | 50.57 | 496.09 | 71.95 |
| Junc J67 | 77.10 | 0.00 | 127.03 | 49.93 | 489.81 | 71.04 |
| Junc J68 | 79.50 | 0.00 | 126.68 | 47.18 | 462.84 | 67.13 |
| Junc J25 | 74.80 | 0.00 | 127.38 | 52.58 | 515.81 | 74.81 |
| Junc J69 | 74.80 | 0.00 | 127.40 | 52.60 | 516.01 | 74.84 |
| Junc J70 | 74.80 | 0.00 | 127.41 | 52.61 | 516.10 | 74.85 |
| Junc J71 | 74.80 | 0.00 | 127.43 | 52.63 | 516.30 | 74.88 |
| Junc J72 | 74.80 | 0.00 | 127.44 | 52.64 | 516.40 | 74.90 |
| Junc J73 | 74.80 | 0.00 | 127.45 | 52.65 | 516.50 | 74.91 |
| Junc J74 | 77.00 | 0.00 | 127.49 | 50.49 | 495.31 | 71.84 |
| Junc J75 | 77.14 | 0.00 | 127.50 | 50.36 | 494.03 | 71.65 |
| Junc J76 | 76.70 | 0.00 | 127.50 | 50.80 | 498.35 | 72.28 |
| Junc J77 | 76.85 | 0.00 | 127.50 | 50.65 | 496.88 | 72.07 |
| Junc J78 | 77.15 | 0.00 | 127.50 | 50.35 | 493.93 | 71.64 |
| Junc J79 | 77.15 | 0.00 | 127.50 | 50.35 | 493.93 | 71.64 |
| Junc J80 | 76.32 | 1.44 | 127.50 | 51.18 | 502.08 | 72.82 |
| Resvr R1 | 127.50 | -60.78 | 127.50 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 127.50 | -43.93 | 127.50 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 66.05 |
| Max= | 74.91 |

Max Day + Fire Flow Demand (Retail West Building) - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P2 | 76.4 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P3 | 9 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P4 | 6.2 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P5 | 8 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P6 | 6.2 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P7 | 2 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P8 | 11.8 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P11 | 13.3 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P14 | 6 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P15 | 5.3 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P16 | 8.9 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P17 | 14.2 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P18 | 2.3 | 150 | 100 | 50 | 2.83 | 84.68 |
| Pipe P19 | 12 | 300 | 120 | 10.78 | 0.15 | 0.12 |
| Pipe P20 | 1.8 | 300 | 120 | 10.78 | 0.15 | 0.12 |
| Pipe P21 | 8.6 | 300 | 120 | 10.78 | 0.15 | 0.12 |
| Pipe P22 | 6.3 | 300 | 120 | 10.78 | 0.15 | 0.12 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 10.78 | 0.15 | 0.12 |
| Pipe P28 | 9.6 | 300 | 120 | 8.16 | 0.12 | 0.07 |
| Pipe P29 | 10.9 | 300 | 120 | 8.16 | 0.12 | 0.07 |
| Pipe P30 | 8.8 | 300 | 120 | 8.16 | 0.12 | 0.07 |
| Pipe P31 | 1.6 | 300 | 120 | 8.16 | 0.12 | 0.07 |
| Pipe P32 | 4.5 | 150 | 100 | 50 | 2.83 | 84.68 |
| Pipe P33 | 12 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P34 | 18.8 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P35 | 50 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P36 | 6 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P39 | 19.6 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P40 | 30.4 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P45 | 4.1 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P46 | 19.3 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -41.84 | 0.59 | 1.49 |
| Pipe P49 | 2.9 | 300 | 120 | -41.84 | 0.59 | 1.48 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -41.84 | 0.59 | 1.48 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | -42.49 | 0.6 | 1.53 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -42.49 | 0.6 | 1.53 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | -42.49 | 0.6 | 1.53 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -42.49 | 0.6 | 1.53 |
| Pipe P66 | 2 | 300 | 120 | -42.49 | 0.6 | 1.53 |
| Pipe P67 | 34.1 | 300 | 120 | 60.78 | 0.86 | 2.96 |
| Pipe P23 | 12.8 | 300 | 120 | 10.78 | 0.15 | 0.12 |
| Pipe P25 | 6.2 | 300 | 120 | 10.78 | 0.15 | 0.12 |
| Pipe P26 | 9.8 | 300 | 120 | 8.16 | 0.12 | 0.07 |
| Pipe P68 | 4.7 | 300 | 120 | -42.49 | 0.6 | 1.53 |
| Pipe P69 | 12 | 300 | 120 | -42.49 | 0.6 | 1.53 |
| Pipe P70 | 1 | 200 | 110 | 42.49 | 1.35 | 12.93 |
| Pipe P71 | 1 | 200 | 110 | -42.49 | 1.35 | 12.94 |
| Pipe P72 | 1.2 | 200 | 110 | 42.49 | 1.35 | 12.93 |
| Pipe P73 | 1.1 | 200 | 110 | 42.49 | 1.35 | 12.93 |
| Pipe P74 | 2.5 | 200 | 110 | 42.49 | 1.35 | 12.93 |
| Pipe P75 | 1 | 200 | 110 | -42.49 | 1.35 | 12.94 |
| Pipe P76 | 9.7 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.02 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (R&D Lab Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 119.95 | 43.85 | 430.17 | 62.39 |
| Junc J2 | 77.10 | 0.00 | 119.27 | 42.17 | 413.69 | 60.00 |
| Junc J3 | 77.10 | 0.00 | 119.19 | 42.09 | 412.90 | 59.89 |
| Junc J4 | 75.75 | 0.00 | 119.13 | 43.38 | 425.56 | 61.72 |
| Junc J5 | 75.75 | 0.00 | 119.06 | 43.31 | 424.87 | 61.62 |
| Junc J6 | 77.10 | 0.00 | 119.01 | 41.91 | 411.14 | 59.63 |
| Junc J7 | 77.10 | 0.00 | 118.99 | 41.89 | 410.94 | 59.60 |
| Junc J8 | 76.86 | 0.00 | 118.58 | 41.72 | 409.27 | 59.36 |
| Junc J9 | 76.80 | 0.00 | 118.58 | 41.78 | 409.86 | 59.45 |
| Junc J10 | 76.90 | 0.00 | 118.49 | 41.59 | 408.00 | 59.18 |
| Junc J11 | 77.10 | 0.00 | 118.37 | 41.27 | 404.86 | 58.72 |
| Junc J12 | 77.20 | 95.00 | 117.40 | 40.20 | 394.36 | 57.20 |
| Junc J13 | 77.40 | 0.00 | 118.37 | 40.97 | 401.92 | 58.29 |
| Junc J14 | 77.50 | 0.00 | 118.37 | 40.87 | 400.93 | 58.15 |
| Junc J15 | 78.60 | 0.00 | 118.37 | 39.77 | 390.14 | 56.59 |
| Junc J16 | 78.70 | 0.00 | 118.36 | 39.66 | 389.06 | 56.43 |
| Junc J17 | 78.90 | 0.00 | 118.36 | 39.46 | 387.10 | 56.14 |
| Junc J18 | 78.90 | 63.00 | 118.06 | 39.16 | 384.16 | 55.72 |
| Junc J19 | 79.00 | 0.00 | 118.38 | 39.38 | 386.32 | 56.03 |
| Junc J20 | 79.40 | 0.00 | 118.39 | 38.99 | 382.49 | 55.48 |
| Junc J21 | 79.50 | 0.00 | 118.40 | 38.90 | 381.61 | 55.35 |
| Junc J22 | 79.50 | 0.00 | 118.42 | 38.92 | 381.81 | 55.38 |
| Junc J23 | 79.50 | 0.00 | 118.46 | 38.96 | 382.20 | 55.43 |
| Junc J24 | 79.60 | 2.62 | 118.46 | 38.86 | 381.22 | 55.29 |
| Junc J26 | 79.50 | 0.00 | 118.44 | 38.94 | 382.00 | 55.40 |
| Junc J27 | 79.50 | 0.00 | 118.45 | 38.95 | 382.10 | 55.42 |
| Junc J28 | 79.66 | 0.00 | 118.50 | 38.84 | 381.02 | 55.26 |
| Junc J29 | 79.80 | 0.00 | 118.52 | 38.72 | 379.84 | 55.09 |
| Junc J30 | 79.80 | 0.00 | 118.54 | 38.74 | 380.04 | 55.12 |
| Junc J31 | 79.84 | 0.00 | 118.54 | 38.70 | 379.65 | 55.06 |
| Junc J32 | 79.88 | 0.00 | 118.54 | 38.66 | 379.25 | 55.01 |
| Junc J33 | 79.84 | 0.00 | 118.57 | 38.73 | 379.94 | 55.11 |
| Junc J34 | 79.71 | 0.00 | 118.61 | 38.90 | 381.61 | 55.35 |
| Junc J35 | 79.56 | 0.00 | 118.71 | 39.15 | 384.06 | 55.70 |
| Junc J36 | 79.55 | 0.00 | 118.73 | 39.18 | 384.36 | 55.75 |
| Junc J37 | 79.59 | 0.00 | 118.73 | 39.14 | 383.96 | 55.69 |
| Junc J38 | 79.51 | 0.00 | 118.76 | 39.25 | 385.04 | 55.85 |
| Junc J39 | 79.51 | 0.00 | 118.80 | 39.29 | 385.43 | 55.90 |
| Junc J40 | 79.45 | 0.00 | 118.86 | 39.41 | 386.61 | 56.07 |
| Junc J41 | 79.47 | 0.00 | 118.86 | 39.39 | 386.42 | 56.04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 118.99 | 39.66 | 389.06 | 56.43 |
| Junc J43 | 79.35 | 0.00 | 118.99 | 39.64 | 388.87 | 56.40 |
| Junc J44 | 79.21 | 0.00 | 119.11 | 39.90 | 391.42 | 56.77 |
| Junc J45 | 78.75 | 0.00 | 119.12 | 40.37 | 396.03 | 57.44 |
| Junc J46 | 78.75 | 0.00 | 119.16 | 40.41 | 396.42 | 57.50 |
| Junc J47 | 78.77 | 0.00 | 119.16 | 40.39 | 396.23 | 57.47 |
| Junc J48 | 78.75 | 0.00 | 119.17 | 40.42 | 396.52 | 57.51 |
| Junc J49 | 78.72 | 0.00 | 119.18 | 40.46 | 396.91 | 57.57 |
| Junc J50 | 77.64 | 0.00 | 119.31 | 41.67 | 408.78 | 59.29 |
| Junc J51 | 77.74 | 0.65 | 119.31 | 41.57 | 407.80 | 59.15 |
| Junc J52 | 77.57 | 0.00 | 119.33 | 41.76 | 409.67 | 59.42 |
| Junc J53 | 77.64 | 0.00 | 119.33 | 41.69 | 408.98 | 59.32 |
| Junc J54 | 77.45 | 0.00 | 119.36 | 41.91 | 411.14 | 59.63 |
| Junc J55 | 77.44 | 0.00 | 119.36 | 41.92 | 411.24 | 59.64 |
| Junc J56 | 76.90 | 0.00 | 119.36 | 42.46 | 416.53 | 60.41 |
| Junc J57 | 76.90 | 0.00 | 119.36 | 42.46 | 416.53 | 60.41 |
| Junc J58 | 77.70 | 0.00 | 119.36 | 41.66 | 408.68 | 59.27 |
| Junc J59 | 77.70 | 0.00 | 119.36 | 41.66 | 408.68 | 59.27 |
| Junc J60 | 77.70 | 0.00 | 119.36 | 41.66 | 408.68 | 59.27 |
| Junc J61 | 77.70 | 0.00 | 119.36 | 41.66 | 408.68 | 59.27 |
| Junc J62 | 77.72 | 0.00 | 119.36 | 41.64 | 408.49 | 59.25 |
| Junc J63 | 77.10 | 0.00 | 119.45 | 42.35 | 415.45 | 60.26 |
| Junc J64 | 77.18 | 63.00 | 118.30 | 41.12 | 403.39 | 58.51 |
| Junc J65 | 76.80 | 0.00 | 119.79 | 42.99 | 421.73 | 61.17 |
| Junc J66 | 76.80 | 0.00 | 119.81 | 43.01 | 421.93 | 61.20 |
| Junc J67 | 77.10 | 0.00 | 118.89 | 41.79 | 409.96 | 59.46 |
| Junc J68 | 79.50 | 0.00 | 118.48 | 38.98 | 382.39 | 55.46 |
| Junc J25 | 74.80 | 0.00 | 119.86 | 45.06 | 442.04 | 64.11 |
| Junc J69 | 74.80 | 0.00 | 119.97 | 45.17 | 443.12 | 64.27 |
| Junc J70 | 74.80 | 0.00 | 120.05 | 45.25 | 443.90 | 64.38 |
| Junc J71 | 74.80 | 0.00 | 120.13 | 45.33 | 444.69 | 64.50 |
| Junc J72 | 74.80 | 0.00 | 120.23 | 45.43 | 445.67 | 64.64 |
| Junc J73 | 74.80 | 0.00 | 120.32 | 45.52 | 446.55 | 64.77 |
| Junc J74 | 77.00 | 0.00 | 120.52 | 43.52 | 426.93 | 61.92 |
| Junc J75 | 77.14 | 0.00 | 120.60 | 43.46 | 426.34 | 61.84 |
| Junc J76 | 76.70 | 0.00 | 120.60 | 43.90 | 430.66 | 62.46 |
| Junc J77 | 76.85 | 0.00 | 120.60 | 43.75 | 429.19 | 62.25 |
| Junc J78 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J79 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J80 | 76.32 | 1.44 | 120.60 | 44.28 | 434.39 | 63.00 |
| Resvr R1 | 120.30 | -110.11 | 120.30 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 120.60 | -115.60 | 120.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 55.01 |
| Max= | 64.77 |

Max Day + Fire Flow Demand (R&D Lab Building) - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P2 | 76.4 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P3 | 9 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P4 | 6.2 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P5 | 8 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P6 | 6.2 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P7 | 2 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P8 | 11.8 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P11 | 13.3 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P12 | 3.5 | 150 | 100 | 95 | 5.38 | 277.99 |
| Pipe P13 | 24.3 | 300 | 120 | 15.11 | 0.21 | 0.23 |
| Pipe P14 | 6 | 300 | 120 | 15.11 | 0.21 | 0.22 |
| Pipe P15 | 5.3 | 300 | 120 | 15.11 | 0.21 | 0.22 |
| Pipe P16 | 8.9 | 300 | 120 | 15.11 | 0.21 | 0.23 |
| Pipe P17 | 14.2 | 300 | 120 | 15.11 | 0.21 | 0.22 |
| Pipe P18 | 2.3 | 150 | 100 | 63 | 3.57 | 129.92 |
| Pipe P19 | 12 | 300 | 120 | -47.89 | 0.68 | 1.91 |
| Pipe P20 | 1.8 | 300 | 120 | -47.89 | 0.68 | 1.91 |
| Pipe P21 | 8.6 | 300 | 120 | -47.89 | 0.68 | 1.91 |
| Pipe P22 | 6.3 | 300 | 120 | -47.89 | 0.68 | 1.91 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | -47.89 | 0.68 | 1.91 |
| Pipe P28 | 9.6 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P29 | 10.9 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P30 | 8.8 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P31 | 1.6 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P34 | 18.8 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P35 | 50 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P36 | 6 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P39 | 19.6 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P40 | 30.4 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P45 | 4.1 | 300 | 120 | -50.51 | 0.71 | 2.11 |
| Pipe P46 | 19.3 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P49 | 2.9 | 300 | 120 | -50.51 | 0.71 | 2.1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | -51.16 | 0.72 | 2.15 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -51.16 | 0.72 | 2.15 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | -51.16 | 0.72 | 2.15 |
| Pipe P64 | 8.8 | 150 | 100 | 63 | 3.57 | 129.92 |
| Pipe P65 | 36.3 | 300 | 120 | -114.16 | 1.61 | 9.52 |
| Pipe P66 | 2 | 300 | 120 | -114.16 | 1.61 | 9.52 |
| Pipe P67 | 34.1 | 300 | 120 | 110.11 | 1.56 | 8.91 |
| Pipe P23 | 12.8 | 300 | 120 | -47.89 | 0.68 | 1.91 |
| Pipe P25 | 6.2 | 300 | 120 | -47.89 | 0.68 | 1.91 |
| Pipe P26 | 9.8 | 300 | 120 | -50.51 | 0.71 | 2.1 |
| Pipe P68 | 4.7 | 300 | 120 | -114.16 | 1.61 | 9.52 |
| Pipe P69 | 12 | 300 | 120 | -114.16 | 1.61 | 9.52 |
| Pipe P70 | 1 | 200 | 110 | 114.16 | 3.63 | 80.64 |
| Pipe P71 | 1 | 200 | 110 | -114.16 | 3.63 | 80.64 |
| Pipe P72 | 1.2 | 200 | 110 | 114.16 | 3.63 | 80.64 |
| Pipe P73 | 1.1 | 200 | 110 | 114.16 | 3.63 | 80.64 |
| Pipe P74 | 2.5 | 200 | 110 | 114.16 | 3.63 | 80.64 |
| Pipe P75 | 1 | 200 | 110 | -114.16 | 3.63 | 80.64 |
| Pipe P76 | 9.7 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.03 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Parking Garage) - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 119.88 | 43.78 | 429.48 | 62.29 |
| Junc J2 | 77.10 | 0.00 | 119.07 | 41.97 | 411.73 | 59.72 |
| Junc J3 | 77.10 | 0.00 | 118.97 | 41.87 | 410.74 | 59.57 |
| Junc J4 | 75.75 | 0.00 | 118.91 | 43.16 | 423.40 | 61.41 |
| Junc J5 | 75.75 | 0.00 | 118.82 | 43.07 | 422.52 | 61.28 |
| Junc J6 | 77.10 | 0.00 | 118.76 | 41.66 | 408.68 | 59.27 |
| Junc J7 | 77.10 | 0.00 | 118.74 | 41.64 | 408.49 | 59.25 |
| Junc J8 | 76.86 | 0.00 | 118.25 | 41.39 | 406.04 | 58.89 |
| Junc J9 | 76.80 | 0.00 | 118.25 | 41.45 | 406.62 | 58.98 |
| Junc J10 | 76.90 | 0.00 | 118.14 | 41.24 | 404.56 | 58.68 |
| Junc J11 | 77.10 | 0.00 | 118.00 | 40.90 | 401.23 | 58.19 |
| Junc J12 | 77.20 | 0.00 | 118.00 | 40.80 | 400.25 | 58.05 |
| Junc J13 | 77.40 | 0.00 | 117.74 | 40.34 | 395.74 | 57.40 |
| Junc J14 | 77.50 | 0.00 | 117.68 | 40.18 | 394.17 | 57.17 |
| Junc J15 | 78.60 | 0.00 | 117.62 | 39.02 | 382.79 | 55.52 |
| Junc J16 | 78.70 | 0.00 | 117.53 | 38.83 | 380.92 | 55.25 |
| Junc J17 | 78.90 | 0.00 | 117.38 | 38.48 | 377.49 | 54.75 |
| Junc J18 | 78.90 | 0.00 | 117.38 | 38.48 | 377.49 | 54.75 |
| Junc J19 | 79.00 | 0.00 | 117.25 | 38.25 | 375.23 | 54.42 |
| Junc J20 | 79.40 | 0.00 | 117.23 | 37.83 | 371.11 | 53.83 |
| Junc J21 | 79.50 | 0.00 | 117.14 | 37.64 | 369.25 | 53.55 |
| Junc J22 | 79.50 | 0.00 | 117.07 | 37.57 | 368.56 | 53.46 |
| Junc J23 | 79.50 | 0.00 | 116.84 | 37.34 | 366.31 | 53.13 |
| Junc J24 | 79.60 | 2.62 | 116.84 | 37.24 | 365.32 | 52.99 |
| Junc J26 | 79.50 | 0.00 | 116.93 | 37.43 | 367.19 | 53.26 |
| Junc J27 | 79.50 | 0.00 | 116.90 | 37.40 | 366.89 | 53.21 |
| Junc J28 | 79.66 | 0.00 | 116.64 | 36.98 | 362.77 | 52.62 |
| Junc J29 | 79.80 | 0.00 | 116.53 | 36.73 | 360.32 | 52.26 |
| Junc J30 | 79.80 | 0.00 | 116.44 | 36.64 | 359.44 | 52.13 |
| Junc J31 | 79.84 | 0.00 | 116.42 | 36.58 | 358.85 | 52.05 |
| Junc J32 | 79.88 | 0.00 | 116.42 | 36.54 | 358.46 | 51.99 |
| Junc J33 | 79.84 | 0.00 | 116.30 | 36.46 | 357.67 | 51.88 |
| Junc J34 | 79.71 | 0.00 | 116.11 | 36.40 | 357.08 | 51.79 |
| Junc J35 | 79.56 | 0.00 | 115.60 | 36.04 | 353.55 | 51.28 |
| Junc J36 | 79.55 | 0.00 | 115.54 | 35.99 | 353.06 | 51.21 |
| Junc J37 | 79.59 | 75.00 | 114.85 | 35.26 | 345.90 | 50.17 |
| Junc J38 | 79.51 | 0.00 | 115.51 | 36.00 | 353.16 | 51.22 |
| Junc J39 | 79.51 | 0.00 | 115.48 | 35.97 | 352.87 | 51.18 |
| Junc J40 | 79.45 | 0.00 | 115.43 | 35.98 | 352.96 | 51.19 |
| Junc J41 | 79.47 | 75.00 | 115.13 | 35.66 | 349.82 | 50.74 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 115.48 | 36.15 | 354.63 | 51.43 |
| Junc J43 | 79.35 | 75.00 | 115.18 | 35.83 | 351.49 | 50.98 |
| Junc J44 | 79.21 | 0.00 | 115.98 | 36.77 | 360.71 | 52.32 |
| Junc J45 | 78.75 | 0.00 | 116.02 | 37.27 | 365.62 | 53.03 |
| Junc J46 | 78.75 | 0.00 | 116.18 | 37.43 | 367.19 | 53.26 |
| Junc J47 | 78.77 | 0.00 | 116.18 | 37.41 | 366.99 | 53.23 |
| Junc J48 | 78.75 | 0.00 | 116.23 | 37.48 | 367.68 | 53.33 |
| Junc J49 | 78.72 | 0.00 | 116.25 | 37.53 | 368.17 | 53.40 |
| Junc J50 | 77.64 | 0.00 | 116.77 | 39.13 | 383.87 | 55.67 |
| Junc J51 | 77.74 | 0.65 | 116.77 | 39.03 | 382.88 | 55.53 |
| Junc J52 | 77.57 | 0.00 | 116.85 | 39.28 | 385.34 | 55.89 |
| Junc J53 | 77.64 | 0.00 | 116.85 | 39.21 | 384.65 | 55.79 |
| Junc J54 | 77.45 | 0.00 | 116.98 | 39.53 | 387.79 | 56.24 |
| Junc J55 | 77.44 | 0.00 | 116.92 | 39.48 | 387.30 | 56.17 |
| Junc J56 | 76.90 | 0.00 | 116.83 | 39.93 | 391.71 | 56.81 |
| Junc J57 | 76.90 | 0.00 | 116.74 | 39.84 | 390.83 | 56.69 |
| Junc J58 | 77.70 | 0.00 | 116.60 | 38.90 | 381.61 | 55.35 |
| Junc J59 | 77.70 | 0.00 | 116.30 | 38.60 | 378.67 | 54.92 |
| Junc J60 | 77.70 | 0.00 | 116.25 | 38.55 | 378.18 | 54.85 |
| Junc J61 | 77.70 | 0.00 | 116.19 | 38.49 | 377.59 | 54.76 |
| Junc J62 | 77.72 | 75.00 | 115.76 | 38.04 | 373.17 | 54.12 |
| Junc J63 | 77.10 | 0.00 | 117.86 | 40.76 | 399.86 | 57.99 |
| Junc J64 | 77.18 | 0.00 | 117.86 | 40.68 | 399.07 | 57.88 |
| Junc J65 | 76.80 | 0.00 | 118.68 | 41.88 | 410.84 | 59.59 |
| Junc J66 | 76.80 | 0.00 | 118.73 | 41.93 | 411.33 | 59.66 |
| Junc J67 | 77.10 | 0.00 | 118.61 | 41.51 | 407.21 | 59.06 |
| Junc J68 | 79.50 | 0.00 | 116.74 | 37.24 | 365.32 | 52.99 |
| Junc J25 | 74.80 | 0.00 | 118.84 | 44.04 | 432.03 | 62.66 |
| Junc J69 | 74.80 | 0.00 | 119.11 | 44.31 | 434.68 | 63.05 |
| Junc J70 | 74.80 | 0.00 | 119.30 | 44.50 | 436.55 | 63.32 |
| Junc J71 | 74.80 | 0.00 | 119.49 | 44.69 | 438.41 | 63.59 |
| Junc J72 | 74.80 | 0.00 | 119.72 | 44.92 | 440.67 | 63.91 |
| Junc J73 | 74.80 | 0.00 | 119.93 | 45.13 | 442.73 | 64.21 |
| Junc J74 | 77.00 | 0.00 | 120.41 | 43.41 | 425.85 | 61.76 |
| Junc J75 | 77.14 | 0.00 | 120.60 | 43.46 | 426.34 | 61.84 |
| Junc J76 | 76.70 | 0.00 | 120.60 | 43.90 | 430.66 | 62.46 |
| Junc J77 | 76.85 | 0.00 | 120.60 | 43.75 | 429.19 | 62.25 |
| Junc J78 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J79 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J80 | 76.32 | 1.44 | 120.60 | 44.28 | 434.39 | 63.00 |
| Resvr R1 | 120.30 | -121.19 | 120.30 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 120.60 | -183.52 | 120.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 50.17 |
| Max= | 64.21 |

Max Day + Fire Flow Demand (Parking Garage) - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P2 | 76.4 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P3 | 9 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P4 | 6.2 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P5 | 8 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P6 | 6.2 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P7 | 2 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P8 | 11.8 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P11 | 13.3 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P14 | 6 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P15 | 5.3 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P16 | 8.9 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P17 | 14.2 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P20 | 1.8 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P21 | 8.6 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P22 | 6.3 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.08 |
| Pipe P27 | 2.8 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P28 | 9.6 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P29 | 10.9 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P30 | 8.8 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P31 | 1.6 | 300 | 120 | 118.57 | 1.68 | 10.21 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P34 | 18.8 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P35 | 50 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P36 | 6 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P37 | 3.8 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P38 | 15.9 | 300 | 120 | 43.57 | 0.62 | 1.6 |
| Pipe P39 | 19.6 | 300 | 120 | 43.57 | 0.62 | 1.6 |
| Pipe P40 | 30.4 | 300 | 120 | 43.57 | 0.62 | 1.6 |
| Pipe P41 | 1.7 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P42 | 58 | 300 | 120 | -31.43 | 0.44 | 0.87 |
| Pipe P43 | 1.7 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P44 | 60 | 300 | 120 | -106.43 | 1.51 | 8.37 |
| Pipe P45 | 4.1 | 300 | 120 | -106.43 | 1.51 | 8.36 |
| Pipe P46 | 19.3 | 300 | 120 | -106.43 | 1.51 | 8.36 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -106.43 | 1.51 | 8.37 |
| Pipe P49 | 2.9 | 300 | 120 | -106.43 | 1.51 | 8.37 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -106.43 | 1.51 | 8.37 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | -107.08 | 1.51 | 8.46 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -107.08 | 1.51 | 8.46 |
| Pipe P55 | 1.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P56 | 2.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P57 | 2.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P58 | 3.6 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P59 | 8.1 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P60 | 1.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P61 | 1.5 | 200 | 110 | 75 | 2.39 | 37.04 |
| Pipe P62 | 2.4 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P63 | 39.1 | 300 | 120 | -182.08 | 2.58 | 22.61 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -182.08 | 2.58 | 22.61 |
| Pipe P66 | 2 | 300 | 120 | -182.08 | 2.58 | 22.61 |
| Pipe P67 | 34.1 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P23 | 12.8 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P25 | 6.2 | 300 | 120 | 121.19 | 1.71 | 10.64 |
| Pipe P26 | 9.8 | 300 | 120 | 118.57 | 1.68 | 10.22 |
| Pipe P68 | 4.7 | 300 | 120 | -182.08 | 2.58 | 22.61 |
| Pipe P69 | 12 | 300 | 120 | -182.08 | 2.58 | 22.61 |
| Pipe P70 | 1 | 200 | 110 | 182.08 | 5.8 | 191.45 |
| Pipe P71 | 1 | 200 | 110 | -182.08 | 5.8 | 191.46 |
| Pipe P72 | 1.2 | 200 | 110 | 182.08 | 5.8 | 191.46 |
| Pipe P73 | 1.1 | 200 | 110 | 182.08 | 5.8 | 191.46 |
| Pipe P74 | 2.5 | 200 | 110 | 182.08 | 5.8 | 191.46 |
| Pipe P75 | 1 | 200 | 110 | -182.08 | 5.8 | 191.46 |
| Pipe P76 | 9.7 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.03 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Retained Lands - Future Office Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 120.20 | 44.10 | 432.62 | 62.75 |
| Junc J2 | 77.10 | 0.00 | 119.99 | 42.89 | 420.75 | 61.02 |
| Junc J3 | 77.10 | 0.00 | 119.97 | 42.87 | 420.55 | 61.00 |
| Junc J4 | 75.75 | 0.00 | 119.95 | 44.20 | 433.60 | 62.89 |
| Junc J5 | 75.75 | 0.00 | 119.93 | 44.18 | 433.41 | 62.86 |
| Junc J6 | 77.10 | 0.00 | 119.92 | 42.82 | 420.06 | 60.93 |
| Junc J7 | 77.10 | 0.00 | 119.91 | 42.81 | 419.97 | 60.91 |
| Junc J8 | 76.86 | 0.00 | 119.79 | 42.93 | 421.14 | 61.08 |
| Junc J9 | 76.80 | 0.00 | 119.79 | 42.99 | 421.73 | 61.17 |
| Junc J10 | 76.90 | 0.00 | 119.76 | 42.86 | 420.46 | 60.98 |
| Junc J11 | 77.10 | 0.00 | 119.73 | 42.63 | 418.20 | 60.65 |
| Junc J12 | 77.20 | 0.00 | 119.73 | 42.53 | 417.22 | 60.51 |
| Junc J13 | 77.40 | 0.00 | 119.66 | 42.26 | 414.57 | 60.13 |
| Junc J14 | 77.50 | 0.00 | 119.65 | 42.15 | 413.49 | 59.97 |
| Junc J15 | 78.60 | 0.00 | 119.63 | 41.03 | 402.50 | 58.38 |
| Junc J16 | 78.70 | 0.00 | 119.61 | 40.91 | 401.33 | 58.21 |
| Junc J17 | 78.90 | 0.00 | 119.57 | 40.67 | 398.97 | 57.87 |
| Junc J18 | 78.90 | 0.00 | 119.57 | 40.67 | 398.97 | 57.87 |
| Junc J19 | 79.00 | 0.00 | 119.54 | 40.54 | 397.70 | 57.68 |
| Junc J20 | 79.40 | 0.00 | 119.54 | 40.14 | 393.77 | 57.11 |
| Junc J21 | 79.50 | 0.00 | 119.51 | 40.01 | 392.50 | 56.93 |
| Junc J22 | 79.50 | 0.00 | 119.50 | 40.00 | 392.40 | 56.91 |
| Junc J23 | 79.50 | 0.00 | 119.44 | 39.94 | 391.81 | 56.83 |
| Junc J24 | 79.60 | 2.62 | 119.44 | 39.84 | 390.83 | 56.69 |
| Junc J26 | 79.50 | 0.00 | 119.46 | 39.96 | 392.01 | 56.86 |
| Junc J27 | 79.50 | 0.00 | 119.45 | 39.95 | 391.91 | 56.84 |
| Junc J28 | 79.66 | 0.00 | 119.39 | 39.73 | 389.75 | 56.53 |
| Junc J29 | 79.80 | 0.00 | 119.36 | 39.56 | 388.08 | 56.29 |
| Junc J30 | 79.80 | 0.00 | 119.34 | 39.54 | 387.89 | 56.26 |
| Junc J31 | 79.84 | 0.00 | 119.34 | 39.50 | 387.50 | 56.20 |
| Junc J32 | 79.88 | 0.00 | 119.34 | 39.46 | 387.10 | 56.14 |
| Junc J33 | 79.84 | 0.00 | 119.31 | 39.47 | 387.20 | 56.16 |
| Junc J34 | 79.71 | 0.00 | 119.26 | 39.55 | 387.99 | 56.27 |
| Junc J35 | 79.56 | 0.00 | 119.14 | 39.58 | 388.28 | 56.32 |
| Junc J36 | 79.55 | 0.00 | 119.13 | 39.58 | 388.28 | 56.32 |
| Junc J37 | 79.59 | 0.00 | 119.13 | 39.54 | 387.89 | 56.26 |
| Junc J38 | 79.51 | 0.00 | 119.09 | 39.58 | 388.28 | 56.32 |
| Junc J39 | 79.51 | 0.00 | 119.04 | 39.53 | 387.79 | 56.24 |
| Junc J40 | 79.45 | 0.00 | 118.97 | 39.52 | 387.69 | 56.23 |
| Junc J41 | 79.47 | 0.00 | 118.97 | 39.50 | 387.50 | 56.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 118.83 | 39.50 | 387.50 | 56.20 |
| Junc J43 | 79.35 | 0.00 | 118.83 | 39.48 | 387.30 | 56.17 |
| Junc J44 | 79.21 | 0.00 | 118.68 | 39.47 | 387.20 | 56.16 |
| Junc J45 | 78.75 | 0.00 | 118.67 | 39.92 | 391.62 | 56.80 |
| Junc J46 | 78.75 | 0.00 | 118.62 | 39.87 | 391.12 | 56.73 |
| Junc J47 | 78.77 | 61.00 | 118.42 | 39.65 | 388.97 | 56.41 |
| Junc J48 | 78.75 | 0.00 | 118.63 | 39.88 | 391.22 | 56.74 |
| Junc J49 | 78.72 | 0.00 | 118.63 | 39.91 | 391.52 | 56.78 |
| Junc J50 | 77.64 | 0.00 | 118.63 | 40.99 | 402.11 | 58.32 |
| Junc J51 | 77.74 | 0.65 | 118.63 | 40.89 | 401.13 | 58.18 |
| Junc J52 | 77.57 | 0.00 | 118.63 | 41.06 | 402.80 | 58.42 |
| Junc J53 | 77.64 | 61.00 | 117.77 | 40.13 | 393.68 | 57.10 |
| Junc J54 | 77.45 | 0.00 | 118.69 | 41.24 | 404.56 | 58.68 |
| Junc J55 | 77.44 | 0.00 | 118.65 | 41.21 | 404.27 | 58.63 |
| Junc J56 | 76.90 | 0.00 | 118.58 | 41.68 | 408.88 | 59.30 |
| Junc J57 | 76.90 | 0.00 | 118.52 | 41.62 | 408.29 | 59.22 |
| Junc J58 | 77.70 | 0.00 | 118.43 | 40.73 | 399.56 | 57.95 |
| Junc J59 | 77.70 | 0.00 | 118.23 | 40.53 | 397.60 | 57.67 |
| Junc J60 | 77.70 | 0.00 | 118.19 | 40.49 | 397.21 | 57.61 |
| Junc J61 | 77.70 | 0.00 | 118.15 | 40.45 | 396.81 | 57.55 |
| Junc J62 | 77.72 | 61.00 | 117.86 | 40.14 | 393.77 | 57.11 |
| Junc J63 | 77.10 | 0.00 | 119.15 | 42.05 | 412.51 | 59.83 |
| Junc J64 | 77.18 | 0.00 | 119.15 | 41.97 | 411.73 | 59.72 |
| Junc J65 | 76.80 | 0.00 | 119.59 | 42.79 | 419.77 | 60.88 |
| Junc J66 | 76.80 | 0.00 | 119.61 | 42.81 | 419.97 | 60.91 |
| Junc J67 | 77.10 | 0.00 | 119.88 | 42.78 | 419.67 | 60.87 |
| Junc J68 | 79.50 | 0.00 | 119.41 | 39.91 | 391.52 | 56.78 |
| Junc J25 | 74.80 | 0.00 | 119.67 | 44.87 | 440.17 | 63.84 |
| Junc J69 | 74.80 | 0.00 | 119.81 | 45.01 | 441.55 | 64.04 |
| Junc J70 | 74.80 | 0.00 | 119.91 | 45.11 | 442.53 | 64.18 |
| Junc J71 | 74.80 | 0.00 | 120.01 | 45.21 | 443.51 | 64.33 |
| Junc J72 | 74.80 | 0.00 | 120.13 | 45.33 | 444.69 | 64.50 |
| Junc J73 | 74.80 | 0.00 | 120.25 | 45.45 | 445.86 | 64.67 |
| Junc J74 | 77.00 | 0.00 | 120.50 | 43.50 | 426.74 | 61.89 |
| Junc J75 | 77.14 | 0.00 | 120.60 | 43.46 | 426.34 | 61.84 |
| Junc J76 | 76.70 | 0.00 | 120.60 | 43.90 | 430.66 | 62.46 |
| Junc J77 | 76.85 | 0.00 | 120.60 | 43.75 | 429.19 | 62.25 |
| Junc J78 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J79 | 77.15 | 0.00 | 120.60 | 43.45 | 426.24 | 61.82 |
| Junc J80 | 76.32 | 1.44 | 120.60 | 44.28 | 434.39 | 63.00 |
| Resvr R1 | 120.30 | -57.21 | 120.30 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 120.60 | -130.50 | 120.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 56.14 |
| Max= | 64.67 |

Max Day + Fire Flow Demand (Retained Lands - Future Office Building) - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P2 | 76.4 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P3 | 9 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P4 | 6.2 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P5 | 8 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P6 | 6.2 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P7 | 2 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P8 | 11.8 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P11 | 13.3 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P14 | 6 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P15 | 5.3 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P16 | 8.9 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P17 | 14.2 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P20 | 1.8 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P21 | 8.6 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P22 | 6.3 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P28 | 9.6 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P29 | 10.9 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P30 | 8.8 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P31 | 1.6 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P34 | 18.8 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P35 | 50 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P36 | 6 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P39 | 19.6 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P40 | 30.4 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P45 | 4.1 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P46 | 19.3 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P47 | 1.7 | 150 | 100 | 61 | 3.45 | 122.38 |
| Pipe P48 | 5.8 | 300 | 120 | -6.41 | 0.09 | 0.05 |
| Pipe P49 | 2.9 | 300 | 120 | -6.41 | 0.09 | 0.04 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -6.41 | 0.09 | 0.05 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0 |
| Pipe P52 | 9.2 | 300 | 120 | -7.06 | 0.1 | 0.06 |
| Pipe P53 | 7 | 150 | 100 | 61 | 3.45 | 122.38 |
| Pipe P54 | 15.6 | 300 | 120 | -68.06 | 0.96 | 3.66 |
| Pipe P55 | 1.5 | 200 | 110 | -61 | 1.94 | 25.26 |
| Pipe P56 | 2.5 | 200 | 110 | -61 | 1.94 | 25.26 |
| Pipe P57 | 2.5 | 200 | 110 | -61 | 1.94 | 25.26 |
| Pipe P58 | 3.6 | 200 | 110 | -61 | 1.94 | 25.26 |
| Pipe P59 | 8.1 | 200 | 110 | -61 | 1.94 | 25.26 |
| Pipe P60 | 1.5 | 200 | 110 | -61 | 1.94 | 25.26 |
| Pipe P61 | 1.5 | 200 | 110 | 61 | 1.94 | 25.26 |
| Pipe P62 | 2.4 | 150 | 100 | 61 | 3.45 | 122.38 |
| Pipe P63 | 39.1 | 300 | 120 | -129.06 | 1.83 | 11.95 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -129.06 | 1.83 | 11.95 |
| Pipe P66 | 2 | 300 | 120 | -129.06 | 1.83 | 11.95 |
| Pipe P67 | 34.1 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P23 | 12.8 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P25 | 6.2 | 300 | 120 | 57.21 | 0.81 | 2.65 |
| Pipe P26 | 9.8 | 300 | 120 | 54.59 | 0.77 | 2.43 |
| Pipe P68 | 4.7 | 300 | 120 | -129.06 | 1.83 | 11.96 |
| Pipe P69 | 12 | 300 | 120 | -129.06 | 1.83 | 11.95 |
| Pipe P70 | 1 | 200 | 110 | 129.06 | 4.11 | 101.22 |
| Pipe P71 | 1 | 200 | 110 | -129.06 | 4.11 | 101.22 |
| Pipe P72 | 1.2 | 200 | 110 | 129.06 | 4.11 | 101.22 |
| Pipe P73 | 1.1 | 200 | 110 | 129.06 | 4.11 | 101.22 |
| Pipe P74 | 2.5 | 200 | 110 | 129.06 | 4.11 | 101.22 |
| Pipe P75 | 1 | 200 | 110 | -129.06 | 4.11 | 101.21 |
| Pipe P76 | 9.7 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.03 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (515 Legget Office Building) - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 120.31 | 44.21 | 433.70 | 62.90 |
| Junc J2 | 77.10 | 0.00 | 120.33 | 43.23 | 424.09 | 61.51 |
| Junc J3 | 77.10 | 0.00 | 120.33 | 43.23 | 424.09 | 61.51 |
| Junc J4 | 75.75 | 0.00 | 120.34 | 44.59 | 437.43 | 63.44 |
| Junc J5 | 75.75 | 0.00 | 120.34 | 44.59 | 437.43 | 63.44 |
| Junc J6 | 77.10 | 0.00 | 120.34 | 43.24 | 424.18 | 61.52 |
| Junc J7 | 77.10 | 0.00 | 120.34 | 43.24 | 424.18 | 61.52 |
| Junc J8 | 76.86 | 0.00 | 120.35 | 43.49 | 426.64 | 61.88 |
| Junc J9 | 76.80 | 0.00 | 120.35 | 43.55 | 427.23 | 61.96 |
| Junc J10 | 76.90 | 0.00 | 120.35 | 43.45 | 426.24 | 61.82 |
| Junc J11 | 77.10 | 0.00 | 120.36 | 43.26 | 424.38 | 61.55 |
| Junc J12 | 77.20 | 0.00 | 120.36 | 43.16 | 423.40 | 61.41 |
| Junc J13 | 77.40 | 0.00 | 120.36 | 42.96 | 421.44 | 61.12 |
| Junc J14 | 77.50 | 0.00 | 120.37 | 42.87 | 420.55 | 61.00 |
| Junc J15 | 78.60 | 0.00 | 120.37 | 41.77 | 409.76 | 59.43 |
| Junc J16 | 78.70 | 0.00 | 120.37 | 41.67 | 408.78 | 59.29 |
| Junc J17 | 78.90 | 0.00 | 120.37 | 41.47 | 406.82 | 59.00 |
| Junc J18 | 78.90 | 0.00 | 120.37 | 41.47 | 406.82 | 59.00 |
| Junc J19 | 79.00 | 0.00 | 120.38 | 41.38 | 405.94 | 58.88 |
| Junc J20 | 79.40 | 0.00 | 120.38 | 40.98 | 402.01 | 58.31 |
| Junc J21 | 79.50 | 0.00 | 120.38 | 40.88 | 401.03 | 58.16 |
| Junc J22 | 79.50 | 0.00 | 120.38 | 40.88 | 401.03 | 58.16 |
| Junc J23 | 79.50 | 0.00 | 120.39 | 40.89 | 401.13 | 58.18 |
| Junc J24 | 79.60 | 2.62 | 120.39 | 40.79 | 400.15 | 58.04 |
| Junc J26 | 79.50 | 0.00 | 120.39 | 40.89 | 401.13 | 58.18 |
| Junc J27 | 79.50 | 0.00 | 120.39 | 40.89 | 401.13 | 58.18 |
| Junc J28 | 79.66 | 0.00 | 120.39 | 40.73 | 399.56 | 57.95 |
| Junc J29 | 79.80 | 0.00 | 120.40 | 40.60 | 398.29 | 57.77 |
| Junc J30 | 79.80 | 0.00 | 120.40 | 40.60 | 398.29 | 57.77 |
| Junc J31 | 79.84 | 0.00 | 120.40 | 40.56 | 397.89 | 57.71 |
| Junc J32 | 79.88 | 0.00 | 120.40 | 40.52 | 397.50 | 57.65 |
| Junc J33 | 79.84 | 0.00 | 120.41 | 40.57 | 397.99 | 57.72 |
| Junc J34 | 79.71 | 0.00 | 120.41 | 40.70 | 399.27 | 57.91 |
| Junc J35 | 79.56 | 0.00 | 120.43 | 40.87 | 400.93 | 58.15 |
| Junc J36 | 79.55 | 0.00 | 120.43 | 40.88 | 401.03 | 58.16 |
| Junc J37 | 79.59 | 0.00 | 120.43 | 40.84 | 400.64 | 58.11 |
| Junc J38 | 79.51 | 0.00 | 120.44 | 40.93 | 401.52 | 58.24 |
| Junc J39 | 79.51 | 0.00 | 120.45 | 40.94 | 401.62 | 58.25 |
| Junc J40 | 79.45 | 0.00 | 120.46 | 41.01 | 402.31 | 58.35 |
| Junc J41 | 79.47 | 0.00 | 120.46 | 40.99 | 402.11 | 58.32 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 120.48 | 41.15 | 403.68 | 58.55 |
| Junc J43 | 79.35 | 0.00 | 120.48 | 41.13 | 403.49 | 58.52 |
| Junc J44 | 79.21 | 0.00 | 120.50 | 41.29 | 405.05 | 58.75 |
| Junc J45 | 78.75 | 0.00 | 120.50 | 41.75 | 409.57 | 59.40 |
| Junc J46 | 78.75 | 0.00 | 120.51 | 41.76 | 409.67 | 59.42 |
| Junc J47 | 78.77 | 0.00 | 120.51 | 41.74 | 409.47 | 59.39 |
| Junc J48 | 78.75 | 0.00 | 120.51 | 41.76 | 409.67 | 59.42 |
| Junc J49 | 78.72 | 0.00 | 120.51 | 41.79 | 409.96 | 59.46 |
| Junc J50 | 77.64 | 0.00 | 120.53 | 42.89 | 420.75 | 61.02 |
| Junc J51 | 77.74 | 0.65 | 120.53 | 42.79 | 419.77 | 60.88 |
| Junc J52 | 77.57 | 0.00 | 120.53 | 42.96 | 421.44 | 61.12 |
| Junc J53 | 77.64 | 0.00 | 120.53 | 42.89 | 420.75 | 61.02 |
| Junc J54 | 77.45 | 0.00 | 120.54 | 43.09 | 422.71 | 61.31 |
| Junc J55 | 77.44 | 0.00 | 120.54 | 43.10 | 422.81 | 61.32 |
| Junc J56 | 76.90 | 0.00 | 120.54 | 43.64 | 428.11 | 62.09 |
| Junc J57 | 76.90 | 0.00 | 120.54 | 43.64 | 428.11 | 62.09 |
| Junc J58 | 77.70 | 0.00 | 120.54 | 42.84 | 420.26 | 60.95 |
| Junc J59 | 77.70 | 0.00 | 120.54 | 42.84 | 420.26 | 60.95 |
| Junc J60 | 77.70 | 0.00 | 120.54 | 42.84 | 420.26 | 60.95 |
| Junc J61 | 77.70 | 0.00 | 120.54 | 42.84 | 420.26 | 60.95 |
| Junc J62 | 77.72 | 0.00 | 120.54 | 42.82 | 420.06 | 60.93 |
| Junc J63 | 77.10 | 0.00 | 120.55 | 43.45 | 426.24 | 61.82 |
| Junc J64 | 77.18 | 0.00 | 120.55 | 43.37 | 425.46 | 61.71 |
| Junc J65 | 76.80 | 0.00 | 120.57 | 43.77 | 429.38 | 62.28 |
| Junc J66 | 76.80 | 0.00 | 120.57 | 43.77 | 429.38 | 62.28 |
| Junc J67 | 77.10 | 0.00 | 120.34 | 43.24 | 424.18 | 61.52 |
| Junc J68 | 79.50 | 0.00 | 120.39 | 40.89 | 401.13 | 58.18 |
| Junc J25 | 74.80 | 0.00 | 120.57 | 45.77 | 449.00 | 65.12 |
| Junc J69 | 74.80 | 0.00 | 120.58 | 45.78 | 449.10 | 65.14 |
| Junc J70 | 74.80 | 0.00 | 120.58 | 45.78 | 449.10 | 65.14 |
| Junc J71 | 74.80 | 0.00 | 120.58 | 45.78 | 449.10 | 65.14 |
| Junc J72 | 74.80 | 0.00 | 120.59 | 45.79 | 449.20 | 65.15 |
| Junc J73 | 74.80 | 0.00 | 120.59 | 45.79 | 449.20 | 65.15 |
| Junc J74 | 77.00 | 0.00 | 120.60 | 43.60 | 427.72 | 62.03 |
| Junc J75 | 77.14 | 0.00 | 119.54 | 42.40 | 415.94 | 60.33 |
| Junc J76 | 76.70 | 0.00 | 112.14 | 35.44 | 347.67 | 50.42 |
| Junc J77 | 76.85 | 0.00 | 111.49 | 34.64 | 339.82 | 49.29 |
| Junc J78 | 77.15 | 0.00 | 109.53 | 32.38 | 317.65 | 46.07 |
| Junc J79 | 77.15 | 133.00 | 105.40 | 28.25 | 277.13 | 40.19 |
| Junc J80 | 76.32 | 1.44 | 109.53 | 33.21 | 325.79 | 47.25 |
| Resvr R1 | 120.30 | 16.64 | 120.30 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 120.60 | -154.35 | 120.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 40.19 |
| Max= | 65.15 |

Max Day + Fire Flow Demand (515 Legget Office Building) - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P2 | 76.4 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P3 | 9 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P4 | 6.2 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P5 | 8 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P6 | 6.2 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P7 | 2 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P8 | 11.8 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P11 | 13.3 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P14 | 6 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P15 | 5.3 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P16 | 8.9 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P17 | 14.2 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P20 | 1.8 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P21 | 8.6 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P22 | 6.3 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P28 | 9.6 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P29 | 10.9 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P30 | 8.8 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P31 | 1.6 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P34 | 18.8 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P35 | 50 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P36 | 6 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P39 | 19.6 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P40 | 30.4 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P45 | 4.1 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P46 | 19.3 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P49 | 2.9 | 300 | 120 | -19.26 | 0.27 | 0.35 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | -19.91 | 0.28 | 0.38 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -19.91 | 0.28 | 0.38 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | -19.91 | 0.28 | 0.38 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -19.91 | 0.28 | 0.38 |
| Pipe P66 | 2 | 300 | 120 | -19.91 | 0.28 | 0.38 |
| Pipe P67 | 34.1 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P23 | 12.8 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P25 | 6.2 | 300 | 120 | -16.64 | 0.24 | 0.27 |
| Pipe P26 | 9.8 | 300 | 120 | -19.26 | 0.27 | 0.35 |
| Pipe P68 | 4.7 | 300 | 120 | -19.91 | 0.28 | 0.37 |
| Pipe P69 | 12 | 300 | 120 | -19.91 | 0.28 | 0.38 |
| Pipe P70 | 1 | 200 | 110 | 19.91 | 0.63 | 3.18 |
| Pipe P71 | 1 | 200 | 110 | -19.91 | 0.63 | 3.18 |
| Pipe P72 | 1.2 | 200 | 110 | 19.91 | 0.63 | 3.17 |
| Pipe P73 | 1.1 | 200 | 110 | 19.91 | 0.63 | 3.18 |
| Pipe P74 | 2.5 | 200 | 110 | 19.91 | 0.63 | 3.18 |
| Pipe P75 | 1 | 200 | 110 | -19.91 | 0.63 | 3.17 |
| Pipe P76 | 9.7 | 200 | 110 | 134.44 | 4.28 | 109.17 |
| Pipe P77 | 67.76 | 200 | 110 | 134.44 | 4.28 | 109.17 |
| Pipe P78 | 6 | 200 | 110 | -134.44 | 4.28 | 109.17 |
| Pipe P79 | 17.92 | 200 | 110 | -134.44 | 4.28 | 109.17 |
| Pipe P80 | 7.97 | 150 | 100 | 133 | 7.53 | 518.4 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.03 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Peak Hour Demand - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 126.30 | 50.20 | 492.46 | 71.43 |
| Junc J2 | 77.10 | 0.00 | 126.30 | 49.20 | 482.65 | 70.00 |
| Junc J3 | 77.10 | 0.00 | 126.30 | 49.20 | 482.65 | 70.00 |
| Junc J4 | 75.75 | 0.00 | 126.30 | 50.55 | 495.90 | 71.92 |
| Junc J5 | 75.75 | 0.00 | 126.30 | 50.55 | 495.90 | 71.92 |
| Junc J6 | 77.10 | 0.00 | 126.30 | 49.20 | 482.65 | 70.00 |
| Junc J7 | 77.10 | 0.00 | 126.30 | 49.20 | 482.65 | 70.00 |
| Junc J8 | 76.86 | 0.00 | 126.30 | 49.44 | 485.01 | 70.34 |
| Junc J9 | 76.80 | 0.00 | 126.30 | 49.50 | 485.60 | 70.43 |
| Junc J10 | 76.90 | 0.00 | 126.30 | 49.40 | 484.61 | 70.29 |
| Junc J11 | 77.10 | 0.00 | 126.30 | 49.20 | 482.65 | 70.00 |
| Junc J12 | 77.20 | 0.00 | 126.30 | 49.10 | 481.67 | 69.86 |
| Junc J13 | 77.40 | 0.00 | 126.30 | 48.90 | 479.71 | 69.58 |
| Junc J14 | 77.50 | 0.00 | 126.30 | 48.80 | 478.73 | 69.43 |
| Junc J15 | 78.60 | 0.00 | 126.30 | 47.70 | 467.94 | 67.87 |
| Junc J16 | 78.70 | 0.00 | 126.30 | 47.60 | 466.96 | 67.73 |
| Junc J17 | 78.90 | 0.00 | 126.30 | 47.40 | 464.99 | 67.44 |
| Junc J18 | 78.90 | 0.00 | 126.30 | 47.40 | 464.99 | 67.44 |
| Junc J19 | 79.00 | 0.00 | 126.30 | 47.30 | 464.01 | 67.30 |
| Junc J20 | 79.40 | 0.00 | 126.30 | 46.90 | 460.09 | 66.73 |
| Junc J21 | 79.50 | 0.00 | 126.30 | 46.80 | 459.11 | 66.59 |
| Junc J22 | 79.50 | 0.00 | 126.30 | 46.80 | 459.11 | 66.59 |
| Junc J23 | 79.50 | 0.00 | 126.30 | 46.80 | 459.11 | 66.59 |
| Junc J24 | 79.60 | 4.72 | 126.30 | 46.70 | 458.13 | 66.45 |
| Junc J26 | 79.50 | 0.00 | 126.30 | 46.80 | 459.11 | 66.59 |
| Junc J27 | 79.50 | 0.00 | 126.30 | 46.80 | 459.11 | 66.59 |
| Junc J28 | 79.66 | 0.00 | 126.30 | 46.64 | 457.54 | 66.36 |
| Junc J29 | 79.80 | 0.00 | 126.30 | 46.50 | 456.17 | 66.16 |
| Junc J30 | 79.80 | 0.00 | 126.30 | 46.50 | 456.17 | 66.16 |
| Junc J31 | 79.84 | 0.00 | 126.30 | 46.46 | 455.77 | 66.10 |
| Junc J32 | 79.88 | 0.00 | 126.30 | 46.42 | 455.38 | 66.05 |
| Junc J33 | 79.84 | 0.00 | 126.30 | 46.46 | 455.77 | 66.10 |
| Junc J34 | 79.71 | 0.00 | 126.30 | 46.59 | 457.05 | 66.29 |
| Junc J35 | 79.56 | 0.00 | 126.30 | 46.74 | 458.52 | 66.50 |
| Junc J36 | 79.55 | 0.00 | 126.30 | 46.75 | 458.62 | 66.52 |
| Junc J37 | 79.59 | 0.00 | 126.30 | 46.71 | 458.23 | 66.46 |
| Junc J38 | 79.51 | 0.00 | 126.30 | 46.79 | 459.01 | 66.57 |
| Junc J39 | 79.51 | 0.00 | 126.30 | 46.79 | 459.01 | 66.57 |
| Junc J40 | 79.45 | 0.00 | 126.30 | 46.85 | 459.60 | 66.66 |
| Junc J41 | 79.47 | 0.00 | 126.30 | 46.83 | 459.40 | 66.63 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 126.30 | 46.97 | 460.78 | 66.83 |
| Junc J43 | 79.35 | 0.00 | 126.30 | 46.95 | 460.58 | 66.80 |
| Junc J44 | 79.21 | 0.00 | 126.30 | 47.09 | 461.95 | 67.00 |
| Junc J45 | 78.75 | 0.00 | 126.30 | 47.55 | 466.47 | 67.66 |
| Junc J46 | 78.75 | 0.00 | 126.30 | 47.55 | 466.47 | 67.66 |
| Junc J47 | 78.77 | 0.00 | 126.30 | 47.53 | 466.27 | 67.63 |
| Junc J48 | 78.75 | 0.00 | 126.30 | 47.55 | 466.47 | 67.66 |
| Junc J49 | 78.72 | 0.00 | 126.30 | 47.58 | 466.76 | 67.70 |
| Junc J50 | 77.64 | 0.00 | 126.30 | 48.66 | 477.35 | 69.23 |
| Junc J51 | 77.74 | 1.17 | 126.30 | 48.56 | 476.37 | 69.09 |
| Junc J52 | 77.57 | 0.00 | 126.30 | 48.73 | 478.04 | 69.33 |
| Junc J53 | 77.64 | 0.00 | 126.30 | 48.66 | 477.35 | 69.23 |
| Junc J54 | 77.45 | 0.00 | 126.30 | 48.85 | 479.22 | 69.50 |
| Junc J55 | 77.44 | 0.00 | 126.30 | 48.86 | 479.32 | 69.52 |
| Junc J56 | 76.90 | 0.00 | 126.30 | 49.40 | 484.61 | 70.29 |
| Junc J57 | 76.90 | 0.00 | 126.30 | 49.40 | 484.61 | 70.29 |
| Junc J58 | 77.70 | 0.00 | 126.30 | 48.60 | 476.77 | 69.15 |
| Junc J59 | 77.70 | 0.00 | 126.30 | 48.60 | 476.77 | 69.15 |
| Junc J60 | 77.70 | 0.00 | 126.30 | 48.60 | 476.77 | 69.15 |
| Junc J61 | 77.70 | 0.00 | 126.30 | 48.60 | 476.77 | 69.15 |
| Junc J62 | 77.72 | 0.00 | 126.30 | 48.58 | 476.57 | 69.12 |
| Junc J63 | 77.10 | 0.00 | 126.30 | 49.20 | 482.65 | 70.00 |
| Junc J64 | 77.18 | 0.00 | 126.30 | 49.12 | 481.87 | 69.89 |
| Junc J65 | 76.80 | 0.00 | 126.30 | 49.50 | 485.60 | 70.43 |
| Junc J66 | 76.80 | 0.00 | 126.30 | 49.50 | 485.60 | 70.43 |
| Junc J67 | 77.10 | 0.00 | 126.30 | 49.20 | 482.65 | 70.00 |
| Junc J68 | 79.50 | 0.00 | 126.30 | 46.80 | 459.11 | 66.59 |
| Junc J25 | 74.80 | 0.00 | 126.30 | 51.50 | 505.22 | 73.28 |
| Junc J69 | 74.80 | 0.00 | 126.30 | 51.50 | 505.22 | 73.28 |
| Junc J70 | 74.80 | 0.00 | 126.30 | 51.50 | 505.22 | 73.28 |
| Junc J71 | 74.80 | 0.00 | 126.30 | 51.50 | 505.22 | 73.28 |
| Junc J72 | 74.80 | 0.00 | 126.30 | 51.50 | 505.22 | 73.28 |
| Junc J73 | 74.80 | 0.00 | 126.30 | 51.50 | 505.22 | 73.28 |
| Junc J74 | 77.00 | 0.00 | 126.30 | 49.30 | 483.63 | 70.15 |
| Junc J75 | 77.14 | 0.00 | 126.30 | 49.16 | 482.26 | 69.95 |
| Junc J76 | 76.70 | 0.00 | 126.29 | 49.59 | 486.48 | 70.56 |
| Junc J77 | 76.85 | 0.00 | 126.29 | 49.44 | 485.01 | 70.34 |
| Junc J78 | 77.15 | 0.00 | 126.29 | 49.14 | 482.06 | 69.92 |
| Junc J79 | 77.15 | 0.00 | 126.29 | 49.14 | 482.06 | 69.92 |
| Junc J80 | 76.32 | 2.59 | 126.29 | 49.97 | 490.21 | 71.10 |
| Resvr R1 | 126.30 | -2.98 | 126.30 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 126.30 | -5.50 | 126.30 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 66.05 |
| Max= | 73.28 |

Peak Hour Demand - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P2 | 76.4 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P3 | 9 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P4 | 6.2 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P5 | 8 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P6 | 6.2 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P7 | 2 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P8 | 11.8 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P11 | 13.3 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P14 | 6 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P15 | 5.3 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P16 | 8.9 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P17 | 14.2 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P20 | 1.8 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P21 | 8.6 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P22 | 6.3 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P24 | 5.3 | 200 | 110 | 4.72 | 0.15 | 0.22 |
| Pipe P27 | 2.8 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P28 | 9.6 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P29 | 10.9 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P30 | 8.8 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P31 | 1.6 | 300 | 120 | -1.74 | 0.02 | 0.01 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P34 | 18.8 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P35 | 50 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P36 | 6 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P39 | 19.6 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P40 | 30.4 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P45 | 4.1 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P46 | 19.3 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P49 | 2.9 | 300 | 120 | -1.74 | 0.02 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P51 | 9.8 | 200 | 110 | 1.17 | 0.04 | 0.02 |
| Pipe P52 | 9.2 | 300 | 120 | -2.91 | 0.04 | 0.01 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -2.91 | 0.04 | 0.01 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | -2.91 | 0.04 | 0.01 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -2.91 | 0.04 | 0.01 |
| Pipe P66 | 2 | 300 | 120 | -2.91 | 0.04 | 0.01 |
| Pipe P67 | 34.1 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P23 | 12.8 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P25 | 6.2 | 300 | 120 | 2.98 | 0.04 | 0.01 |
| Pipe P26 | 9.8 | 300 | 120 | -1.74 | 0.02 | 0 |
| Pipe P68 | 4.7 | 300 | 120 | -2.91 | 0.04 | 0.01 |
| Pipe P69 | 12 | 300 | 120 | -2.91 | 0.04 | 0.01 |
| Pipe P70 | 1 | 200 | 110 | 2.91 | 0.09 | 0.09 |
| Pipe P71 | 1 | 200 | 110 | -2.91 | 0.09 | 0.09 |
| Pipe P72 | 1.2 | 200 | 110 | 2.91 | 0.09 | 0.09 |
| Pipe P73 | 1.1 | 200 | 110 | 2.91 | 0.09 | 0.09 |
| Pipe P74 | 2.5 | 200 | 110 | 2.91 | 0.09 | 0.09 |
| Pipe P75 | 1 | 200 | 110 | -2.91 | 0.09 | 0.09 |
| Pipe P76 | 9.7 | 200 | 110 | 2.59 | 0.08 | 0.07 |
| Pipe P77 | 67.76 | 200 | 110 | 2.59 | 0.08 | 0.07 |
| Pipe P78 | 6 | 200 | 110 | -2.59 | 0.08 | 0.07 |
| Pipe P79 | 17.92 | 200 | 110 | -2.59 | 0.08 | 0.07 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -2.59 | 0.08 | 0.07 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max HGL - DOUBLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 131.00 | 54.90 | 538.57 | 78.11 |
| Junc J2 | 77.10 | 0.00 | 131.00 | 53.90 | 528.76 | 76.69 |
| Junc J3 | 77.10 | 0.00 | 131.00 | 53.90 | 528.76 | 76.69 |
| Junc J4 | 75.75 | 0.00 | 131.00 | 55.25 | 542.00 | 78.61 |
| Junc J5 | 75.75 | 0.00 | 131.00 | 55.25 | 542.00 | 78.61 |
| Junc J6 | 77.10 | 0.00 | 131.00 | 53.90 | 528.76 | 76.69 |
| Junc J7 | 77.10 | 0.00 | 131.00 | 53.90 | 528.76 | 76.69 |
| Junc J8 | 76.86 | 0.00 | 131.00 | 54.14 | 531.11 | 77.03 |
| Junc J9 | 76.80 | 0.00 | 131.00 | 54.20 | 531.70 | 77.12 |
| Junc J10 | 76.90 | 0.00 | 131.00 | 54.10 | 530.72 | 76.97 |
| Junc J11 | 77.10 | 0.00 | 131.00 | 53.90 | 528.76 | 76.69 |
| Junc J12 | 77.20 | 0.00 | 131.00 | 53.80 | 527.78 | 76.55 |
| Junc J13 | 77.40 | 0.00 | 131.00 | 53.60 | 525.82 | 76.26 |
| Junc J14 | 77.50 | 0.00 | 131.00 | 53.50 | 524.84 | 76.12 |
| Junc J15 | 78.60 | 0.00 | 131.00 | 52.40 | 514.04 | 74.56 |
| Junc J16 | 78.70 | 0.00 | 131.00 | 52.30 | 513.06 | 74.41 |
| Junc J17 | 78.90 | 0.00 | 131.00 | 52.10 | 511.10 | 74.13 |
| Junc J18 | 78.90 | 0.00 | 131.00 | 52.10 | 511.10 | 74.13 |
| Junc J19 | 79.00 | 0.00 | 131.00 | 52.00 | 510.12 | 73.99 |
| Junc J20 | 79.40 | 0.00 | 131.00 | 51.60 | 506.20 | 73.42 |
| Junc J21 | 79.50 | 0.00 | 131.00 | 51.50 | 505.22 | 73.28 |
| Junc J22 | 79.50 | 0.00 | 131.00 | 51.50 | 505.22 | 73.28 |
| Junc J23 | 79.50 | 0.00 | 131.00 | 51.50 | 505.22 | 73.28 |
| Junc J24 | 79.60 | 2.62 | 131.00 | 51.40 | 504.23 | 73.13 |
| Junc J26 | 79.50 | 0.00 | 131.00 | 51.50 | 505.22 | 73.28 |
| Junc J27 | 79.50 | 0.00 | 131.00 | 51.50 | 505.22 | 73.28 |
| Junc J28 | 79.66 | 0.00 | 131.00 | 51.34 | 503.65 | 73.05 |
| Junc J29 | 79.80 | 0.00 | 131.00 | 51.20 | 502.27 | 72.85 |
| Junc J30 | 79.80 | 0.00 | 131.00 | 51.20 | 502.27 | 72.85 |
| Junc J31 | 79.84 | 0.00 | 131.00 | 51.16 | 501.88 | 72.79 |
| Junc J32 | 79.88 | 0.00 | 131.00 | 51.12 | 501.49 | 72.73 |
| Junc J33 | 79.84 | 0.00 | 131.00 | 51.16 | 501.88 | 72.79 |
| Junc J34 | 79.71 | 0.00 | 131.00 | 51.29 | 503.15 | 72.98 |
| Junc J35 | 79.56 | 0.00 | 131.00 | 51.44 | 504.63 | 73.19 |
| Junc J36 | 79.55 | 0.00 | 131.00 | 51.45 | 504.72 | 73.20 |
| Junc J37 | 79.59 | 0.00 | 131.00 | 51.41 | 504.33 | 73.15 |
| Junc J38 | 79.51 | 0.00 | 131.00 | 51.49 | 505.12 | 73.26 |
| Junc J39 | 79.51 | 0.00 | 131.00 | 51.49 | 505.12 | 73.26 |
| Junc J40 | 79.45 | 0.00 | 131.00 | 51.55 | 505.71 | 73.35 |
| Junc J41 | 79.47 | 0.00 | 131.00 | 51.53 | 505.51 | 73.32 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 131.00 | 51.67 | 506.88 | 73.52 |
| Junc J43 | 79.35 | 0.00 | 131.00 | 51.65 | 506.69 | 73.49 |
| Junc J44 | 79.21 | 0.00 | 131.00 | 51.79 | 508.06 | 73.69 |
| Junc J45 | 78.75 | 0.00 | 131.00 | 52.25 | 512.57 | 74.34 |
| Junc J46 | 78.75 | 0.00 | 131.00 | 52.25 | 512.57 | 74.34 |
| Junc J47 | 78.77 | 0.00 | 131.00 | 52.23 | 512.38 | 74.31 |
| Junc J48 | 78.75 | 0.00 | 131.00 | 52.25 | 512.57 | 74.34 |
| Junc J49 | 78.72 | 0.00 | 131.00 | 52.28 | 512.87 | 74.39 |
| Junc J50 | 77.64 | 0.00 | 131.00 | 53.36 | 523.46 | 75.92 |
| Junc J51 | 77.74 | 0.65 | 131.00 | 53.26 | 522.48 | 75.78 |
| Junc J52 | 77.57 | 0.00 | 131.00 | 53.43 | 524.15 | 76.02 |
| Junc J53 | 77.64 | 0.00 | 131.00 | 53.36 | 523.46 | 75.92 |
| Junc J54 | 77.45 | 0.00 | 131.00 | 53.55 | 525.33 | 76.19 |
| Junc J55 | 77.44 | 0.00 | 131.00 | 53.56 | 525.42 | 76.21 |
| Junc J56 | 76.90 | 0.00 | 131.00 | 54.10 | 530.72 | 76.97 |
| Junc J57 | 76.90 | 0.00 | 131.00 | 54.10 | 530.72 | 76.97 |
| Junc J58 | 77.70 | 0.00 | 131.00 | 53.30 | 522.87 | 75.84 |
| Junc J59 | 77.70 | 0.00 | 131.00 | 53.30 | 522.87 | 75.84 |
| Junc J60 | 77.70 | 0.00 | 131.00 | 53.30 | 522.87 | 75.84 |
| Junc J61 | 77.70 | 0.00 | 131.00 | 53.30 | 522.87 | 75.84 |
| Junc J62 | 77.72 | 0.00 | 131.00 | 53.28 | 522.68 | 75.81 |
| Junc J63 | 77.10 | 0.00 | 131.00 | 53.90 | 528.76 | 76.69 |
| Junc J64 | 77.18 | 0.00 | 131.00 | 53.82 | 527.97 | 76.58 |
| Junc J65 | 76.80 | 0.00 | 131.00 | 54.20 | 531.70 | 77.12 |
| Junc J66 | 76.80 | 0.00 | 131.00 | 54.20 | 531.70 | 77.12 |
| Junc J67 | 77.10 | 0.00 | 131.00 | 53.90 | 528.76 | 76.69 |
| Junc J68 | 79.50 | 0.00 | 131.00 | 51.50 | 505.22 | 73.28 |
| Junc J25 | 74.80 | 0.00 | 131.00 | 56.20 | 551.32 | 79.96 |
| Junc J69 | 74.80 | 0.00 | 131.00 | 56.20 | 551.32 | 79.96 |
| Junc J70 | 74.80 | 0.00 | 131.00 | 56.20 | 551.32 | 79.96 |
| Junc J71 | 74.80 | 0.00 | 131.00 | 56.20 | 551.32 | 79.96 |
| Junc J72 | 74.80 | 0.00 | 131.00 | 56.20 | 551.32 | 79.96 |
| Junc J73 | 74.80 | 0.00 | 131.00 | 56.20 | 551.32 | 79.96 |
| Junc J74 | 77.00 | 0.00 | 131.00 | 54.00 | 529.74 | 76.83 |
| Junc J75 | 77.14 | 0.00 | 131.00 | 53.86 | 528.37 | 76.63 |
| Junc J76 | 76.70 | 0.00 | 131.00 | 54.30 | 532.68 | 77.26 |
| Junc J77 | 76.85 | 0.00 | 131.00 | 54.15 | 531.21 | 77.05 |
| Junc J78 | 77.15 | 0.00 | 131.00 | 53.85 | 528.27 | 76.62 |
| Junc J79 | 77.15 | 0.00 | 131.00 | 53.85 | 528.27 | 76.62 |
| Junc J80 | 76.32 | 1.44 | 131.00 | 54.68 | 536.41 | 77.80 |
| Resvr R1 | 131.00 | -1.66 | 131.00 | 0.00 | 0.00 | 0.00 |
| Resvr R2 | 131.00 | -3.05 | 131.00 | 0.00 | 0.00 | 0.00 |

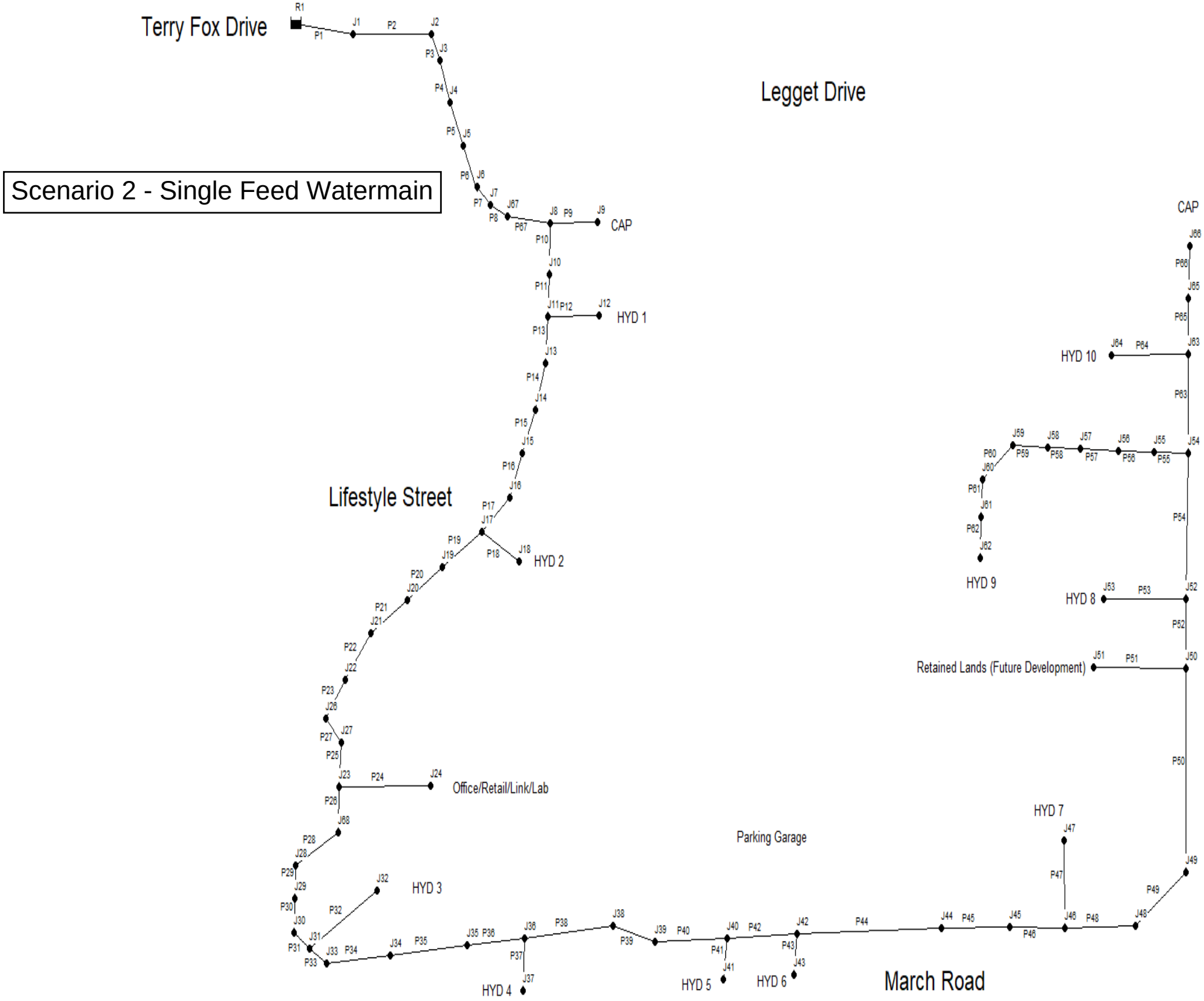
| | |
|---|---|
| Min= | 72.73 |
| Max= | 79.96 |

Max HGL - DOUBLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P2 | 76.4 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P3 | 9 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P4 | 6.2 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P5 | 8 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P6 | 6.2 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P7 | 2 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P8 | 11.8 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P11 | 13.3 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P14 | 6 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P15 | 5.3 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P16 | 8.9 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P17 | 14.2 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P20 | 1.8 | 300 | 120 | 1.66 | 0.02 | 0.01 |
| Pipe P21 | 8.6 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P22 | 6.3 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P28 | 9.6 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P29 | 10.9 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P30 | 8.8 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P31 | 1.6 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P34 | 18.8 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P35 | 50 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P36 | 6 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P39 | 19.6 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P40 | 30.4 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P45 | 4.1 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P46 | 19.3 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P49 | 2.9 | 300 | 120 | -0.96 | 0.01 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0 |
| Pipe P52 | 9.2 | 300 | 120 | -1.61 | 0.02 | 0 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | -1.61 | 0.02 | 0 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | -1.61 | 0.02 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | -1.61 | 0.02 | 0 |
| Pipe P66 | 2 | 300 | 120 | -1.61 | 0.02 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P23 | 12.8 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P25 | 6.2 | 300 | 120 | 1.66 | 0.02 | 0 |
| Pipe P26 | 9.8 | 300 | 120 | -0.96 | 0.01 | 0 |
| Pipe P68 | 4.7 | 300 | 120 | -1.61 | 0.02 | 0 |
| Pipe P69 | 12 | 300 | 120 | -1.61 | 0.02 | 0 |
| Pipe P70 | 1 | 200 | 110 | 1.61 | 0.05 | 0.03 |
| Pipe P71 | 1 | 200 | 110 | -1.61 | 0.05 | 0.04 |
| Pipe P72 | 1.2 | 200 | 110 | 1.61 | 0.05 | 0.03 |
| Pipe P73 | 1.1 | 200 | 110 | 1.61 | 0.05 | 0.03 |
| Pipe P74 | 2.5 | 200 | 110 | 1.61 | 0.05 | 0.03 |
| Pipe P75 | 1 | 200 | 110 | -1.61 | 0.05 | 0.04 |
| Pipe P76 | 9.7 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P77 | 67.76 | 200 | 110 | 1.44 | 0.05 | 0.02 |
| Pipe P78 | 6 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P79 | 17.92 | 200 | 110 | -1.44 | 0.05 | 0.02 |
| Pipe P80 | 7.97 | 150 | 100 | 0 | 0 | 0 |
| Pipe P81 | 1.85 | 200 | 110 | -1.44 | 0.05 | 0.02 |


Scenario 2 - Single Feed Watermain
Terry Fox Drive
Legget Drive
Lifestyle Street
Office/Retail/Link/Lab
Parking Garage
Retained Lands (Future Development)
March Road
HYD 1
HYD 2
HYD 3
HYD 4
HYD 5
HYD 6
HYD 7
HYD 8
HYD 9
HYD 10
CAP
CAP
R1
J1
J2
J3
J4
J5
J6
J7
J8
J9
J10
J11
J12
J13
J14
J15
J16
J17
J18
J19
J20
J21
J22
J23
J24
J26
J27
J28
J29
J30
J31
J32
J33
J34
J35
J36
J37
J38
J39
J40
J41
J42
J43
J44
J45
J46
J47
J48
J49
J50
J51
J52
J53
J54
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J58
J59
J60
J61
J62
J63
J64
J65
J66
J67
J68
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
P13
P14
P15
P16
P17
P18
P19
P20
P21
P22
P23
P24
P25
P26
P27
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P54
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P56
P57
P58
P59
P60
P61
P62
P63
P64
P65
P66
P67

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Office & Link Building) - SINGLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 107.18 | 31.08 | 304.89 | 44.22 |
| Junc J2 | 77.10 | 0.00 | 106.37 | 29.27 | 287.14 | 41.65 |
| Junc J3 | 77.10 | 0.00 | 106.27 | 29.17 | 286.16 | 41.50 |
| Junc J4 | 75.75 | 0.00 | 106.21 | 30.46 | 298.81 | 43.34 |
| Junc J5 | 75.75 | 0.00 | 106.12 | 30.37 | 297.93 | 43.21 |
| Junc J6 | 77.10 | 0.00 | 106.06 | 28.96 | 284.10 | 41.20 |
| Junc J7 | 77.10 | 0.00 | 106.03 | 28.93 | 283.80 | 41.16 |
| Junc J8 | 76.86 | 0.00 | 105.55 | 28.69 | 281.45 | 40.82 |
| Junc J9 | 76.80 | 0.00 | 105.55 | 28.75 | 282.04 | 40.91 |
| Junc J10 | 76.90 | 0.00 | 105.44 | 28.54 | 279.98 | 40.61 |
| Junc J11 | 77.10 | 0.00 | 105.30 | 28.20 | 276.64 | 40.12 |
| Junc J12 | 77.20 | 0.00 | 105.30 | 28.10 | 275.66 | 39.98 |
| Junc J13 | 77.40 | 0.00 | 105.04 | 27.64 | 271.15 | 39.33 |
| Junc J14 | 77.50 | 0.00 | 104.97 | 27.47 | 269.48 | 39.08 |
| Junc J15 | 78.60 | 0.00 | 104.92 | 26.32 | 258.20 | 37.45 |
| Junc J16 | 78.70 | 0.00 | 104.82 | 26.12 | 256.24 | 37.16 |
| Junc J17 | 78.90 | 0.00 | 104.67 | 25.77 | 252.80 | 36.67 |
| Junc J18 | 78.90 | 0.00 | 104.67 | 25.77 | 252.80 | 36.67 |
| Junc J19 | 79.00 | 0.00 | 104.54 | 25.54 | 250.55 | 36.34 |
| Junc J20 | 79.40 | 0.00 | 104.53 | 25.13 | 246.53 | 35.76 |
| Junc J21 | 79.50 | 0.00 | 104.43 | 24.93 | 244.56 | 35.47 |
| Junc J22 | 79.50 | 0.00 | 104.37 | 24.87 | 243.97 | 35.39 |
| Junc J23 | 79.50 | 0.00 | 104.13 | 24.63 | 241.62 | 35.04 |
| Junc J24 | 79.60 | 2.62 | 104.13 | 24.53 | 240.64 | 34.90 |
| Junc J26 | 79.50 | 0.00 | 104.23 | 24.73 | 242.60 | 35.19 |
| Junc J27 | 79.50 | 0.00 | 104.20 | 24.70 | 242.31 | 35.14 |
| Junc J28 | 79.66 | 0.00 | 103.94 | 24.28 | 238.19 | 34.55 |
| Junc J29 | 79.80 | 0.00 | 103.82 | 24.02 | 235.64 | 34.18 |
| Junc J30 | 79.80 | 0.00 | 103.73 | 23.93 | 234.75 | 34.05 |
| Junc J31 | 79.84 | 0.00 | 103.72 | 23.88 | 234.26 | 33.98 |
| Junc J32 | 79.88 | 59.00 | 103.20 | 23.32 | 228.77 | 33.18 |
| Junc J33 | 79.84 | 0.00 | 103.68 | 23.84 | 233.87 | 33.92 |
| Junc J34 | 79.71 | 0.00 | 103.63 | 23.92 | 234.66 | 34.03 |
| Junc J35 | 79.56 | 0.00 | 103.49 | 23.93 | 234.75 | 34.05 |
| Junc J36 | 79.55 | 0.00 | 103.47 | 23.92 | 234.66 | 34.03 |
| Junc J37 | 79.59 | 59.00 | 103.03 | 23.44 | 229.95 | 33.35 |
| Junc J38 | 79.51 | 0.00 | 103.47 | 23.96 | 235.05 | 34.09 |
| Junc J39 | 79.51 | 0.00 | 103.47 | 23.96 | 235.05 | 34.09 |
| Junc J40 | 79.45 | 0.00 | 103.47 | 24.02 | 235.64 | 34.18 |
| Junc J41 | 79.47 | 0.00 | 103.47 | 24.00 | 235.44 | 34.15 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J42 | 79.33 | 0.00 | 103.47 | 24.14 | 236.81 | 34.35 |
| Junc J43 | 79.35 | 0.00 | 103.47 | 24.12 | 236.62 | 34.32 |
| Junc J44 | 79.21 | 0.00 | 103.47 | 24.26 | 237.99 | 34.52 |
| Junc J45 | 78.75 | 0.00 | 103.47 | 24.72 | 242.50 | 35.17 |
| Junc J46 | 78.75 | 0.00 | 103.47 | 24.72 | 242.50 | 35.17 |
| Junc J47 | 78.77 | 0.00 | 103.47 | 24.70 | 242.31 | 35.14 |
| Junc J48 | 78.75 | 0.00 | 103.47 | 24.72 | 242.50 | 35.17 |
| Junc J49 | 78.72 | 0.00 | 103.47 | 24.75 | 242.80 | 35.21 |
| Junc J50 | 77.64 | 0.00 | 103.47 | 25.83 | 253.39 | 36.75 |
| Junc J51 | 77.74 | 0.65 | 103.47 | 25.73 | 252.41 | 36.61 |
| Junc J52 | 77.57 | 0.00 | 103.47 | 25.90 | 254.08 | 36.85 |
| Junc J53 | 77.64 | 0.00 | 103.47 | 25.83 | 253.39 | 36.75 |
| Junc J54 | 77.45 | 0.00 | 103.47 | 26.02 | 255.26 | 37.02 |
| Junc J55 | 77.44 | 0.00 | 103.47 | 26.03 | 255.35 | 37.04 |
| Junc J56 | 76.90 | 0.00 | 103.47 | 26.57 | 260.65 | 37.80 |
| Junc J57 | 76.90 | 0.00 | 103.47 | 26.57 | 260.65 | 37.80 |
| Junc J58 | 77.70 | 0.00 | 103.47 | 25.77 | 252.80 | 36.67 |
| Junc J59 | 77.70 | 0.00 | 103.47 | 25.77 | 252.80 | 36.67 |
| Junc J60 | 77.70 | 0.00 | 103.47 | 25.77 | 252.80 | 36.67 |
| Junc J61 | 77.70 | 0.00 | 103.47 | 25.77 | 252.80 | 36.67 |
| Junc J62 | 77.72 | 0.00 | 103.47 | 25.75 | 252.61 | 36.64 |
| Junc J63 | 77.10 | 0.00 | 103.47 | 26.37 | 258.69 | 37.52 |
| Junc J64 | 77.18 | 0.00 | 103.47 | 26.29 | 257.90 | 37.41 |
| Junc J65 | 76.83 | 0.00 | 103.47 | 26.64 | 261.34 | 37.90 |
| Junc J66 | 76.80 | 0.00 | 103.47 | 26.67 | 261.63 | 37.95 |
| Junc J67 | 77.10 | 0.00 | 105.91 | 28.81 | 282.63 | 40.99 |
| Junc J68 | 79.50 | 0.00 | 104.03 | 24.53 | 240.64 | 34.90 |
| Resvr R1 | 107.60 | -121.27 | 107.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 33.18 |
| Max= | 44.22 |

Max Day + Fire Flow Demand (Office & Link Building) - SINGLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P2 | 76.4 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P3 | 9 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P4 | 6.2 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P5 | 8 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P6 | 6.2 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P7 | 2 | 300 | 120 | 121.27 | 1.72 | 10.66 |
| Pipe P8 | 11.8 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P11 | 13.3 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P14 | 6 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P15 | 5.3 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P16 | 8.9 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P17 | 14.2 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P20 | 1.75 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P21 | 8.6 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P22 | 6.3 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P28 | 9.6 | 300 | 120 | 118.65 | 1.68 | 10.23 |
| Pipe P29 | 10.9 | 300 | 120 | 118.65 | 1.68 | 10.23 |
| Pipe P30 | 8.8 | 300 | 120 | 118.65 | 1.68 | 10.23 |
| Pipe P31 | 1.6 | 300 | 120 | 118.65 | 1.68 | 10.23 |
| Pipe P32 | 4.5 | 150 | 100 | 59 | 3.34 | 115.06 |
| Pipe P33 | 12 | 300 | 120 | 59.65 | 0.84 | 2.86 |
| Pipe P34 | 18.8 | 300 | 120 | 59.65 | 0.84 | 2.86 |
| Pipe P35 | 50 | 300 | 120 | 59.65 | 0.84 | 2.86 |
| Pipe P36 | 6 | 300 | 120 | 59.65 | 0.84 | 2.86 |
| Pipe P37 | 3.8 | 150 | 100 | 59 | 3.34 | 115.06 |
| Pipe P38 | 15.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P39 | 19.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P40 | 30.4 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P45 | 4.1 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P46 | 19.3 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P49 | 2.9 | 300 | 120 | 0.65 | 0.01 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | 0 | 0 | 0 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | 0 | 0 | 0 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | 0 | 0 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P23 | 12.8 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P25 | 6.2 | 300 | 120 | 121.27 | 1.72 | 10.65 |
| Pipe P26 | 9.8 | 300 | 120 | 118.65 | 1.68 | 10.23 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Retail East Building) - SINGLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 126.21 | 50.11 | 491.58 | 71.30 |
| Junc J2 | 77.10 | 0.00 | 126.03 | 48.93 | 480.00 | 69.62 |
| Junc J3 | 77.10 | 0.00 | 126.01 | 48.91 | 479.81 | 69.59 |
| Junc J4 | 75.75 | 0.00 | 126.00 | 50.25 | 492.95 | 71.50 |
| Junc J5 | 75.75 | 0.00 | 125.98 | 50.23 | 492.76 | 71.47 |
| Junc J6 | 77.10 | 0.00 | 125.96 | 48.86 | 479.32 | 69.52 |
| Junc J7 | 77.10 | 0.00 | 125.96 | 48.86 | 479.32 | 69.52 |
| Junc J8 | 76.86 | 0.00 | 125.85 | 48.99 | 480.59 | 69.70 |
| Junc J9 | 76.80 | 0.00 | 125.85 | 49.05 | 481.18 | 69.79 |
| Junc J10 | 76.90 | 0.00 | 125.83 | 48.93 | 480.00 | 69.62 |
| Junc J11 | 77.10 | 0.00 | 125.80 | 48.70 | 477.75 | 69.29 |
| Junc J12 | 77.20 | 0.00 | 125.80 | 48.60 | 476.77 | 69.15 |
| Junc J13 | 77.40 | 0.00 | 125.74 | 48.34 | 474.22 | 68.78 |
| Junc J14 | 77.50 | 0.00 | 125.73 | 48.23 | 473.14 | 68.62 |
| Junc J15 | 78.60 | 0.00 | 125.72 | 47.12 | 462.25 | 67.04 |
| Junc J16 | 78.70 | 0.00 | 125.69 | 46.99 | 460.97 | 66.86 |
| Junc J17 | 78.90 | 0.00 | 125.66 | 46.76 | 458.72 | 66.53 |
| Junc J18 | 78.90 | 50.00 | 125.47 | 46.57 | 456.85 | 66.26 |
| Junc J19 | 79.00 | 0.00 | 125.66 | 46.66 | 457.73 | 66.39 |
| Junc J20 | 79.40 | 0.00 | 125.66 | 46.26 | 453.81 | 65.82 |
| Junc J21 | 79.50 | 0.00 | 125.66 | 46.16 | 452.83 | 65.68 |
| Junc J22 | 79.50 | 0.00 | 125.66 | 46.16 | 452.83 | 65.68 |
| Junc J23 | 79.50 | 0.00 | 125.66 | 46.16 | 452.83 | 65.68 |
| Junc J24 | 79.60 | 2.62 | 125.66 | 46.06 | 451.85 | 65.54 |
| Junc J26 | 79.50 | 0.00 | 125.66 | 46.16 | 452.83 | 65.68 |
| Junc J27 | 79.50 | 0.00 | 125.66 | 46.16 | 452.83 | 65.68 |
| Junc J28 | 79.66 | 0.00 | 125.66 | 46.00 | 451.26 | 65.45 |
| Junc J29 | 79.80 | 0.00 | 125.66 | 45.86 | 449.89 | 65.25 |
| Junc J30 | 79.80 | 0.00 | 125.66 | 45.86 | 449.89 | 65.25 |
| Junc J31 | 79.84 | 0.00 | 125.66 | 45.82 | 449.49 | 65.19 |
| Junc J32 | 79.88 | 0.00 | 125.66 | 45.78 | 449.10 | 65.14 |
| Junc J33 | 79.84 | 0.00 | 125.66 | 45.82 | 449.49 | 65.19 |
| Junc J34 | 79.71 | 0.00 | 125.66 | 45.95 | 450.77 | 65.38 |
| Junc J35 | 79.56 | 0.00 | 125.66 | 46.10 | 452.24 | 65.59 |
| Junc J36 | 79.55 | 0.00 | 125.66 | 46.11 | 452.34 | 65.61 |
| Junc J37 | 79.59 | 0.00 | 125.66 | 46.07 | 451.95 | 65.55 |
| Junc J38 | 79.51 | 0.00 | 125.66 | 46.15 | 452.73 | 65.66 |
| Junc J39 | 79.51 | 0.00 | 125.66 | 46.15 | 452.73 | 65.66 |
| Junc J40 | 79.45 | 0.00 | 125.66 | 46.21 | 453.32 | 65.75 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J41 | 79.47 | 0.00 | 125.66 | 46.19 | 453.12 | 65.72 |
| Junc J42 | 79.33 | 0.00 | 125.66 | 46.33 | 454.50 | 65.92 |
| Junc J43 | 79.35 | 0.00 | 125.66 | 46.31 | 454.30 | 65.89 |
| Junc J44 | 79.21 | 0.00 | 125.66 | 46.45 | 455.67 | 66.09 |
| Junc J45 | 78.75 | 0.00 | 125.66 | 46.91 | 460.19 | 66.74 |
| Junc J46 | 78.75 | 0.00 | 125.66 | 46.91 | 460.19 | 66.74 |
| Junc J47 | 78.77 | 0.00 | 125.66 | 46.89 | 459.99 | 66.72 |
| Junc J48 | 78.75 | 0.00 | 125.66 | 46.91 | 460.19 | 66.74 |
| Junc J49 | 78.72 | 0.00 | 125.66 | 46.94 | 460.48 | 66.79 |
| Junc J50 | 77.64 | 0.00 | 125.66 | 48.02 | 471.08 | 68.32 |
| Junc J51 | 77.74 | 0.65 | 125.66 | 47.92 | 470.10 | 68.18 |
| Junc J52 | 77.57 | 0.00 | 125.66 | 48.09 | 471.76 | 68.42 |
| Junc J53 | 77.64 | 0.00 | 125.66 | 48.02 | 471.08 | 68.32 |
| Junc J54 | 77.45 | 0.00 | 125.66 | 48.21 | 472.94 | 68.59 |
| Junc J55 | 77.44 | 0.00 | 125.66 | 48.22 | 473.04 | 68.61 |
| Junc J56 | 76.90 | 0.00 | 125.66 | 48.76 | 478.34 | 69.38 |
| Junc J57 | 76.90 | 0.00 | 125.66 | 48.76 | 478.34 | 69.38 |
| Junc J58 | 77.70 | 0.00 | 125.66 | 47.96 | 470.49 | 68.24 |
| Junc J59 | 77.70 | 0.00 | 125.66 | 47.96 | 470.49 | 68.24 |
| Junc J60 | 77.70 | 0.00 | 125.66 | 47.96 | 470.49 | 68.24 |
| Junc J61 | 77.70 | 0.00 | 125.66 | 47.96 | 470.49 | 68.24 |
| Junc J62 | 77.72 | 0.00 | 125.66 | 47.94 | 470.29 | 68.21 |
| Junc J63 | 77.10 | 0.00 | 125.66 | 48.56 | 476.37 | 69.09 |
| Junc J64 | 77.18 | 0.00 | 125.66 | 48.48 | 475.59 | 68.98 |
| Junc J65 | 76.83 | 0.00 | 125.66 | 48.83 | 479.02 | 69.48 |
| Junc J66 | 76.80 | 0.00 | 125.66 | 48.86 | 479.32 | 69.52 |
| Junc J67 | 77.10 | 0.00 | 125.93 | 48.83 | 479.02 | 69.48 |
| Junc J68 | 79.50 | 0.00 | 125.66 | 46.16 | 452.83 | 65.68 |
| Resvr R1 | 126.30 | -53.27 | 126.30 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 65.14 |
| Max= | 71.50 |

Max Day + Fire Flow Demand (Retail East Building) - SINGLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P2 | 76.4 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P3 | 9 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P4 | 6.2 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P5 | 8 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P6 | 6.2 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P7 | 2 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P8 | 11.8 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P11 | 13.3 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P14 | 6 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P15 | 5.3 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P16 | 8.9 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P17 | 14.2 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P18 | 2.3 | 150 | 100 | 50 | 2.83 | 84.68 |
| Pipe P19 | 12 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P20 | 1.75 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P21 | 8.6 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P22 | 6.3 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.08 |
| Pipe P27 | 2.8 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P28 | 9.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P29 | 10.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P30 | 8.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P31 | 1.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P34 | 18.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P35 | 50 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P36 | 6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P39 | 19.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P40 | 30.4 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P45 | 4.1 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P46 | 19.3 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P49 | 2.9 | 300 | 120 | 0.65 | 0.01 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | 0 | 0 | 0 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | 0 | 0 | 0 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | 0 | 0 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P23 | 12.8 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P25 | 6.2 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P26 | 9.8 | 300 | 120 | 0.65 | 0.01 | 0 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Retail West Building) - SINGLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 125.99 | 49.89 | 489.42 | 70.98 |
| Junc J2 | 77.10 | 0.00 | 125.39 | 48.29 | 473.72 | 68.71 |
| Junc J3 | 77.10 | 0.00 | 125.31 | 48.21 | 472.94 | 68.59 |
| Junc J4 | 75.75 | 0.00 | 125.27 | 49.52 | 485.79 | 70.46 |
| Junc J5 | 75.75 | 0.00 | 125.20 | 49.45 | 485.10 | 70.36 |
| Junc J6 | 77.10 | 0.00 | 125.15 | 48.05 | 471.37 | 68.37 |
| Junc J7 | 77.10 | 0.00 | 125.14 | 48.04 | 471.27 | 68.35 |
| Junc J8 | 76.86 | 0.00 | 124.77 | 47.91 | 470.00 | 68.17 |
| Junc J9 | 76.80 | 0.00 | 124.77 | 47.97 | 470.59 | 68.25 |
| Junc J10 | 76.90 | 0.00 | 124.69 | 47.79 | 468.82 | 68.00 |
| Junc J11 | 77.10 | 0.00 | 124.59 | 47.49 | 465.88 | 67.57 |
| Junc J12 | 77.20 | 0.00 | 124.59 | 47.39 | 464.90 | 67.43 |
| Junc J13 | 77.40 | 0.00 | 124.40 | 47.00 | 461.07 | 66.87 |
| Junc J14 | 77.50 | 0.00 | 124.35 | 46.85 | 459.60 | 66.66 |
| Junc J15 | 78.60 | 0.00 | 124.31 | 45.71 | 448.42 | 65.04 |
| Junc J16 | 78.70 | 0.00 | 124.24 | 45.54 | 446.75 | 64.80 |
| Junc J17 | 78.90 | 0.00 | 124.13 | 45.23 | 443.71 | 64.35 |
| Junc J18 | 78.90 | 50.00 | 123.93 | 45.03 | 441.74 | 64.07 |
| Junc J19 | 79.00 | 0.00 | 124.10 | 45.10 | 442.43 | 64.17 |
| Junc J20 | 79.40 | 0.00 | 124.09 | 44.69 | 438.41 | 63.59 |
| Junc J21 | 79.50 | 0.00 | 124.07 | 44.57 | 437.23 | 63.42 |
| Junc J22 | 79.50 | 0.00 | 124.06 | 44.56 | 437.13 | 63.40 |
| Junc J23 | 79.50 | 0.00 | 124.01 | 44.51 | 436.64 | 63.33 |
| Junc J24 | 79.60 | 2.62 | 124.01 | 44.41 | 435.66 | 63.19 |
| Junc J26 | 79.50 | 0.00 | 124.03 | 44.53 | 436.84 | 63.36 |
| Junc J27 | 79.50 | 0.00 | 124.02 | 44.52 | 436.74 | 63.34 |
| Junc J28 | 79.66 | 0.00 | 123.97 | 44.31 | 434.68 | 63.05 |
| Junc J29 | 79.80 | 0.00 | 123.94 | 44.14 | 433.01 | 62.80 |
| Junc J30 | 79.80 | 0.00 | 123.93 | 44.13 | 432.92 | 62.79 |
| Junc J31 | 79.84 | 0.00 | 123.92 | 44.08 | 432.42 | 62.72 |
| Junc J32 | 79.88 | 50.00 | 123.54 | 43.66 | 428.30 | 62.12 |
| Junc J33 | 79.84 | 0.00 | 123.92 | 44.08 | 432.42 | 62.72 |
| Junc J34 | 79.71 | 0.00 | 123.92 | 44.21 | 433.70 | 62.90 |
| Junc J35 | 79.56 | 0.00 | 123.92 | 44.36 | 435.17 | 63.12 |
| Junc J36 | 79.55 | 0.00 | 123.92 | 44.37 | 435.27 | 63.13 |
| Junc J37 | 79.59 | 0.00 | 123.92 | 44.33 | 434.88 | 63.07 |
| Junc J38 | 79.51 | 0.00 | 123.92 | 44.41 | 435.66 | 63.19 |
| Junc J39 | 79.51 | 0.00 | 123.92 | 44.41 | 435.66 | 63.19 |
| Junc J40 | 79.45 | 0.00 | 123.92 | 44.47 | 436.25 | 63.27 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J41 | 79.47 | 0.00 | 123.92 | 44.45 | 436.05 | 63.24 |
| Junc J42 | 79.33 | 0.00 | 123.92 | 44.59 | 437.43 | 63.44 |
| Junc J43 | 79.35 | 0.00 | 123.92 | 44.57 | 437.23 | 63.42 |
| Junc J44 | 79.21 | 0.00 | 123.92 | 44.71 | 438.61 | 63.61 |
| Junc J45 | 78.75 | 0.00 | 123.92 | 45.17 | 443.12 | 64.27 |
| Junc J46 | 78.75 | 0.00 | 123.92 | 45.17 | 443.12 | 64.27 |
| Junc J47 | 78.77 | 0.00 | 123.92 | 45.15 | 442.92 | 64.24 |
| Junc J48 | 78.75 | 0.00 | 123.92 | 45.17 | 443.12 | 64.27 |
| Junc J49 | 78.72 | 0.00 | 123.92 | 45.20 | 443.41 | 64.31 |
| Junc J50 | 77.64 | 0.00 | 123.92 | 46.28 | 454.01 | 65.85 |
| Junc J51 | 77.74 | 0.65 | 123.92 | 46.18 | 453.03 | 65.71 |
| Junc J52 | 77.57 | 0.00 | 123.92 | 46.35 | 454.69 | 65.95 |
| Junc J53 | 77.64 | 0.00 | 123.92 | 46.28 | 454.01 | 65.85 |
| Junc J54 | 77.45 | 0.00 | 123.92 | 46.47 | 455.87 | 66.12 |
| Junc J55 | 77.44 | 0.00 | 123.92 | 46.48 | 455.97 | 66.13 |
| Junc J56 | 76.90 | 0.00 | 123.92 | 47.02 | 461.27 | 66.90 |
| Junc J57 | 76.90 | 0.00 | 123.92 | 47.02 | 461.27 | 66.90 |
| Junc J58 | 77.70 | 0.00 | 123.92 | 46.22 | 453.42 | 65.76 |
| Junc J59 | 77.70 | 0.00 | 123.92 | 46.22 | 453.42 | 65.76 |
| Junc J60 | 77.70 | 0.00 | 123.92 | 46.22 | 453.42 | 65.76 |
| Junc J61 | 77.70 | 0.00 | 123.92 | 46.22 | 453.42 | 65.76 |
| Junc J62 | 77.72 | 0.00 | 123.92 | 46.20 | 453.22 | 65.73 |
| Junc J63 | 77.10 | 0.00 | 123.92 | 46.82 | 459.30 | 66.62 |
| Junc J64 | 77.18 | 0.00 | 123.92 | 46.74 | 458.52 | 66.50 |
| Junc J65 | 76.83 | 0.00 | 123.92 | 47.09 | 461.95 | 67.00 |
| Junc J66 | 76.80 | 0.00 | 123.92 | 47.12 | 462.25 | 67.04 |
| Junc J67 | 77.10 | 0.00 | 125.04 | 47.94 | 470.29 | 68.21 |
| Junc J68 | 79.50 | 0.00 | 123.99 | 44.49 | 436.45 | 63.30 |
| Resvr R1 | 126.30 | -103.27 | 126.30 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 62.12 |
| Max= | 70.98 |

Max Day + Fire Flow Demand (Retail West Building) - SINGLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P2 | 76.4 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P3 | 9 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P4 | 6.2 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P5 | 8 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P6 | 6.2 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P7 | 2 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P8 | 11.8 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P11 | 13.3 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P14 | 6 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P15 | 5.3 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P16 | 8.9 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P17 | 14.2 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P18 | 2.3 | 150 | 100 | 50 | 2.83 | 84.68 |
| Pipe P19 | 12 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P20 | 1.75 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P21 | 8.6 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P22 | 6.3 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P28 | 9.6 | 300 | 120 | 50.65 | 0.72 | 2.11 |
| Pipe P29 | 10.9 | 300 | 120 | 50.65 | 0.72 | 2.11 |
| Pipe P30 | 8.8 | 300 | 120 | 50.65 | 0.72 | 2.12 |
| Pipe P31 | 1.6 | 300 | 120 | 50.65 | 0.72 | 2.11 |
| Pipe P32 | 4.5 | 150 | 100 | 50 | 2.83 | 84.68 |
| Pipe P33 | 12 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P34 | 18.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P35 | 50 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P36 | 6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P39 | 19.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P40 | 30.4 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P45 | 4.1 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P46 | 19.3 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P49 | 2.9 | 300 | 120 | 0.65 | 0.01 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | 0 | 0 | 0 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | 0 | 0 | 0 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | 0 | 0 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 103.27 | 1.46 | 7.91 |
| Pipe P23 | 12.8 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P25 | 6.2 | 300 | 120 | 53.27 | 0.75 | 2.32 |
| Pipe P26 | 9.8 | 300 | 120 | 50.65 | 0.72 | 2.11 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (R&D Lab Building) - SINGLE WM Feed - 300mm **(220 FF ONLY)**
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 106.30 | 30.20 | 296.26 | 42.97 |
| Junc J2 | 77.10 | 0.00 | 103.75 | 26.65 | 261.44 | 37.92 |
| Junc J3 | 77.10 | 0.00 | 103.46 | 26.36 | 258.59 | 37.51 |
| Junc J4 | 75.75 | 0.00 | 103.25 | 27.50 | 269.78 | 39.13 |
| Junc J5 | 75.75 | 0.00 | 102.98 | 27.23 | 267.13 | 38.74 |
| Junc J6 | 77.10 | 0.00 | 102.78 | 25.68 | 251.92 | 36.54 |
| Junc J7 | 77.10 | 0.00 | 102.71 | 25.61 | 251.23 | 36.44 |
| Junc J8 | 76.86 | 0.00 | 101.18 | 24.32 | 238.58 | 34.60 |
| Junc J9 | 76.80 | 0.00 | 101.18 | 24.38 | 239.17 | 34.69 |
| Junc J10 | 76.90 | 0.00 | 100.85 | 23.95 | 234.95 | 34.08 |
| Junc J11 | 77.10 | 0.00 | 100.41 | 23.31 | 228.67 | 33.17 |
| Junc J12 | 77.20 | 95.00 | 99.44 | 22.24 | 218.17 | 31.64 |
| Junc J13 | 77.40 | 0.00 | 100.12 | 22.72 | 222.88 | 32.33 |
| Junc J14 | 77.50 | 0.00 | 100.05 | 22.55 | 221.22 | 32.08 |
| Junc J15 | 78.60 | 0.00 | 99.98 | 21.38 | 209.74 | 30.42 |
| Junc J16 | 78.70 | 0.00 | 99.88 | 21.18 | 207.78 | 30.14 |
| Junc J17 | 78.90 | 0.00 | 99.70 | 20.80 | 204.05 | 29.59 |
| Junc J18 | 78.90 | 63.00 | 99.41 | 20.51 | 201.20 | 29.18 |
| Junc J19 | 79.00 | 0.00 | 99.66 | 20.66 | 202.67 | 29.40 |
| Junc J20 | 79.40 | 0.00 | 99.66 | 20.26 | 198.75 | 28.83 |
| Junc J21 | 79.50 | 0.00 | 99.63 | 20.13 | 197.48 | 28.64 |
| Junc J22 | 79.50 | 0.00 | 99.61 | 20.11 | 197.28 | 28.61 |
| Junc J23 | 79.50 | 0.00 | 99.53 | 20.03 | 196.49 | 28.50 |
| Junc J24 | 79.60 | 2.62 | 99.53 | 19.93 | 195.51 | 28.36 |
| Junc J26 | 79.50 | 0.00 | 99.56 | 20.06 | 196.79 | 28.54 |
| Junc J27 | 79.50 | 0.00 | 99.55 | 20.05 | 196.69 | 28.53 |
| Junc J28 | 79.66 | 0.00 | 99.47 | 19.81 | 194.34 | 28.19 |
| Junc J29 | 79.80 | 0.00 | 99.43 | 19.63 | 192.57 | 27.93 |
| Junc J30 | 79.80 | 0.00 | 99.40 | 19.60 | 192.28 | 27.89 |
| Junc J31 | 79.84 | 0.00 | 99.40 | 19.56 | 191.88 | 27.83 |
| Junc J32 | 79.88 | 0.00 | 99.40 | 19.52 | 191.49 | 27.77 |
| Junc J33 | 79.84 | 0.00 | 99.36 | 19.52 | 191.49 | 27.77 |
| Junc J34 | 79.71 | 0.00 | 99.30 | 19.59 | 192.18 | 27.87 |
| Junc J35 | 79.56 | 0.00 | 99.14 | 19.58 | 192.08 | 27.86 |
| Junc J36 | 79.55 | 0.00 | 99.12 | 19.57 | 191.98 | 27.84 |
| Junc J37 | 79.59 | 0.00 | 99.12 | 19.53 | 191.59 | 27.79 |
| Junc J38 | 79.51 | 0.00 | 99.07 | 19.56 | 191.88 | 27.83 |
| Junc J39 | 79.51 | 0.00 | 99.00 | 19.49 | 191.20 | 27.73 |
| Junc J40 | 79.45 | 0.00 | 98.90 | 19.45 | 190.80 | 27.67 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J41 | 79.47 | 0.00 | 98.90 | 19.43 | 190.61 | 27.65 |
| Junc J42 | 79.33 | 0.00 | 98.72 | 19.39 | 190.22 | 27.59 |
| Junc J43 | 79.35 | 0.00 | 98.72 | 19.37 | 190.02 | 27.56 |
| Junc J44 | 79.21 | 0.00 | 98.52 | 19.31 | 189.43 | 27.47 |
| Junc J45 | 78.75 | 0.00 | 98.51 | 19.76 | 193.85 | 28.11 |
| Junc J46 | 78.75 | 0.00 | 98.45 | 19.70 | 193.26 | 28.03 |
| Junc J47 | 78.77 | 0.00 | 98.45 | 19.68 | 193.06 | 28.00 |
| Junc J48 | 78.75 | 0.00 | 98.43 | 19.68 | 193.06 | 28.00 |
| Junc J49 | 78.72 | 0.00 | 98.42 | 19.70 | 193.26 | 28.03 |
| Junc J50 | 77.64 | 0.00 | 98.22 | 20.58 | 201.89 | 29.28 |
| Junc J51 | 77.74 | 0.65 | 98.22 | 20.48 | 200.91 | 29.14 |
| Junc J52 | 77.57 | 0.00 | 98.19 | 20.62 | 202.28 | 29.34 |
| Junc J53 | 77.64 | 0.00 | 98.19 | 20.55 | 201.60 | 29.24 |
| Junc J54 | 77.45 | 0.00 | 98.14 | 20.69 | 202.97 | 29.44 |
| Junc J55 | 77.44 | 0.00 | 98.14 | 20.70 | 203.07 | 29.45 |
| Junc J56 | 76.90 | 0.00 | 98.14 | 21.24 | 208.36 | 30.22 |
| Junc J57 | 76.90 | 0.00 | 98.14 | 21.24 | 208.36 | 30.22 |
| Junc J58 | 77.70 | 0.00 | 98.14 | 20.44 | 200.52 | 29.08 |
| Junc J59 | 77.70 | 0.00 | 98.14 | 20.44 | 200.52 | 29.08 |
| Junc J60 | 77.70 | 0.00 | 98.14 | 20.44 | 200.52 | 29.08 |
| Junc J61 | 77.70 | 0.00 | 98.14 | 20.44 | 200.52 | 29.08 |
| Junc J62 | 77.72 | 0.00 | 98.14 | 20.42 | 200.32 | 29.05 |
| Junc J63 | 77.10 | 0.00 | 98.02 | 20.92 | 205.23 | 29.77 |
| Junc J64 | 77.18 | 63.00 | 96.87 | 19.69 | 193.16 | 28.02 |
| Junc J65 | 76.83 | 0.00 | 98.02 | 21.19 | 207.87 | 30.15 |
| Junc J66 | 76.80 | 0.00 | 98.02 | 21.22 | 208.17 | 30.19 |
| Junc J67 | 77.10 | 0.00 | 102.32 | 25.22 | 247.41 | 35.88 |
| Junc J68 | 79.50 | 0.00 | 99.50 | 20.00 | 196.20 | 28.46 |
| Resvr R1 | 107.60 | -224.27 | 107.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 27.47 |
| Max= | 42.97 |

Max Day + Fire Flow Demand (R&D Lab Building) - SINGLE WM Feed - 300mm (220 FF ONLY)

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P2 | 76.4 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P3 | 9 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P4 | 6.2 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P5 | 8 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P6 | 6.2 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P7 | 2 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P8 | 11.8 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P11 | 13.3 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P12 | 3.5 | 150 | 100 | 95 | 5.38 | 277.99 |
| Pipe P13 | 24.3 | 300 | 120 | 129.27 | 1.83 | 11.99 |
| Pipe P14 | 6 | 300 | 120 | 129.27 | 1.83 | 11.99 |
| Pipe P15 | 5.3 | 300 | 120 | 129.27 | 1.83 | 11.99 |
| Pipe P16 | 8.9 | 300 | 120 | 129.27 | 1.83 | 11.99 |
| Pipe P17 | 14.2 | 300 | 120 | 129.27 | 1.83 | 11.99 |
| Pipe P18 | 2.3 | 150 | 100 | 63 | 3.57 | 129.92 |
| Pipe P19 | 12 | 300 | 120 | 66.27 | 0.94 | 3.48 |
| Pipe P20 | 1.75 | 300 | 120 | 66.27 | 0.94 | 3.48 |
| Pipe P21 | 8.6 | 300 | 120 | 66.27 | 0.94 | 3.48 |
| Pipe P22 | 6.3 | 300 | 120 | 66.27 | 0.94 | 3.48 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 66.27 | 0.94 | 3.48 |
| Pipe P28 | 9.6 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P29 | 10.9 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P30 | 8.8 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P31 | 1.6 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P34 | 18.8 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P35 | 50 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P36 | 6 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P39 | 19.6 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P40 | 30.4 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P45 | 4.1 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P46 | 19.3 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P49 | 2.9 | 300 | 120 | 63.65 | 0.9 | 3.23 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 63.65 | 0.9 | 3.23 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | 63 | 0.89 | 3.17 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | 63 | 0.89 | 3.17 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | 63 | 0.89 | 3.17 |
| Pipe P64 | 8.8 | 150 | 100 | 63 | 3.57 | 129.92 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 224.27 | 3.17 | 33.26 |
| Pipe P23 | 12.8 | 300 | 120 | 66.27 | 0.94 | 3.48 |
| Pipe P25 | 6.2 | 300 | 120 | 66.27 | 0.94 | 3.48 |
| Pipe P26 | 9.8 | 300 | 120 | 63.65 | 0.9 | 3.23 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Parking Garage) - SINGLE WM Feed - 300mm **(150 FF ONLY)**
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.1 | 0.0 | 107.0 | 30.9 | 302.74 | 43.91 |
| Junc J2 | 77.1 | 0.0 | 105.7 | 28.6 | 280.57 | 40.69 |
| Junc J3 | 77.1 | 0.0 | 105.6 | 28.5 | 279.09 | 40.48 |
| Junc J4 | 75.8 | 0.0 | 105.5 | 29.7 | 291.36 | 42.26 |
| Junc J5 | 75.8 | 0.0 | 105.3 | 29.6 | 290.08 | 42.07 |
| Junc J6 | 77.1 | 0.0 | 105.2 | 28.1 | 275.86 | 40.01 |
| Junc J7 | 77.1 | 0.0 | 105.2 | 28.1 | 275.46 | 39.95 |
| Junc J8 | 76.9 | 0.0 | 104.4 | 27.6 | 270.46 | 39.23 |
| Junc J9 | 76.8 | 0.0 | 104.4 | 27.6 | 271.05 | 39.31 |
| Junc J10 | 76.9 | 0.0 | 104.3 | 27.4 | 268.50 | 38.94 |
| Junc J11 | 77.1 | 0.0 | 104.1 | 27.0 | 264.38 | 38.34 |
| Junc J12 | 77.2 | 0.0 | 104.1 | 26.9 | 263.40 | 38.20 |
| Junc J13 | 77.4 | 0.0 | 103.7 | 26.3 | 257.51 | 37.35 |
| Junc J14 | 77.5 | 0.0 | 103.6 | 26.1 | 255.55 | 37.06 |
| Junc J15 | 78.6 | 0.0 | 103.5 | 24.9 | 243.88 | 35.37 |
| Junc J16 | 78.7 | 0.0 | 103.3 | 24.6 | 241.52 | 35.03 |
| Junc J17 | 78.9 | 0.0 | 103.1 | 24.2 | 237.21 | 34.40 |
| Junc J18 | 78.9 | 0.0 | 103.1 | 24.2 | 237.21 | 34.40 |
| Junc J19 | 79.0 | 0.0 | 102.9 | 23.9 | 234.26 | 33.98 |
| Junc J20 | 79.4 | 0.0 | 102.9 | 23.5 | 230.14 | 33.38 |
| Junc J21 | 79.5 | 0.0 | 102.7 | 23.2 | 227.69 | 33.02 |
| Junc J22 | 79.5 | 0.0 | 102.6 | 23.1 | 226.71 | 32.88 |
| Junc J23 | 79.5 | 0.0 | 102.3 | 22.8 | 223.18 | 32.37 |
| Junc J24 | 79.6 | 2.6 | 102.3 | 22.7 | 222.20 | 32.23 |
| Junc J26 | 79.5 | 0.0 | 102.4 | 22.9 | 224.65 | 32.58 |
| Junc J27 | 79.5 | 0.0 | 102.4 | 22.9 | 224.16 | 32.51 |
| Junc J28 | 79.7 | 0.0 | 101.9 | 22.3 | 218.57 | 31.70 |
| Junc J29 | 79.8 | 0.0 | 101.8 | 22.0 | 215.53 | 31.26 |
| Junc J30 | 79.8 | 0.0 | 101.6 | 21.8 | 214.15 | 31.06 |
| Junc J31 | 79.8 | 0.0 | 101.6 | 21.8 | 213.47 | 30.96 |
| Junc J32 | 79.9 | 0.0 | 101.6 | 21.7 | 213.07 | 30.90 |
| Junc J33 | 79.8 | 0.0 | 101.4 | 21.6 | 211.60 | 30.69 |
| Junc J34 | 79.7 | 0.0 | 101.1 | 21.4 | 209.93 | 30.45 |
| Junc J35 | 79.6 | 0.0 | 100.3 | 20.8 | 203.66 | 29.54 |
| Junc J36 | 79.6 | 0.0 | 100.2 | 20.7 | 202.77 | 29.41 |
| Junc J37 | 79.6 | 0.0 | 100.2 | 20.6 | 202.38 | 29.35 |
| Junc J38 | 79.5 | 0.0 | 100.0 | 20.5 | 200.71 | 29.11 |
| Junc J39 | 79.5 | 0.0 | 99.7 | 20.2 | 197.67 | 28.67 |
| Junc J40 | 79.5 | 0.0 | 99.2 | 19.7 | 193.45 | 28.06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J41 | 79.5 | 0.0 | 99.2 | 19.7 | 193.26 | 28.03 |
| Junc J42 | 79.3 | 0.0 | 98.3 | 18.9 | 185.61 | 26.92 |
| Junc J43 | 79.4 | 75.0 | 98.0 | 18.6 | 182.47 | 26.46 |
| Junc J44 | 79.2 | 0.0 | 98.0 | 18.8 | 184.13 | 26.71 |
| Junc J45 | 78.8 | 0.0 | 98.0 | 19.2 | 188.55 | 27.35 |
| Junc J46 | 78.8 | 0.0 | 97.9 | 19.1 | 187.67 | 27.22 |
| Junc J47 | 78.8 | 0.0 | 97.9 | 19.1 | 187.47 | 27.19 |
| Junc J48 | 78.8 | 0.0 | 97.9 | 19.1 | 187.37 | 27.18 |
| Junc J49 | 78.7 | 0.0 | 97.8 | 19.1 | 187.57 | 27.20 |
| Junc J50 | 77.6 | 0.0 | 97.6 | 19.9 | 195.51 | 28.36 |
| Junc J51 | 77.7 | 0.7 | 97.6 | 19.8 | 194.53 | 28.21 |
| Junc J52 | 77.6 | 0.0 | 97.5 | 20.0 | 195.81 | 28.40 |
| Junc J53 | 77.6 | 0.0 | 97.5 | 19.9 | 195.12 | 28.30 |
| Junc J54 | 77.5 | 0.0 | 97.5 | 20.0 | 196.30 | 28.47 |
| Junc J55 | 77.4 | 0.0 | 97.4 | 20.0 | 195.81 | 28.40 |
| Junc J56 | 76.9 | 0.0 | 97.3 | 20.4 | 200.22 | 29.04 |
| Junc J57 | 76.9 | 0.0 | 97.2 | 20.3 | 199.34 | 28.91 |
| Junc J58 | 77.7 | 0.0 | 97.1 | 19.4 | 190.12 | 27.57 |
| Junc J59 | 77.7 | 0.0 | 96.8 | 19.1 | 187.17 | 27.15 |
| Junc J60 | 77.7 | 0.0 | 96.7 | 19.0 | 186.68 | 27.08 |
| Junc J61 | 77.7 | 0.0 | 96.7 | 19.0 | 186.10 | 26.99 |
| Junc J62 | 77.7 | 75.0 | 96.2 | 18.5 | 181.68 | 26.35 |
| Junc J63 | 77.1 | 0.0 | 97.5 | 20.4 | 199.73 | 28.97 |
| Junc J64 | 77.2 | 0.0 | 97.5 | 20.3 | 198.95 | 28.85 |
| Junc J65 | 76.8 | 0.0 | 97.5 | 20.6 | 202.38 | 29.35 |
| Junc J66 | 76.8 | 0.0 | 97.5 | 20.7 | 202.67 | 29.40 |
| Junc J67 | 77.1 | 0.0 | 105.0 | 27.9 | 273.60 | 39.68 |
| Junc J68 | 79.5 | 0.0 | 102.1 | 22.6 | 221.71 | 32.16 |
| Resvr R1 | 107.6 | -153.3 | 107.6 | 0.0 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 26.35 |
| Max= | 43.91 |

Max Day + Fire Flow Demand (Parking Garage) - SINGLE WM Feed - 300mm (150 FF ONLY)

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P2 | 76.4 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P3 | 9 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P4 | 6.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P5 | 8 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P6 | 6.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P7 | 2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P8 | 11.8 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P11 | 13.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P14 | 6 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P15 | 5.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P16 | 8.9 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P17 | 14.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P20 | 1.75 | 300 | 120 | 153.27 | 2.17 | 16.43 |
| Pipe P21 | 8.6 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P22 | 6.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.08 |
| Pipe P27 | 2.8 | 300 | 120 | 153.27 | 2.17 | 16.43 |
| Pipe P28 | 9.6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P29 | 10.9 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P30 | 8.8 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P31 | 1.6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P34 | 18.8 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P35 | 50 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P36 | 6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P39 | 19.6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P40 | 30.4 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P43 | 1.7 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P44 | 60 | 300 | 120 | 75.65 | 1.07 | 4.45 |
| Pipe P45 | 4.1 | 300 | 120 | 75.65 | 1.07 | 4.44 |
| Pipe P46 | 19.3 | 300 | 120 | 75.65 | 1.07 | 4.45 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 75.65 | 1.07 | 4.45 |
| Pipe P49 | 2.9 | 300 | 120 | 75.65 | 1.07 | 4.45 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 75.65 | 1.07 | 4.45 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | 75 | 1.06 | 4.37 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | 75 | 1.06 | 4.37 |
| Pipe P55 | 1.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P56 | 2.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P57 | 2.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P58 | 3.6 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P59 | 8.1 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P60 | 1.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P61 | 1.5 | 200 | 110 | 75 | 2.39 | 37.04 |
| Pipe P62 | 2.4 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P63 | 39.1 | 300 | 120 | 0 | 0 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P23 | 12.8 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P25 | 6.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P26 | 9.8 | 300 | 120 | 150.65 | 2.13 | 15.92 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max Day + Fire Flow Demand (Retained Lands - Future Office Building) - SINGLE WM Feed - 300mm **(150 FF ONLY)**
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 106.96 | 30.86 | 302.74 | 43.91 |
| Junc J2 | 77.10 | 0.00 | 105.70 | 28.60 | 280.57 | 40.69 |
| Junc J3 | 77.10 | 0.00 | 105.55 | 28.45 | 279.09 | 40.48 |
| Junc J4 | 75.75 | 0.00 | 105.45 | 29.70 | 291.36 | 42.26 |
| Junc J5 | 75.75 | 0.00 | 105.32 | 29.57 | 290.08 | 42.07 |
| Junc J6 | 77.10 | 0.00 | 105.22 | 28.12 | 275.86 | 40.01 |
| Junc J7 | 77.10 | 0.00 | 105.18 | 28.08 | 275.46 | 39.95 |
| Junc J8 | 76.86 | 0.00 | 104.43 | 27.57 | 270.46 | 39.23 |
| Junc J9 | 76.80 | 0.00 | 104.43 | 27.63 | 271.05 | 39.31 |
| Junc J10 | 76.90 | 0.00 | 104.27 | 27.37 | 268.50 | 38.94 |
| Junc J11 | 77.10 | 0.00 | 104.05 | 26.95 | 264.38 | 38.34 |
| Junc J12 | 77.20 | 0.00 | 104.05 | 26.85 | 263.40 | 38.20 |
| Junc J13 | 77.40 | 0.00 | 103.65 | 26.25 | 257.51 | 37.35 |
| Junc J14 | 77.50 | 0.00 | 103.55 | 26.05 | 255.55 | 37.06 |
| Junc J15 | 78.60 | 0.00 | 103.46 | 24.86 | 243.88 | 35.37 |
| Junc J16 | 78.70 | 0.00 | 103.32 | 24.62 | 241.52 | 35.03 |
| Junc J17 | 78.90 | 0.00 | 103.08 | 24.18 | 237.21 | 34.40 |
| Junc J18 | 78.90 | 0.00 | 103.08 | 24.18 | 237.21 | 34.40 |
| Junc J19 | 79.00 | 0.00 | 102.88 | 23.88 | 234.26 | 33.98 |
| Junc J20 | 79.40 | 0.00 | 102.86 | 23.46 | 230.14 | 33.38 |
| Junc J21 | 79.50 | 0.00 | 102.71 | 23.21 | 227.69 | 33.02 |
| Junc J22 | 79.50 | 0.00 | 102.61 | 23.11 | 226.71 | 32.88 |
| Junc J23 | 79.50 | 0.00 | 102.25 | 22.75 | 223.18 | 32.37 |
| Junc J24 | 79.60 | 2.62 | 102.25 | 22.65 | 222.20 | 32.23 |
| Junc J26 | 79.50 | 0.00 | 102.40 | 22.90 | 224.65 | 32.58 |
| Junc J27 | 79.50 | 0.00 | 102.35 | 22.85 | 224.16 | 32.51 |
| Junc J28 | 79.66 | 0.00 | 101.94 | 22.28 | 218.57 | 31.70 |
| Junc J29 | 79.80 | 0.00 | 101.77 | 21.97 | 215.53 | 31.26 |
| Junc J30 | 79.80 | 0.00 | 101.63 | 21.83 | 214.15 | 31.06 |
| Junc J31 | 79.84 | 0.00 | 101.60 | 21.76 | 213.47 | 30.96 |
| Junc J32 | 79.88 | 0.00 | 101.60 | 21.72 | 213.07 | 30.90 |
| Junc J33 | 79.84 | 0.00 | 101.41 | 21.57 | 211.60 | 30.69 |
| Junc J34 | 79.71 | 0.00 | 101.11 | 21.40 | 209.93 | 30.45 |
| Junc J35 | 79.56 | 0.00 | 100.32 | 20.76 | 203.66 | 29.54 |
| Junc J36 | 79.55 | 0.00 | 100.22 | 20.67 | 202.77 | 29.41 |
| Junc J37 | 79.59 | 0.00 | 100.22 | 20.63 | 202.38 | 29.35 |
| Junc J38 | 79.51 | 0.00 | 99.97 | 20.46 | 200.71 | 29.11 |
| Junc J39 | 79.51 | 0.00 | 99.66 | 20.15 | 197.67 | 28.67 |
| Junc J40 | 79.45 | 0.00 | 99.17 | 19.72 | 193.45 | 28.06 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J41 | 79.47 | 0.00 | 99.17 | 19.70 | 193.26 | 28.03 |
| Junc J42 | 79.33 | 0.00 | 98.25 | 18.92 | 185.61 | 26.92 |
| Junc J43 | 79.35 | 0.00 | 98.25 | 18.90 | 185.41 | 26.89 |
| Junc J44 | 79.21 | 0.00 | 97.30 | 18.09 | 177.46 | 25.74 |
| Junc J45 | 78.75 | 0.00 | 97.23 | 18.48 | 181.29 | 26.29 |
| Junc J46 | 78.75 | 0.00 | 96.92 | 18.17 | 178.25 | 25.85 |
| Junc J47 | 78.77 | 0.00 | 96.92 | 18.15 | 178.05 | 25.82 |
| Junc J48 | 78.75 | 0.00 | 96.83 | 18.08 | 177.36 | 25.72 |
| Junc J49 | 78.72 | 0.00 | 96.78 | 18.06 | 177.17 | 25.70 |
| Junc J50 | 77.64 | 0.00 | 95.80 | 18.16 | 178.15 | 25.84 |
| Junc J51 | 77.74 | 0.65 | 95.80 | 18.06 | 177.17 | 25.70 |
| Junc J52 | 77.57 | 0.00 | 95.65 | 18.08 | 177.36 | 25.72 |
| Junc J53 | 77.64 | 75.00 | 94.40 | 16.76 | 164.42 | 23.85 |
| Junc J54 | 77.45 | 0.00 | 95.59 | 18.14 | 177.95 | 25.81 |
| Junc J55 | 77.44 | 0.00 | 95.53 | 18.09 | 177.46 | 25.74 |
| Junc J56 | 76.90 | 0.00 | 95.44 | 18.54 | 181.88 | 26.38 |
| Junc J57 | 76.90 | 0.00 | 95.34 | 18.44 | 180.90 | 26.24 |
| Junc J58 | 77.70 | 0.00 | 95.21 | 17.51 | 171.77 | 24.91 |
| Junc J59 | 77.70 | 0.00 | 94.91 | 17.21 | 168.83 | 24.49 |
| Junc J60 | 77.70 | 0.00 | 94.86 | 17.16 | 168.34 | 24.42 |
| Junc J61 | 77.70 | 0.00 | 94.80 | 17.10 | 167.75 | 24.33 |
| Junc J62 | 77.72 | 75.00 | 94.37 | 16.65 | 163.34 | 23.69 |
| Junc J63 | 77.10 | 0.00 | 95.59 | 18.49 | 181.39 | 26.31 |
| Junc J64 | 77.18 | 0.00 | 95.59 | 18.41 | 180.60 | 26.19 |
| Junc J65 | 76.83 | 0.00 | 95.59 | 18.76 | 184.04 | 26.69 |
| Junc J66 | 76.80 | 0.00 | 95.59 | 18.79 | 184.33 | 26.73 |
| Junc J67 | 77.10 | 0.00 | 104.99 | 27.89 | 273.60 | 39.68 |
| Junc J68 | 79.50 | 0.00 | 102.10 | 22.60 | 221.71 | 32.16 |
| Resvr R1 | 107.60 | -153.27 | 107.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 23.69 |
| Max= | 43.91 |

Max Day + Fire Flow Demand (Retained Lands - Future Office Building) - SINGLE WM Feed - 300mm (150 FF ONLY)

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P2 | 76.4 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P3 | 9 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P4 | 6.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P5 | 8 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P6 | 6.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P7 | 2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P8 | 11.8 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P11 | 13.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P14 | 6 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P15 | 5.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P16 | 8.9 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P17 | 14.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P20 | 1.75 | 300 | 120 | 153.27 | 2.17 | 16.43 |
| Pipe P21 | 8.6 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P22 | 6.3 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 153.27 | 2.17 | 16.43 |
| Pipe P28 | 9.6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P29 | 10.9 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P30 | 8.8 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P31 | 1.6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P34 | 18.8 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P35 | 50 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P36 | 6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P39 | 19.6 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P40 | 30.4 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P45 | 4.1 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P46 | 19.3 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P49 | 2.9 | 300 | 120 | 150.65 | 2.13 | 15.92 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 150.65 | 2.13 | 15.92 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0.01 |
| Pipe P52 | 9.2 | 300 | 120 | 150 | 2.12 | 15.79 |
| Pipe P53 | 7 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P54 | 15.6 | 300 | 120 | 75 | 1.06 | 4.37 |
| Pipe P55 | 1.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P56 | 2.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P57 | 2.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P58 | 3.6 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P59 | 8.1 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P60 | 1.5 | 200 | 110 | -75 | 2.39 | 37.04 |
| Pipe P61 | 1.5 | 200 | 110 | 75 | 2.39 | 37.04 |
| Pipe P62 | 2.4 | 150 | 100 | 75 | 4.24 | 179.43 |
| Pipe P63 | 39.1 | 300 | 120 | 0 | 0 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P23 | 12.8 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P25 | 6.2 | 300 | 120 | 153.27 | 2.17 | 16.44 |
| Pipe P26 | 9.8 | 300 | 120 | 150.65 | 2.13 | 15.92 |

# 570 & 520 March Road - Nokia OIC
# Water Model Results

Peak Hour Demand - SINGLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 125.60 | 49.50 | 485.60 | 70.43 |
| Junc J2 | 77.10 | 0.00 | 125.60 | 48.50 | 475.79 | 69.01 |
| Junc J3 | 77.10 | 0.00 | 125.60 | 48.50 | 475.79 | 69.01 |
| Junc J4 | 75.75 | 0.00 | 125.59 | 49.84 | 488.93 | 70.91 |
| Junc J5 | 75.75 | 0.00 | 125.59 | 49.84 | 488.93 | 70.91 |
| Junc J6 | 77.10 | 0.00 | 125.59 | 48.49 | 475.69 | 68.99 |
| Junc J7 | 77.10 | 0.00 | 125.59 | 48.49 | 475.69 | 68.99 |
| Junc J8 | 76.86 | 0.00 | 125.59 | 48.73 | 478.04 | 69.33 |
| Junc J9 | 76.80 | 0.00 | 125.59 | 48.79 | 478.63 | 69.42 |
| Junc J10 | 76.90 | 0.00 | 125.59 | 48.69 | 477.65 | 69.28 |
| Junc J11 | 77.10 | 0.00 | 125.59 | 48.49 | 475.69 | 68.99 |
| Junc J12 | 77.20 | 0.00 | 125.59 | 48.39 | 474.71 | 68.85 |
| Junc J13 | 77.40 | 0.00 | 125.59 | 48.19 | 472.74 | 68.57 |
| Junc J14 | 77.50 | 0.00 | 125.59 | 48.09 | 471.76 | 68.42 |
| Junc J15 | 78.60 | 0.00 | 125.59 | 46.99 | 460.97 | 66.86 |
| Junc J16 | 78.70 | 0.00 | 125.59 | 46.89 | 459.99 | 66.72 |
| Junc J17 | 78.90 | 0.00 | 125.59 | 46.69 | 458.03 | 66.43 |
| Junc J18 | 78.90 | 0.00 | 125.59 | 46.69 | 458.03 | 66.43 |
| Junc J19 | 79.00 | 0.00 | 125.59 | 46.59 | 457.05 | 66.29 |
| Junc J20 | 79.40 | 0.00 | 125.59 | 46.19 | 453.12 | 65.72 |
| Junc J21 | 79.50 | 0.00 | 125.59 | 46.09 | 452.14 | 65.58 |
| Junc J22 | 79.50 | 0.00 | 125.59 | 46.09 | 452.14 | 65.58 |
| Junc J23 | 79.50 | 0.00 | 125.59 | 46.09 | 452.14 | 65.58 |
| Junc J24 | 79.60 | 4.72 | 125.59 | 45.99 | 451.16 | 65.44 |
| Junc J26 | 79.50 | 0.00 | 125.59 | 46.09 | 452.14 | 65.58 |
| Junc J27 | 79.50 | 0.00 | 125.59 | 46.09 | 452.14 | 65.58 |
| Junc J28 | 79.66 | 0.00 | 125.59 | 45.93 | 450.57 | 65.35 |
| Junc J29 | 79.80 | 0.00 | 125.59 | 45.79 | 449.20 | 65.15 |
| Junc J30 | 79.80 | 0.00 | 125.59 | 45.79 | 449.20 | 65.15 |
| Junc J31 | 79.84 | 0.00 | 125.59 | 45.75 | 448.81 | 65.09 |
| Junc J32 | 79.88 | 0.00 | 125.59 | 45.71 | 448.42 | 65.04 |
| Junc J33 | 79.84 | 0.00 | 125.59 | 45.75 | 448.81 | 65.09 |
| Junc J34 | 79.71 | 0.00 | 125.59 | 45.88 | 450.08 | 65.28 |
| Junc J35 | 79.56 | 0.00 | 125.59 | 46.03 | 451.55 | 65.49 |
| Junc J36 | 79.55 | 0.00 | 125.59 | 46.04 | 451.65 | 65.51 |
| Junc J37 | 79.59 | 0.00 | 125.59 | 46.00 | 451.26 | 65.45 |
| Junc J38 | 79.51 | 0.00 | 125.59 | 46.08 | 452.04 | 65.56 |
| Junc J39 | 79.51 | 0.00 | 125.59 | 46.08 | 452.04 | 65.56 |
| Junc J40 | 79.45 | 0.00 | 125.59 | 46.14 | 452.63 | 65.65 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J41 | 79.47 | 0.00 | 125.59 | 46.12 | 452.44 | 65.62 |
| Junc J42 | 79.33 | 0.00 | 125.59 | 46.26 | 453.81 | 65.82 |
| Junc J43 | 79.35 | 0.00 | 125.59 | 46.24 | 453.61 | 65.79 |
| Junc J44 | 79.21 | 0.00 | 125.59 | 46.38 | 454.99 | 65.99 |
| Junc J45 | 78.75 | 0.00 | 125.59 | 46.84 | 459.50 | 66.64 |
| Junc J46 | 78.75 | 0.00 | 125.59 | 46.84 | 459.50 | 66.64 |
| Junc J47 | 78.77 | 0.00 | 125.59 | 46.82 | 459.30 | 66.62 |
| Junc J48 | 78.75 | 0.00 | 125.59 | 46.84 | 459.50 | 66.64 |
| Junc J49 | 78.72 | 0.00 | 125.59 | 46.87 | 459.79 | 66.69 |
| Junc J50 | 77.64 | 0.00 | 125.59 | 47.95 | 470.39 | 68.22 |
| Junc J51 | 77.74 | 1.17 | 125.59 | 47.85 | 469.41 | 68.08 |
| Junc J52 | 77.57 | 0.00 | 125.59 | 48.02 | 471.08 | 68.32 |
| Junc J53 | 77.64 | 0.00 | 125.59 | 47.95 | 470.39 | 68.22 |
| Junc J54 | 77.45 | 0.00 | 125.59 | 48.14 | 472.25 | 68.49 |
| Junc J55 | 77.44 | 0.00 | 125.59 | 48.15 | 472.35 | 68.51 |
| Junc J56 | 76.90 | 0.00 | 125.59 | 48.69 | 477.65 | 69.28 |
| Junc J57 | 76.90 | 0.00 | 125.59 | 48.69 | 477.65 | 69.28 |
| Junc J58 | 77.70 | 0.00 | 125.59 | 47.89 | 469.80 | 68.14 |
| Junc J59 | 77.70 | 0.00 | 125.59 | 47.89 | 469.80 | 68.14 |
| Junc J60 | 77.70 | 0.00 | 125.59 | 47.89 | 469.80 | 68.14 |
| Junc J61 | 77.70 | 0.00 | 125.59 | 47.89 | 469.80 | 68.14 |
| Junc J62 | 77.72 | 0.00 | 125.59 | 47.87 | 469.60 | 68.11 |
| Junc J63 | 77.10 | 0.00 | 125.59 | 48.49 | 475.69 | 68.99 |
| Junc J64 | 77.18 | 0.00 | 125.59 | 48.41 | 474.90 | 68.88 |
| Junc J65 | 76.83 | 0.00 | 125.59 | 48.76 | 478.34 | 69.38 |
| Junc J66 | 76.80 | 0.00 | 125.59 | 48.79 | 478.63 | 69.42 |
| Junc J67 | 77.10 | 0.00 | 125.59 | 48.49 | 475.69 | 68.99 |
| Junc J68 | 79.50 | 0.00 | 125.59 | 46.09 | 452.14 | 65.58 |
| Resvr R1 | 125.60 | -5.89 | 125.60 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 65.04 |
| Max= | 70.91 |

Peak Hour Demand - SINGLE WM Feed - 300mm

Network Table - Links

| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P2 | 76.4 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P3 | 9 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P4 | 6.2 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P5 | 8 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P6 | 6.2 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P7 | 2 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P8 | 11.8 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P11 | 13.3 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P14 | 6 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P15 | 5.3 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P16 | 8.9 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P17 | 14.2 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P20 | 1.75 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P21 | 8.6 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P22 | 6.3 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P24 | 5.3 | 200 | 110 | 4.72 | 0.15 | 0.22 |
| Pipe P27 | 2.8 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P28 | 9.6 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P29 | 10.9 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P30 | 8.8 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P31 | 1.6 | 300 | 120 | 1.17 | 0.02 | 0.01 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P34 | 18.8 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P35 | 50 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P36 | 6 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P39 | 19.6 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P40 | 30.4 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P45 | 4.1 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P46 | 19.3 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P49 | 2.9 | 300 | 120 | 1.17 | 0.02 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 1.17 | 0.02 | 0 |
| Pipe P51 | 9.8 | 200 | 110 | 1.17 | 0.04 | 0.02 |
| Pipe P52 | 9.2 | 300 | 120 | 0 | 0 | 0 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | 0 | 0 | 0 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | 0 | 0 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P23 | 12.8 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P25 | 6.2 | 300 | 120 | 5.89 | 0.08 | 0.04 |
| Pipe P26 | 9.8 | 300 | 120 | 1.17 | 0.02 | 0 |

# 570 & 520 March Road - Nokia OIC
## Water Model Results

Max HGL - SINGLE WM Feed - 300mm
Network Table - Nodes

| Node ID | Elevation | Demand | Head | Pressure | Pressure | Pressure |
|---|---|---|---|---|---|---|
| | m | L/s | m | m | kPa | psi |
| Junc J1 | 76.10 | 0.00 | 130.90 | 54.80 | 537.59 | 77.97 |
| Junc J2 | 77.10 | 0.00 | 130.90 | 53.80 | 527.78 | 76.55 |
| Junc J3 | 77.10 | 0.00 | 130.90 | 53.80 | 527.78 | 76.55 |
| Junc J4 | 75.75 | 0.00 | 130.90 | 55.15 | 541.02 | 78.47 |
| Junc J5 | 75.75 | 0.00 | 130.90 | 55.15 | 541.02 | 78.47 |
| Junc J6 | 77.10 | 0.00 | 130.90 | 53.80 | 527.78 | 76.55 |
| Junc J7 | 77.10 | 0.00 | 130.90 | 53.80 | 527.78 | 76.55 |
| Junc J8 | 76.86 | 0.00 | 130.90 | 54.04 | 530.13 | 76.89 |
| Junc J9 | 76.80 | 0.00 | 130.90 | 54.10 | 530.72 | 76.97 |
| Junc J10 | 76.90 | 0.00 | 130.90 | 54.00 | 529.74 | 76.83 |
| Junc J11 | 77.10 | 0.00 | 130.90 | 53.80 | 527.78 | 76.55 |
| Junc J12 | 77.20 | 0.00 | 130.90 | 53.70 | 526.80 | 76.41 |
| Junc J13 | 77.40 | 0.00 | 130.90 | 53.50 | 524.84 | 76.12 |
| Junc J14 | 77.50 | 0.00 | 130.90 | 53.40 | 523.85 | 75.98 |
| Junc J15 | 78.60 | 0.00 | 130.90 | 52.30 | 513.06 | 74.41 |
| Junc J16 | 78.70 | 0.00 | 130.90 | 52.20 | 512.08 | 74.27 |
| Junc J17 | 78.90 | 0.00 | 130.90 | 52.00 | 510.12 | 73.99 |
| Junc J18 | 78.90 | 0.00 | 130.90 | 52.00 | 510.12 | 73.99 |
| Junc J19 | 79.00 | 0.00 | 130.90 | 51.90 | 509.14 | 73.84 |
| Junc J20 | 79.40 | 0.00 | 130.90 | 51.50 | 505.22 | 73.28 |
| Junc J21 | 79.50 | 0.00 | 130.90 | 51.40 | 504.23 | 73.13 |
| Junc J22 | 79.50 | 0.00 | 130.90 | 51.40 | 504.23 | 73.13 |
| Junc J23 | 79.50 | 0.00 | 130.90 | 51.40 | 504.23 | 73.13 |
| Junc J24 | 79.60 | 2.62 | 130.90 | 51.30 | 503.25 | 72.99 |
| Junc J26 | 79.50 | 0.00 | 130.90 | 51.40 | 504.23 | 73.13 |
| Junc J27 | 79.50 | 0.00 | 130.90 | 51.40 | 504.23 | 73.13 |
| Junc J28 | 79.66 | 0.00 | 130.90 | 51.24 | 502.66 | 72.91 |
| Junc J29 | 79.80 | 0.00 | 130.90 | 51.10 | 501.29 | 72.71 |
| Junc J30 | 79.80 | 0.00 | 130.90 | 51.10 | 501.29 | 72.71 |
| Junc J31 | 79.84 | 0.00 | 130.90 | 51.06 | 500.90 | 72.65 |
| Junc J32 | 79.88 | 0.00 | 130.90 | 51.02 | 500.51 | 72.59 |
| Junc J33 | 79.84 | 0.00 | 130.90 | 51.06 | 500.90 | 72.65 |
| Junc J34 | 79.71 | 0.00 | 130.90 | 51.19 | 502.17 | 72.83 |
| Junc J35 | 79.56 | 0.00 | 130.90 | 51.34 | 503.65 | 73.05 |
| Junc J36 | 79.55 | 0.00 | 130.90 | 51.35 | 503.74 | 73.06 |
| Junc J37 | 79.59 | 0.00 | 130.90 | 51.31 | 503.35 | 73.00 |
| Junc J38 | 79.51 | 0.00 | 130.90 | 51.39 | 504.14 | 73.12 |
| Junc J39 | 79.51 | 0.00 | 130.90 | 51.39 | 504.14 | 73.12 |
| Junc J40 | 79.45 | 0.00 | 130.90 | 51.45 | 504.72 | 73.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Junc J41 | 79.47 | 0.00 | 130.90 | 51.43 | 504.53 | 73.18 |
| Junc J42 | 79.33 | 0.00 | 130.90 | 51.57 | 505.90 | 73.37 |
| Junc J43 | 79.35 | 0.00 | 130.90 | 51.55 | 505.71 | 73.35 |
| Junc J44 | 79.21 | 0.00 | 130.90 | 51.69 | 507.08 | 73.55 |
| Junc J45 | 78.75 | 0.00 | 130.90 | 52.15 | 511.59 | 74.20 |
| Junc J46 | 78.75 | 0.00 | 130.90 | 52.15 | 511.59 | 74.20 |
| Junc J47 | 78.77 | 0.00 | 130.90 | 52.13 | 511.40 | 74.17 |
| Junc J48 | 78.75 | 0.00 | 130.90 | 52.15 | 511.59 | 74.20 |
| Junc J49 | 78.72 | 0.00 | 130.90 | 52.18 | 511.89 | 74.24 |
| Junc J50 | 77.64 | 0.00 | 130.90 | 53.26 | 522.48 | 75.78 |
| Junc J51 | 77.74 | 0.65 | 130.90 | 53.16 | 521.50 | 75.64 |
| Junc J52 | 77.57 | 0.00 | 130.90 | 53.33 | 523.17 | 75.88 |
| Junc J53 | 77.64 | 0.00 | 130.90 | 53.26 | 522.48 | 75.78 |
| Junc J54 | 77.45 | 0.00 | 130.90 | 53.45 | 524.34 | 76.05 |
| Junc J55 | 77.44 | 0.00 | 130.90 | 53.46 | 524.44 | 76.06 |
| Junc J56 | 76.90 | 0.00 | 130.90 | 54.00 | 529.74 | 76.83 |
| Junc J57 | 76.90 | 0.00 | 130.90 | 54.00 | 529.74 | 76.83 |
| Junc J58 | 77.70 | 0.00 | 130.90 | 53.20 | 521.89 | 75.69 |
| Junc J59 | 77.70 | 0.00 | 130.90 | 53.20 | 521.89 | 75.69 |
| Junc J60 | 77.70 | 0.00 | 130.90 | 53.20 | 521.89 | 75.69 |
| Junc J61 | 77.70 | 0.00 | 130.90 | 53.20 | 521.89 | 75.69 |
| Junc J62 | 77.72 | 0.00 | 130.90 | 53.18 | 521.70 | 75.67 |
| Junc J63 | 77.10 | 0.00 | 130.90 | 53.80 | 527.78 | 76.55 |
| Junc J64 | 77.18 | 0.00 | 130.90 | 53.72 | 526.99 | 76.43 |
| Junc J65 | 76.83 | 0.00 | 130.90 | 54.07 | 530.43 | 76.93 |
| Junc J66 | 76.80 | 0.00 | 130.90 | 54.10 | 530.72 | 76.97 |
| Junc J67 | 77.10 | 0.00 | 130.90 | 53.80 | 527.78 | 76.55 |
| Junc J68 | 79.50 | 0.00 | 130.90 | 51.40 | 504.23 | 73.13 |
| Resvr R1 | 130.90 | -3.27 | 130.90 | 0.00 | 0.00 | 0.00 |

| | |
|---|---|
| Min= | 72.59 |
| Max= | 78.47 |

Max HGL - SINGLE WM Feed - 300mm

Network Table - Links

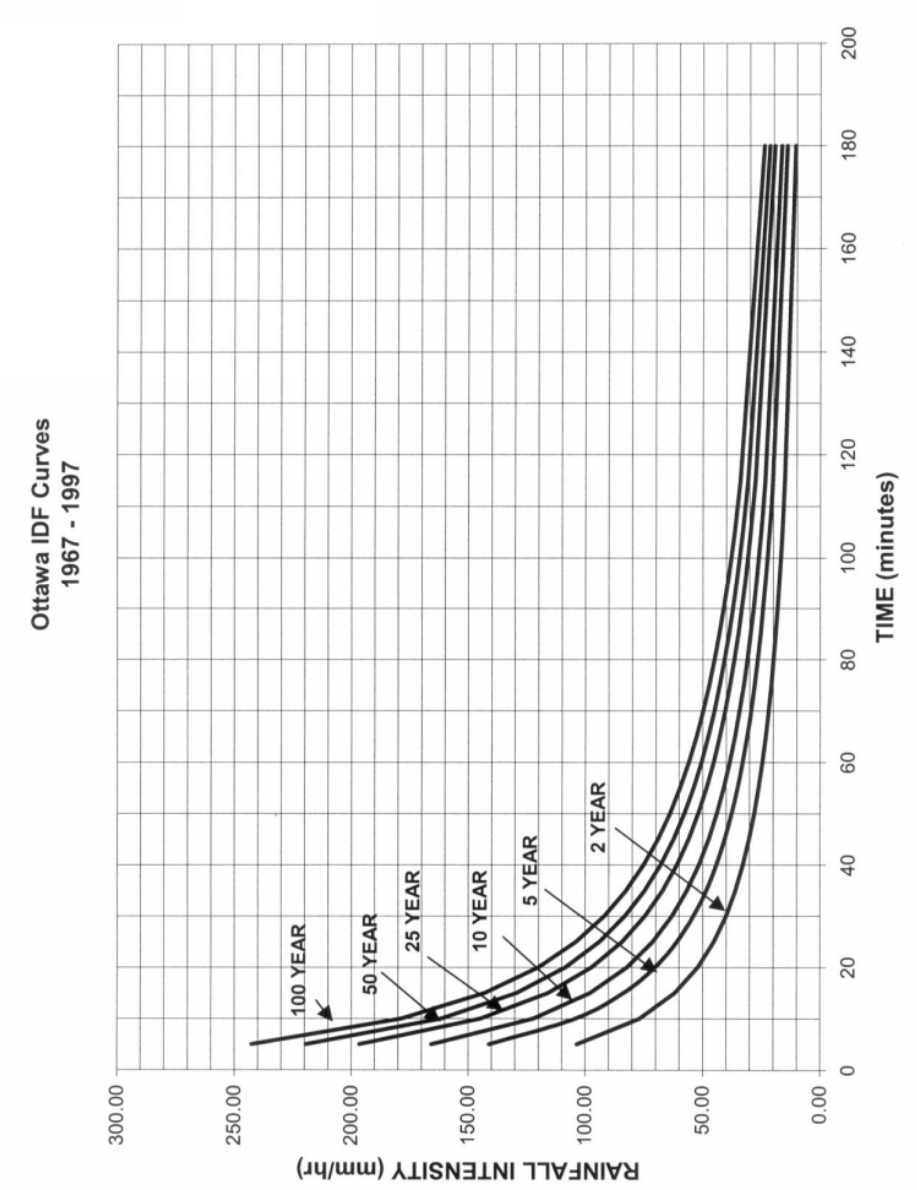
| Link ID | Length | Diameter | Roughness | Flow | Velocity | Unit Headloss |
|---|---|---|---|---|---|---|
| | m | mm | | L/s | m/s | m/km |
| Pipe P1 | 39.2 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P2 | 76.4 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P3 | 9 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P4 | 6.2 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P5 | 8 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P6 | 6.2 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P7 | 2 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P8 | 11.8 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P9 | 5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P10 | 10 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P11 | 13.3 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P12 | 3.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P13 | 24.3 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P14 | 6 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P15 | 5.3 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P16 | 8.9 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P17 | 14.2 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P18 | 2.3 | 150 | 100 | 0 | 0 | 0 |
| Pipe P19 | 12 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P20 | 1.75 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P21 | 8.6 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P22 | 6.3 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P24 | 5.3 | 200 | 110 | 2.62 | 0.08 | 0.07 |
| Pipe P27 | 2.8 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P28 | 9.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P29 | 10.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P30 | 8.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P31 | 1.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P32 | 4.5 | 150 | 100 | 0 | 0 | 0 |
| Pipe P33 | 12 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P34 | 18.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P35 | 50 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P36 | 6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P37 | 3.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P38 | 15.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P39 | 19.6 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P40 | 30.4 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P41 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P42 | 58 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P43 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P44 | 60 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P45 | 4.1 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P46 | 19.3 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P47 | 1.7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P48 | 5.8 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P49 | 2.9 | 300 | 120 | 0.65 | 0.01 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe P50 | 61.9 | 300 | 120 | 0.65 | 0.01 | 0 |
| Pipe P51 | 9.8 | 200 | 110 | 0.65 | 0.02 | 0 |
| Pipe P52 | 9.2 | 300 | 120 | 0 | 0 | 0 |
| Pipe P53 | 7 | 150 | 100 | 0 | 0 | 0 |
| Pipe P54 | 15.6 | 300 | 120 | 0 | 0 | 0 |
| Pipe P55 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P56 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P57 | 2.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P58 | 3.6 | 200 | 110 | 0 | 0 | 0 |
| Pipe P59 | 8.1 | 200 | 110 | 0 | 0 | 0 |
| Pipe P60 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P61 | 1.5 | 200 | 110 | 0 | 0 | 0 |
| Pipe P62 | 2.4 | 150 | 100 | 0 | 0 | 0 |
| Pipe P63 | 39.1 | 300 | 120 | 0 | 0 | 0 |
| Pipe P64 | 8.8 | 150 | 100 | 0 | 0 | 0 |
| Pipe P65 | 36.3 | 300 | 120 | 0 | 0 | 0 |
| Pipe P66 | 1.5 | 300 | 120 | 0 | 0 | 0 |
| Pipe P67 | 34.1 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P23 | 12.8 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P25 | 6.2 | 300 | 120 | 3.27 | 0.05 | 0.01 |
| Pipe P26 | 9.8 | 300 | 120 | 0.65 | 0.01 | 0 |

# APPENDIX E

## IDF Curves, SWM Calculations, Storm Sewer Design Sheets, Culvert Capacity Calculations

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



# Proposed Nokia Ottawa Innovation Campus
# 570 and 520 March Road

| Pre - Development Stormwater Flows | | |
|---|---|---|
| **Description** | ***Area (ha)*** | **Allowable Flows*** |
| Allowable thorugh ex. 375mm STM | 1.772 | **63.8** |
| Allowable though ex. 575mm STM | 3.497 | **235.1** |

*allowables from KRP SWM report

**Post - Development Stormwater Flows (Controlled to a maximum release rate of 63.8 L/s)**

| Area | Description | *Area (ha)* | *$A_{imp}$ (ha) C=0.9* | *$A_{planter}$ (ha) C=0.6* | *$A_{perv}$ (ha) C=0.2* | $C_5$ | $C_{100}$ | Uncontrolled Flow (L/s) | | | Controlled Flow (L/s) | | | Storage Required ($m^3$) | | | Storage Provided ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 2-year | 5-year | 100-year | 2-year | 5-year | 100-year | 2-year | 5-year | 100-year | |
| A-0a | Direct Runoff (Lifestyle Street) | 0.039 | 0.000 | 0.000 | 0.039 | 0.20 | 0.25 | 1.7 | 2.3 | 5.0 | - | - | - | - | - | - | - |
| A-0b | Direct Runoff (Legget Drive) | 0.008 | 0.000 | 0.000 | 0.008 | 0.20 | 0.25 | 0.3 | 0.4 | 1.0 | - | - | - | - | - | - | - |
| A-1 | Controlled Flow - ICD (Lifestyle Street - Upper Side) | 0.141 | 0.138 | 0.004 | 0.000 | 0.89 | 0.99 | - | - | - | 12.5 | 13.7 | 17.5 | 14.4 | 21.7 | 49.2 | 55.4 |
| A-2 | Controlled Flow - ICD (Lifestyle Street - Lower Side) | 0.296 | 0.276 | 0.009 | 0.011 | 0.86 | 0.96 | - | - | - | 10.4 | 12.1 | 17.0 | 44.3 | 62.6 | 130.3 | 134.0 |
| A-3 | Retail West Roof | 0.098 | 0.098 | 0.000 | 0.000 | 0.90 | 1.00 | - | - | - | 1.9 | 2.5 | 3.8 | 14.9 | 20.1 | 41.2 | 42.0 |
| A-4 | Retail East Roof | 0.075 | 0.075 | 0.000 | 0.000 | 0.90 | 1.00 | - | - | - | 1.9 | 2.5 | 3.8 | 10.2 | 13.9 | 28.7 | 29.9 |
| A-5 | Office Tower Roof | 0.288 | 0.288 | 0.000 | 0.000 | 0.90 | 1.00 | - | - | - | 9.0 | 9.7 | 11.1 | 35.8 | 53.0 | 120.6 | 130.0 |
| A-6 | Common Area and Amenity Roof | 0.117 | 0.117 | 0.000 | 0.000 | 0.90 | 1.00 | - | - | - | 3.7 | 4.0 | 4.5 | 13.2 | 19.6 | 45.1 | 55.7 |
| **Totals :** | | 1.061 | - | | - | - | - | **2.0** | **2.8** | **5.9** | **39.4** | **44.5** | **57.7** | **132.8** | **191.0** | **415.2** | |

| **Total On-Site Stormwater Flows** | **41.4** | **47.3** | **63.6** |
|---|---|---|---|

$T_c$ = 10mins

**Post - Development Stormwater Flows (Controlled to a maximum release rate of 235.1 L/s)**

| Area | Description | *Area (ha)* | *$A_{imp}$ (ha) C=0.9* | *$A_{planter}$ (ha) C=0.6* | *$A_{perv}$ (ha) C=0.2* | $C_5$ | $C_{100}$ | Uncontrolled Flow (L/s) | | | Controlled Flow (L/s) | | | Storage Required ($m^3$) | | | Storage Provided ($m^3$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 2-year | 5-year | 100-year | 2-year | 5-year | 100-year | 2-year | 5-year | 100-year | |
| B-0a | Direct Runoff (Legget Drive) | 0.038 | 0.003 | 0.000 | 0.036 | 0.25 | 0.30 | 2.0 | 2.7 | 5.7 | - | - | - | - | - | - | - |
| B-0b | Direct Runoff (Access Route) | 0.071 | 0.000 | 0.000 | 0.071 | 0.20 | 0.25 | 3.0 | 4.1 | 8.8 | - | - | - | - | - | - | - |
| B-1 | Controlled Flow - SWM Tank & ICD (R&D Lab) | 0.795 | 0.795 | 0.000 | 0.000 | 0.90 | 1.00 | - | - | - | 22.5 | 27.2 | 41.0 | 135.8 | 188.4 | 380.0 | 402.3 |
| B-2 | Controlled Flow - ICD (Plaza & Entrance Dropoff) | 0.584 | 0.367 | 0.024 | 0.193 | 0.66 | 0.74 | - | - | - | 31.9 | 35.8 | 48.0 | 48.3 | 71.2 | 159.1 | 163.0 |
| B-3 | Controlled Flow - ICD (Parking Structure) | 1.187 | 1.162 | 0.000 | 0.025 | 0.89 | 0.98 | - | - | - | 23.7 | 29.8 | 46.0 | 222.2 | 303.3 | 603.6 | 607.7 |
| B-4 | Controlled Flow - ICD (Access Route) | 0.752 | 0.726 | 0.000 | 0.025 | 0.88 | 0.97 | - | - | - | 19.6 | 23.7 | 35.0 | 127.4 | 176.5 | 358.0 | 365.1 |
| C-0 | Direct Runoff (Retained Lands) | 0.064 | 0.000 | 0.000 | 0.064 | 0.20 | 0.25 | 2.7 | 3.7 | 7.9 | - | - | - | - | - | - | - |
| C-1 | Controlled Flow - ICD (Retained Lands) | 0.642 | 0.000 | 0.000 | 0.642 | 0.20 | 0.25 | - | - | - | 26.1 | 26.5 | 27.0 | 8.6 | 15.0 | 49.6 | 65.5 |
| C-2 | Controlled Flow - ICD (Retained Lands - ROW) | 0.075 | 0.075 | 0.000 | 0.000 | 0.90 | 1.00 | - | - | - | 8.3 | 10.5 | 15.0 | 6.7 | 9.5 | 21.1 | 23.8 |
| **Totals :** | | 4.208 | - | - | - | - | - | **7.7** | **10.5** | **22.4** | **132.1** | **153.5** | **212.0** | **549.1** | **763.8** | **1571.4** | |

| **Total On-Site Stormwater Flows** | **139.8** | **164.0** | **234.4** |
|---|---|---|---|

$T_c$ = 10mins

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:2 YEAR EVENT**
**AREA A-0a Un-Controlled Runoff - 600 March Road**

OTTAWA IDF CURVE

Area = 0.039 ha Qallow = 1.7 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 2.31 | 0.60 | 0.18 |
| 10 | 76.81 | 1.71 | 0.00 | 0.00 |
| 15 | 61.77 | 1.38 | -0.33 | -0.30 |
| 20 | 52.03 | 1.16 | -0.55 | -0.66 |
| 25 | 45.17 | 1.01 | -0.70 | -1.06 |
| 30 | 40.04 | 0.89 | -0.82 | -1.47 |
| 35 | 36.06 | 0.80 | -0.91 | -1.91 |
| 40 | 32.86 | 0.73 | -0.98 | -2.35 |
| 45 | 30.24 | 0.67 | -1.04 | -2.80 |
| 50 | 28.04 | 0.62 | -1.09 | -3.26 |
| 55 | 26.17 | 0.58 | -1.13 | -3.72 |
| 60 | 24.56 | 0.55 | -1.16 | -4.19 |
| 65 | 23.15 | 0.52 | -1.19 | -4.66 |
| 70 | 21.91 | 0.49 | -1.22 | -5.13 |
| 75 | 20.81 | 0.46 | -1.25 | -5.61 |
| 90 | 18.14 | 0.40 | -1.31 | -7.05 |
| 105 | 16.13 | 0.36 | -1.35 | -8.51 |
| 120 | 14.56 | 0.32 | -1.39 | -9.98 |
| 135 | 13.30 | 0.30 | -1.41 | -11.45 |
| 150 | 12.25 | 0.27 | -1.44 | -12.94 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:5 YEAR EVENT**
**AREA A-0a Un-Controlled Runoff - 600 March Road**

OTTAWA IDF CURVE

Area = 0.039 ha Qallow = 2.3 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 3.14 | 0.82 | 0.25 |
| 10 | 104.19 | 2.32 | 0.00 | 0.00 |
| 15 | 83.56 | 1.86 | -0.46 | -0.41 |
| 20 | 70.25 | 1.56 | -0.76 | -0.91 |
| 25 | 60.90 | 1.36 | -0.96 | -1.45 |
| 30 | 53.93 | 1.20 | -1.12 | -2.01 |
| 35 | 48.52 | 1.08 | -1.24 | -2.60 |
| 40 | 44.18 | 0.98 | -1.34 | -3.21 |
| 45 | 40.63 | 0.90 | -1.42 | -3.82 |
| 50 | 37.65 | 0.84 | -1.48 | -4.44 |
| 55 | 35.12 | 0.78 | -1.54 | -5.07 |
| 60 | 32.94 | 0.73 | -1.59 | -5.71 |
| 65 | 31.04 | 0.69 | -1.63 | -6.35 |
| 70 | 29.37 | 0.65 | -1.67 | -7.00 |
| 75 | 27.89 | 0.62 | -1.70 | -7.65 |
| 90 | 24.29 | 0.54 | -1.78 | -9.61 |
| 105 | 21.58 | 0.48 | -1.84 | -11.59 |
| 120 | 19.47 | 0.43 | -1.89 | -13.58 |
| 135 | 17.76 | 0.40 | -1.92 | -15.59 |
| 150 | 16.36 | 0.36 | -1.96 | -17.60 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YEAR EVENT**
**AREA A-0a Un-Controlled Runoff - 600 March Road**

OTTAWA IDF CURVE

Area = 0.039 ha Qallow = 5.0 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 6.74 | 1.78 | 0.53 |
| 10 | 178.56 | 4.96 | 0.00 | 0.00 |
| 15 | 142.89 | 3.97 | -0.99 | -0.89 |
| 20 | 119.95 | 3.33 | -1.63 | -1.95 |
| 25 | 103.85 | 2.88 | -2.07 | -3.11 |
| 30 | 91.87 | 2.55 | -2.41 | -4.33 |
| 35 | 82.58 | 2.29 | -2.66 | -5.59 |
| 40 | 75.15 | 2.09 | -2.87 | -6.89 |
| 45 | 69.05 | 1.92 | -3.04 | -8.21 |
| 50 | 63.95 | 1.77 | -3.18 | -9.54 |
| 55 | 59.62 | 1.65 | -3.30 | -10.89 |
| 60 | 55.89 | 1.55 | -3.40 | -12.25 |
| 65 | 52.65 | 1.46 | -3.49 | -13.63 |
| 70 | 49.79 | 1.38 | -3.57 | -15.01 |
| 75 | 47.26 | 1.31 | -3.64 | -16.40 |
| 90 | 41.11 | 1.14 | -3.81 | -20.60 |
| 105 | 36.50 | 1.01 | -3.94 | -24.84 |
| 120 | 32.89 | 0.91 | -4.04 | -29.10 |
| 135 | 30.00 | 0.83 | -4.12 | -33.39 |
| 150 | 27.61 | 0.77 | -4.19 | -37.70 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YR + 20% IDF Increase**
**AREA A-0a Un-Controlled Runoff - 600 March Road**

OTTAWA IDF CURVE

Area = 0.039 ha Qallow = 5.9 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 8.08 | 2.14 | 0.64 |
| 10 | 214.27 | 5.95 | 0.00 | 0.00 |
| 15 | 171.47 | 4.76 | -1.19 | -1.07 |
| 20 | 143.94 | 3.99 | -1.95 | -2.34 |
| 25 | 124.62 | 3.46 | -2.49 | -3.73 |
| 30 | 110.24 | 3.06 | -2.89 | -5.20 |
| 35 | 99.09 | 2.75 | -3.20 | -6.71 |
| 40 | 90.17 | 2.50 | -3.44 | -8.26 |
| 45 | 82.86 | 2.30 | -3.65 | -9.85 |
| 50 | 76.74 | 2.13 | -3.82 | -11.45 |
| 55 | 71.55 | 1.99 | -3.96 | -13.07 |
| 60 | 67.07 | 1.86 | -4.08 | -14.71 |
| 65 | 63.18 | 1.75 | -4.19 | -16.35 |
| 70 | 59.75 | 1.66 | -4.29 | -18.01 |
| 75 | 56.71 | 1.57 | -4.37 | -19.68 |
| 90 | 49.33 | 1.37 | -4.58 | -24.72 |
| 105 | 43.80 | 1.22 | -4.73 | -29.80 |
| 120 | 39.47 | 1.10 | -4.85 | -34.92 |
| 135 | 36.00 | 1.00 | -4.95 | -40.07 |
| 150 | 33.13 | 0.92 | -5.03 | -45.24 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:2 YEAR EVENT**
**AREA A-0b Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.008 ha Qallow = 0.3 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 0.44 | 0.11 | 0.03 |
| 10 | 76.81 | 0.33 | 0.00 | 0.00 |
| 15 | 61.77 | 0.26 | -0.06 | -0.06 |
| 20 | 52.03 | 0.22 | -0.11 | -0.13 |
| 25 | 45.17 | 0.19 | -0.14 | -0.20 |
| 30 | 40.04 | 0.17 | -0.16 | -0.28 |
| 35 | 36.06 | 0.15 | -0.17 | -0.37 |
| 40 | 32.86 | 0.14 | -0.19 | -0.45 |
| 45 | 30.24 | 0.13 | -0.20 | -0.54 |
| 50 | 28.04 | 0.12 | -0.21 | -0.63 |
| 55 | 26.17 | 0.11 | -0.22 | -0.72 |
| 60 | 24.56 | 0.11 | -0.22 | -0.81 |
| 65 | 23.15 | 0.10 | -0.23 | -0.90 |
| 70 | 21.91 | 0.09 | -0.24 | -0.99 |
| 75 | 20.81 | 0.09 | -0.24 | -1.08 |
| 90 | 18.14 | 0.08 | -0.25 | -1.36 |
| 105 | 16.13 | 0.07 | -0.26 | -1.64 |
| 120 | 14.56 | 0.06 | -0.27 | -1.92 |
| 135 | 13.30 | 0.06 | -0.27 | -2.20 |
| 150 | 12.25 | 0.05 | -0.28 | -2.49 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:5 YEAR EVENT**
**AREA A-0b Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.008 ha Qallow = 0.4 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 0.60 | 0.16 | 0.05 |
| 10 | 104.19 | 0.45 | 0.00 | 0.00 |
| 15 | 83.56 | 0.36 | -0.09 | -0.08 |
| 20 | 70.25 | 0.30 | -0.15 | -0.17 |
| 25 | 60.90 | 0.26 | -0.19 | -0.28 |
| 30 | 53.93 | 0.23 | -0.22 | -0.39 |
| 35 | 48.52 | 0.21 | -0.24 | -0.50 |
| 40 | 44.18 | 0.19 | -0.26 | -0.62 |
| 45 | 40.63 | 0.17 | -0.27 | -0.73 |
| 50 | 37.65 | 0.16 | -0.28 | -0.85 |
| 55 | 35.12 | 0.15 | -0.30 | -0.98 |
| 60 | 32.94 | 0.14 | -0.31 | -1.10 |
| 65 | 31.04 | 0.13 | -0.31 | -1.22 |
| 70 | 29.37 | 0.13 | -0.32 | -1.35 |
| 75 | 27.89 | 0.12 | -0.33 | -1.47 |
| 90 | 24.29 | 0.10 | -0.34 | -1.85 |
| 105 | 21.58 | 0.09 | -0.35 | -2.23 |
| 120 | 19.47 | 0.08 | -0.36 | -2.61 |
| 135 | 17.76 | 0.08 | -0.37 | -3.00 |
| 150 | 16.36 | 0.07 | -0.38 | -3.38 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YEAR EVENT**
**AREA A-0b Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.008 ha Qallow = 1.0 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 1.32 | 0.35 | 0.10 |
| 10 | 178.56 | 0.97 | 0.00 | 0.00 |
| 15 | 142.89 | 0.78 | -0.19 | -0.17 |
| 20 | 119.95 | 0.65 | -0.32 | -0.38 |
| 25 | 103.85 | 0.57 | -0.41 | -0.61 |
| 30 | 91.87 | 0.50 | -0.47 | -0.85 |
| 35 | 82.58 | 0.45 | -0.52 | -1.10 |
| 40 | 75.15 | 0.41 | -0.56 | -1.35 |
| 45 | 69.05 | 0.38 | -0.60 | -1.61 |
| 50 | 63.95 | 0.35 | -0.62 | -1.87 |
| 55 | 59.62 | 0.32 | -0.65 | -2.14 |
| 60 | 55.89 | 0.30 | -0.67 | -2.41 |
| 65 | 52.65 | 0.29 | -0.69 | -2.67 |
| 70 | 49.79 | 0.27 | -0.70 | -2.95 |
| 75 | 47.26 | 0.26 | -0.72 | -3.22 |
| 90 | 41.11 | 0.22 | -0.75 | -4.04 |
| 105 | 36.50 | 0.20 | -0.77 | -4.87 |
| 120 | 32.89 | 0.18 | -0.79 | -5.71 |
| 135 | 30.00 | 0.16 | -0.81 | -6.55 |
| 150 | 27.61 | 0.15 | -0.82 | -7.40 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YR + 20% IDF Increase**
**AREA A-0b Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.008 ha Qallow = 1.2 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 1.59 | 0.42 | 0.13 |
| 10 | 214.27 | 1.17 | 0.00 | 0.00 |
| 15 | 171.47 | 0.93 | -0.23 | -0.21 |
| 20 | 143.94 | 0.78 | -0.38 | -0.46 |
| 25 | 124.62 | 0.68 | -0.49 | -0.73 |
| 30 | 110.24 | 0.60 | -0.57 | -1.02 |
| 35 | 99.09 | 0.54 | -0.63 | -1.32 |
| 40 | 90.17 | 0.49 | -0.68 | -1.62 |
| 45 | 82.86 | 0.45 | -0.72 | -1.93 |
| 50 | 76.74 | 0.42 | -0.75 | -2.25 |
| 55 | 71.55 | 0.39 | -0.78 | -2.57 |
| 60 | 67.07 | 0.37 | -0.80 | -2.89 |
| 65 | 63.18 | 0.34 | -0.82 | -3.21 |
| 70 | 59.75 | 0.33 | -0.84 | -3.53 |
| 75 | 56.71 | 0.31 | -0.86 | -3.86 |
| 90 | 49.33 | 0.27 | -0.90 | -4.85 |
| 105 | 43.80 | 0.24 | -0.93 | -5.85 |
| 120 | 39.47 | 0.21 | -0.95 | -6.85 |
| 135 | 36.00 | 0.20 | -0.97 | -7.86 |
| 150 | 33.13 | 0.18 | -0.99 | -8.88 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)**

OTTAWA IDF CURVE — Qpeak = 12.5 L/s
Area = 0.141 ha — Qavg = 6.3 L/s
C = 0.89 — Vol(max) = 14.4 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 36.26 | 30.01 | 9.00 |
| 10 | 76.81 | 26.89 | 20.64 | 12.38 |
| 15 | 61.77 | 21.62 | 15.37 | 13.84 |
| 20 | 52.03 | 18.22 | 11.97 | 14.36 |
| 25 | 45.17 | 15.81 | 9.56 | 14.34 |
| 30 | 40.04 | 14.02 | 7.77 | 13.98 |
| 35 | 36.06 | 12.62 | 6.37 | 13.39 |
| 40 | 32.86 | 11.51 | 5.26 | 12.61 |
| 45 | 30.24 | 10.59 | 4.34 | 11.71 |
| 50 | 28.04 | 9.82 | 3.57 | 10.70 |
| 55 | 26.17 | 9.16 | 2.91 | 9.61 |
| 60 | 24.56 | 8.60 | 2.35 | 8.45 |
| 65 | 23.15 | 8.11 | 1.86 | 7.24 |
| 70 | 21.91 | 7.67 | 1.42 | 5.97 |
| 75 | 20.81 | 7.29 | 1.04 | 4.67 |
| 90 | 18.14 | 6.35 | 0.10 | 0.55 |
| 105 | 16.13 | 5.65 | -0.60 | -3.79 |
| 120 | 14.56 | 5.10 | -1.15 | -8.29 |
| 135 | 13.30 | 4.65 | -1.60 | -12.92 |
| 150 | 12.25 | 4.29 | -1.96 | -17.65 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)**

OTTAWA IDF CURVE — Qpeak = 13.7 L/s
Area = 0.141 ha — Qavg = 6.9 L/s
C = 0.89 — Vol(max) = 21.7 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 49.43 | 42.58 | 12.77 |
| 10 | 104.19 | 36.48 | 29.63 | 17.78 |
| 15 | 83.56 | 29.25 | 22.40 | 20.16 |
| 20 | 70.25 | 24.60 | 17.75 | 21.29 |
| 25 | 60.90 | 21.32 | 14.47 | 21.70 |
| 30 | 53.93 | 18.88 | 12.03 | 21.65 |
| 35 | 48.52 | 16.99 | 10.14 | 21.29 |
| 40 | 44.18 | 15.47 | 8.62 | 20.69 |
| 45 | 40.63 | 14.22 | 7.37 | 19.91 |
| 50 | 37.65 | 13.18 | 6.33 | 19.00 |
| 55 | 35.12 | 12.30 | 5.45 | 17.97 |
| 60 | 32.94 | 11.53 | 4.68 | 16.86 |
| 65 | 31.04 | 10.87 | 4.02 | 15.67 |
| 70 | 29.37 | 10.28 | 3.43 | 14.42 |
| 75 | 27.89 | 9.76 | 2.91 | 13.11 |
| 90 | 24.29 | 8.50 | 1.65 | 8.93 |
| 105 | 21.58 | 7.56 | 0.71 | 4.45 |
| 120 | 19.47 | 6.82 | -0.03 | -0.25 |
| 135 | 17.76 | 6.22 | -0.63 | -5.11 |
| 150 | 16.36 | 5.73 | -1.12 | -10.09 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)**

OTTAWA IDF CURVE — Qpeak = 17.5 L/s
Area = 0.141 ha — Qavg = 8.8 L/s
C = 0.99 — Vol(max) = 49.2 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 94.49 | 85.74 | 25.72 |
| 10 | 178.56 | 69.52 | 60.77 | 36.46 |
| 15 | 142.89 | 55.63 | 46.88 | 42.20 |
| 20 | 119.95 | 46.70 | 37.95 | 45.54 |
| 25 | 103.85 | 40.43 | 31.68 | 47.52 |
| 30 | 91.87 | 35.77 | 27.02 | 48.63 |
| 35 | 82.58 | 32.15 | 23.40 | 49.14 |
| 40 | 75.15 | 29.26 | 20.51 | 49.22 |
| 45 | 69.05 | 26.88 | 18.13 | 48.96 |
| 50 | 63.95 | 24.90 | 16.15 | 48.45 |
| 55 | 59.62 | 23.21 | 14.46 | 47.73 |
| 60 | 55.89 | 21.76 | 13.01 | 46.84 |
| 65 | 52.65 | 20.50 | 11.75 | 45.81 |
| 70 | 49.79 | 19.38 | 10.63 | 44.67 |
| 75 | 47.26 | 18.40 | 9.65 | 43.42 |
| 90 | 41.11 | 16.01 | 7.26 | 39.18 |
| 105 | 36.50 | 14.21 | 5.46 | 34.40 |
| 120 | 32.89 | 12.81 | 4.06 | 29.21 |
| 135 | 30.00 | 11.68 | 2.93 | 23.72 |
| 150 | 27.61 | 10.75 | 2.00 | 18.00 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA A-1 Controlled Site Flows (Lifestyle Street - Upper Side)**

OTTAWA IDF CURVE — Qpeak = 17.5 L/s
Area = 0.141 ha — Qavg = 8.8 L/s
C = 0.99 — Vol(max) = 63.5 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 113.39 | 104.64 | 31.39 |
| 10 | 214.27 | 83.42 | 74.67 | 44.80 |
| 15 | 171.47 | 66.76 | 58.01 | 52.21 |
| 20 | 143.94 | 56.04 | 47.29 | 56.75 |
| 25 | 124.62 | 48.52 | 39.77 | 59.65 |
| 30 | 110.24 | 42.92 | 34.17 | 61.51 |
| 35 | 99.09 | 38.58 | 29.83 | 62.64 |
| 40 | 90.17 | 35.11 | 26.36 | 63.26 |
| 45 | 82.86 | 32.26 | 23.51 | 63.48 |
| 50 | 76.74 | 29.88 | 21.13 | 63.39 |
| 55 | 71.55 | 27.86 | 19.11 | 63.05 |
| 60 | 67.07 | 26.11 | 17.36 | 62.51 |
| 65 | 63.18 | 24.60 | 15.85 | 61.80 |
| 70 | 59.75 | 23.26 | 14.51 | 60.95 |
| 75 | 56.71 | 22.08 | 13.33 | 59.98 |
| 90 | 49.33 | 19.21 | 10.46 | 56.47 |
| 105 | 43.80 | 17.05 | 8.30 | 52.30 |
| 120 | 39.47 | 15.37 | 6.62 | 47.65 |
| 135 | 36.00 | 14.01 | 5.26 | 42.64 |
| 150 | 33.13 | 12.90 | 4.15 | 37.35 |

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| UG STORAGE | 1144 | 40.58 | 82.51 | | 80.17 |
| STMMH 101 | 1200 | 1.13 | 82.30 | 80.14 | 80.12 |
| STMMH 102 | 1200 | 1.13 | 82.05 | 79.54 | 79.49 |

**PI =** 3.141592654
**PIPE I.D.=** 304.8 PVC
**U/G Storage Pipe Volume**
End Area 0.073 ($m^2$)
Total Length 61.2 (m)
Pipe Volume 4.5 ($m^3$)

**Area A-1: Storage Table**

| Elevation (m) | System Depth (m) | UG STORAGE Volume ($m^3$) | STMMH 101 Volume ($m^3$) | STMMH 102 Volume ($m^3$) | Underground Storage: Combined Volume ($m^3$) | Surface Storage: UG STORAGE Area ($m^2$) | UG STORAGE Volume ($m^3$) | STMMH 101 Area ($m^2$) | STMMH 101 Volume ($m^3$) | STMMH 102 Area ($m^2$) | STMMH 102 Volume ($m^3$) | Total Storage: Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 79.49 | 0.00 | 0.00 | 0.00 | 0.00 | 4.46 | - | - | - | - | - | - | - | **0** | - |
| 80.35 | 0.18 | 7.31 | 0.26 | 0.97 | 13.00 | - | - | - | - | - | - | - | **13.0** | 0.71 |
| 80.49 | 0.32 | 12.99 | 0.42 | 1.13 | 19.00 | - | - | - | - | - | - | - | **19.0** | 0.85 |
| 81.02 | 0.85 | 34.50 | 1.02 | 1.73 | 41.71 | - | - | - | - | - | - | - | **41.7** | 1.38 |
| 81.31 | 1.14 | 46.27 | 1.35 | 2.06 | 54.13 | - | - | - | - | - | - | - | **54.1** | 1.67 |
| 81.85 | 1.68 | 46.27 | 1.96 | 2.67 | 55.36 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **55.4** | 2.21 |
| 81.88 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **55.4** | 2.24 |
| 81.91 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **55.4** | 2.27 |
| 81.95 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **55.4** | 2.31 |

**Tempest HF Type A ICD**

**1:100 Yr**
Flow (L/s) = 17.5
Head (m) = 1.38
Elevation (m) = **81.02**
Outlet Pipe Dia.(mm) = 304
Volume (m3) = 49.2

**1:5 Yr**
Flow (L/s) = 13.7
Head (m) = 0.85
Elevation (m) = **80.49**
Outlet Pipe Dia.(mm) = 304
Volume (m3) = 21.7

**1:2 Yr**
Flow (L/s) = 12.5
Head (m) = 0.71
Elevation (m) = **80.35**
Outlet Pipe Dia.(mm) = 304
Volume (m3) = 14.4

**Orifice Size - 1:100 yr Flow Check**

Q=0.62xAx(2gh)^0.5

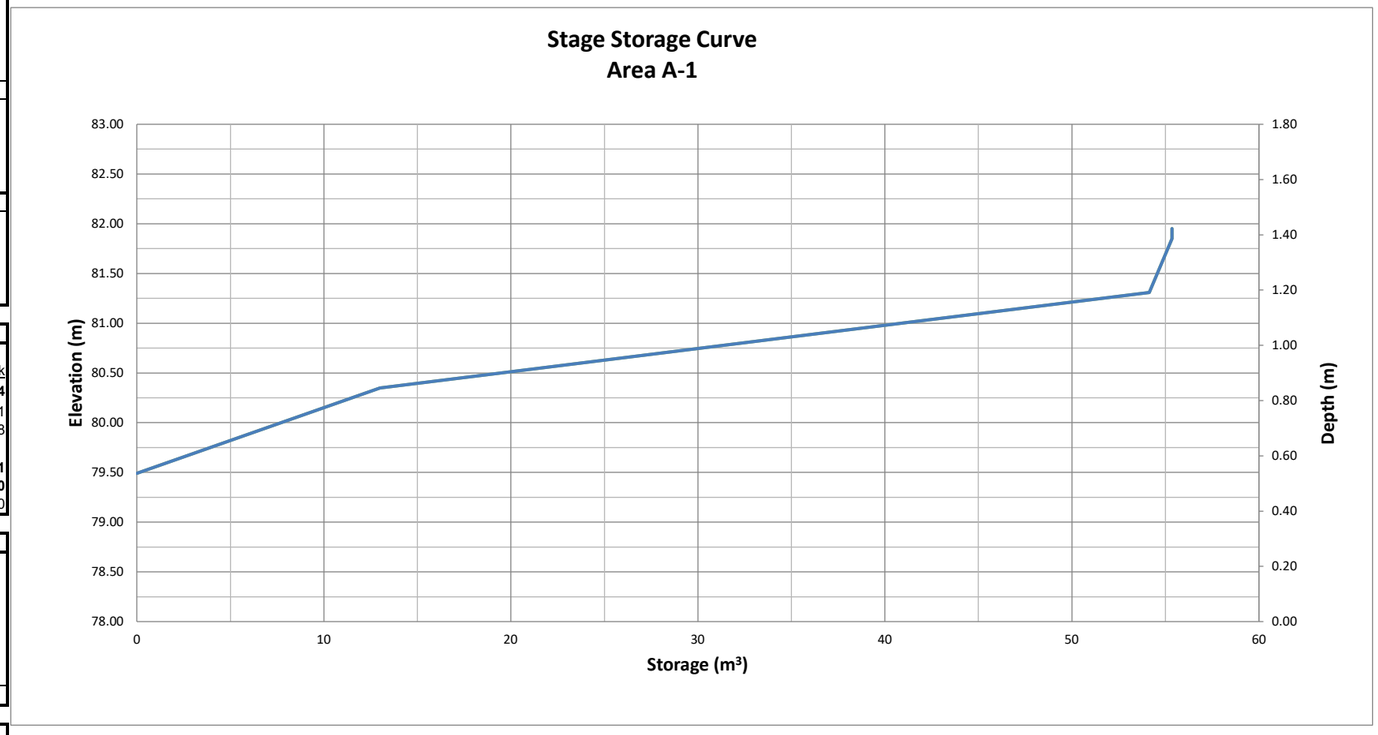
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0175 | **0.0174** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **1.38** | 1.38 |
| A ($m^2$) = | **0.005428405** | **0.00541** |
| D (m) = | **0.083136394** | **0.08300** |
| D (mm) = | **83** | 83.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0137 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.85** |
| A ($m^2$) = | **0.00541** |
| D (m) = | **0.083** |
| D (mm) = | **83** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0125 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.71** |
| A ($m^2$) = | **0.00541** |
| D (m) = | **0.083** |
| D (mm) = | **83** |



**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)**

OTTAWA IDF CURVE — Qpeak = 10.4 L/s
Area = 0.296 ha — Qavg = 5.2 L/s
C = 0.86 — Vol(max) = 44.3 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 73.73 | 68.53 | 20.56 |
| 10 | 76.81 | 54.68 | 49.48 | 29.69 |
| 15 | 61.77 | 43.97 | 38.77 | 34.89 |
| 20 | 52.03 | 37.04 | 31.84 | 38.21 |
| 25 | 45.17 | 32.15 | 26.95 | 40.43 |
| 30 | 40.04 | 28.51 | 23.31 | 41.95 |
| 35 | 36.06 | 25.67 | 20.47 | 42.99 |
| 40 | 32.86 | 23.40 | 18.20 | 43.67 |
| 45 | 30.24 | 21.53 | 16.33 | 44.08 |
| 50 | 28.04 | 19.96 | 14.76 | 44.29 |
| 55 | 26.17 | 18.63 | 13.43 | 44.32 |
| 60 | 24.56 | 17.48 | 12.28 | 44.22 |
| 65 | 23.15 | 16.48 | 11.28 | 44.00 |
| 70 | 21.91 | 15.60 | 10.40 | 43.68 |
| 75 | 20.81 | 14.82 | 9.62 | 43.27 |
| 90 | 18.14 | 12.92 | 7.72 | 41.66 |
| 105 | 16.13 | 11.49 | 6.29 | 39.60 |
| 120 | 14.56 | 10.37 | 5.17 | 37.20 |
| 135 | 13.30 | 9.46 | 4.26 | 34.55 |
| 150 | 12.25 | 8.72 | 3.52 | 31.70 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)**

OTTAWA IDF CURVE — Qpeak = 12.1 L/s
Area = 0.296 ha — Qavg = 6.1 L/s
C = 0.86 — Vol(max) = 62.6 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 100.50 | 94.45 | 28.34 |
| 10 | 104.19 | 74.17 | 68.12 | 40.87 |
| 15 | 83.56 | 59.48 | 53.43 | 48.09 |
| 20 | 70.25 | 50.01 | 43.96 | 52.75 |
| 25 | 60.90 | 43.35 | 37.30 | 55.95 |
| 30 | 53.93 | 38.39 | 32.34 | 58.21 |
| 35 | 48.52 | 34.54 | 28.49 | 59.83 |
| 40 | 44.18 | 31.45 | 25.40 | 60.97 |
| 45 | 40.63 | 28.92 | 22.87 | 61.76 |
| 50 | 37.65 | 26.80 | 20.75 | 62.26 |
| 55 | 35.12 | 25.00 | 18.95 | 62.55 |
| 60 | 32.94 | 23.45 | 17.40 | 62.65 |
| 65 | 31.04 | 22.10 | 16.05 | 62.59 |
| 70 | 29.37 | 20.91 | 14.86 | 62.41 |
| 75 | 27.89 | 19.85 | 13.80 | 62.11 |
| 90 | 24.29 | 17.29 | 11.24 | 60.70 |
| 105 | 21.58 | 15.36 | 9.31 | 58.68 |
| 120 | 19.47 | 13.86 | 7.81 | 56.22 |
| 135 | 17.76 | 12.65 | 6.60 | 53.43 |
| 150 | 16.36 | 11.65 | 5.60 | 50.38 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)**

OTTAWA IDF CURVE — Qpeak = 17.0 L/s
Area = 0.296 ha — Qavg = 8.5 L/s
C = 0.96 — Vol(max) = 130.3 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 192.38 | 183.88 | 55.16 |
| 10 | 178.56 | 141.53 | 133.03 | 79.82 |
| 15 | 142.89 | 113.26 | 104.76 | 94.29 |
| 20 | 119.95 | 95.08 | 86.58 | 103.89 |
| 25 | 103.85 | 82.31 | 73.81 | 110.72 |
| 30 | 91.87 | 72.82 | 64.32 | 115.77 |
| 35 | 82.58 | 65.46 | 56.96 | 119.61 |
| 40 | 75.15 | 59.56 | 51.06 | 122.55 |
| 45 | 69.05 | 54.73 | 46.23 | 124.83 |
| 50 | 63.95 | 50.69 | 42.19 | 126.58 |
| 55 | 59.62 | 47.26 | 38.76 | 127.91 |
| 60 | 55.89 | 44.30 | 35.80 | 128.90 |
| 65 | 52.65 | 41.73 | 33.23 | 129.60 |
| 70 | 49.79 | 39.47 | 30.97 | 130.05 |
| 75 | 47.26 | 37.46 | 28.96 | 130.30 |
| 90 | 41.11 | 32.59 | 24.09 | 130.07 |
| 105 | 36.50 | 28.93 | 20.43 | 128.70 |
| 120 | 32.89 | 26.07 | 17.57 | 126.53 |
| 135 | 30.00 | 23.78 | 15.28 | 123.74 |
| 150 | 27.61 | 21.89 | 13.39 | 120.47 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA A-2 Controlled Site Flows (Lifestyle Street - Lower Side)**

OTTAWA IDF CURVE — Qpeak = 17.0 L/s
Area = 0.296 ha — Qavg = 8.5 L/s
C = 0.96 — Vol(max) = 165.3 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 230.85 | 222.35 | 66.71 |
| 10 | 214.27 | 169.84 | 161.34 | 96.80 |
| 15 | 171.47 | 135.92 | 127.42 | 114.67 |
| 20 | 143.94 | 114.09 | 105.59 | 126.71 |
| 25 | 124.62 | 98.78 | 90.28 | 135.41 |
| 30 | 110.24 | 87.38 | 78.88 | 141.99 |
| 35 | 99.09 | 78.55 | 70.05 | 147.10 |
| 40 | 90.17 | 71.48 | 62.98 | 151.14 |
| 45 | 82.86 | 65.68 | 57.18 | 154.38 |
| 50 | 76.74 | 60.83 | 52.33 | 156.99 |
| 55 | 71.55 | 56.71 | 48.21 | 159.10 |
| 60 | 67.07 | 53.17 | 44.67 | 160.79 |
| 65 | 63.18 | 50.08 | 41.58 | 162.15 |
| 70 | 59.75 | 47.36 | 38.86 | 163.20 |
| 75 | 56.71 | 44.95 | 36.45 | 164.02 |
| 90 | 49.33 | 39.10 | 30.60 | 165.26 |
| 105 | 43.80 | 34.72 | 26.22 | 165.16 |
| 120 | 39.47 | 31.29 | 22.79 | 164.08 |
| 135 | 36.00 | 28.53 | 20.03 | 162.26 |
| 150 | 33.13 | 26.26 | 17.76 | 159.86 |

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| UG STORAGE | 1144 | 110.40 | 79.84 | | 78.16 |
| CBMH 249 | 1200 | 1.13 | 79.80 | 78.15 | 78.10 |
| CBMH 250 | 1200 | 1.13 | 79.54 | 78.05 | 78.04 |
| CBMH 251 | 1200 | 1.13 | 79.54 | 78.02 | 77.92 |

**PI =** 3.141592654
**PIPE I.D.=** 304.8 PVC
**U/G Storage Pipe Volume**
End Area 0.073 ($m^2$)
Total Length 21.5 (m)
Pipe Volume 1.6 ($m^3$)

**Area A-2: Storage Table**

| Elevation (m) | System Depth (m) | UG STORAGE Volume ($m^3$) | CBMH 249 Volume ($m^3$) | CBMH 250 Volume ($m^3$) | CBMH 251 Volume ($m^3$) | Underground Combined Volume ($m^3$) | Surface Storage: UG STORAGE Area ($m^2$) | UG STORAGE Volume ($m^3$) | CBMH 249 Area ($m^2$) | CBMH 249 Volume ($m^3$) | CBMH 250 Area ($m^2$) | CBMH 250 Volume ($m^3$) | CBMH 251 Area ($m^2$) | CBMH 251 Volume ($m^3$) | Total Storage: Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77.92 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.57 | - | - | - | - | - | - | - | - | - | **0** | - |
| 78.54 | 0.38 | 41.95 | 0.50 | 0.57 | 0.70 | 44.58 | - | - | - | - | - | - | - | - | - | **44.6** | 0.47 |
| 78.70 | 0.54 | 59.62 | 0.68 | 0.75 | 0.88 | 62.61 | - | - | - | - | - | - | - | - | - | **62.6** | 0.63 |
| 79.30 | 1.14 | 125.86 | 1.36 | 1.43 | 1.56 | 130.21 | - | - | - | - | - | - | - | - | - | **130.2** | 1.23 |
| 79.32 | 1.16 | 125.86 | 1.38 | 1.45 | 1.58 | 130.25 | - | - | - | - | - | - | - | - | - | **130.3** | 1.25 |
| 79.54 | 1.38 | 125.86 | 1.63 | 1.70 | 1.83 | 130.75 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **130.7** | 1.47 |
| 79.59 | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 15.59 | 0.39 | 15.69 | 0.39 | 0.4 | **131.1** | 1.52 |
| 79.64 | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 29.27 | 1.51 | 29.27 | 0.00 | 1.5 | **132.3** | 1.57 |
| 79.69 | | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 39.37 | 3.23 | 39.37 | 0.00 | 3.2 | **134.0** | 1.62 |

**Tempest HF Type A ICD**

**1:100 Yr**
Flow (L/s) = 17.0
Head (m) = 1.25
Elevation (m) = **79.32**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 130.3

**1:5 Yr**
Flow (L/s) = 12.1
Head (m) = 0.63
Elevation (m) = **78.70**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 62.6

**1:2 Yr**
Flow (L/s) = 10.4
Head (m) = 0.47
Elevation (m) = **78.54**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 44.3

**Orifice Size - 1:100 yr Flow Check**

Q=0.62xAx(2gh)^0.5

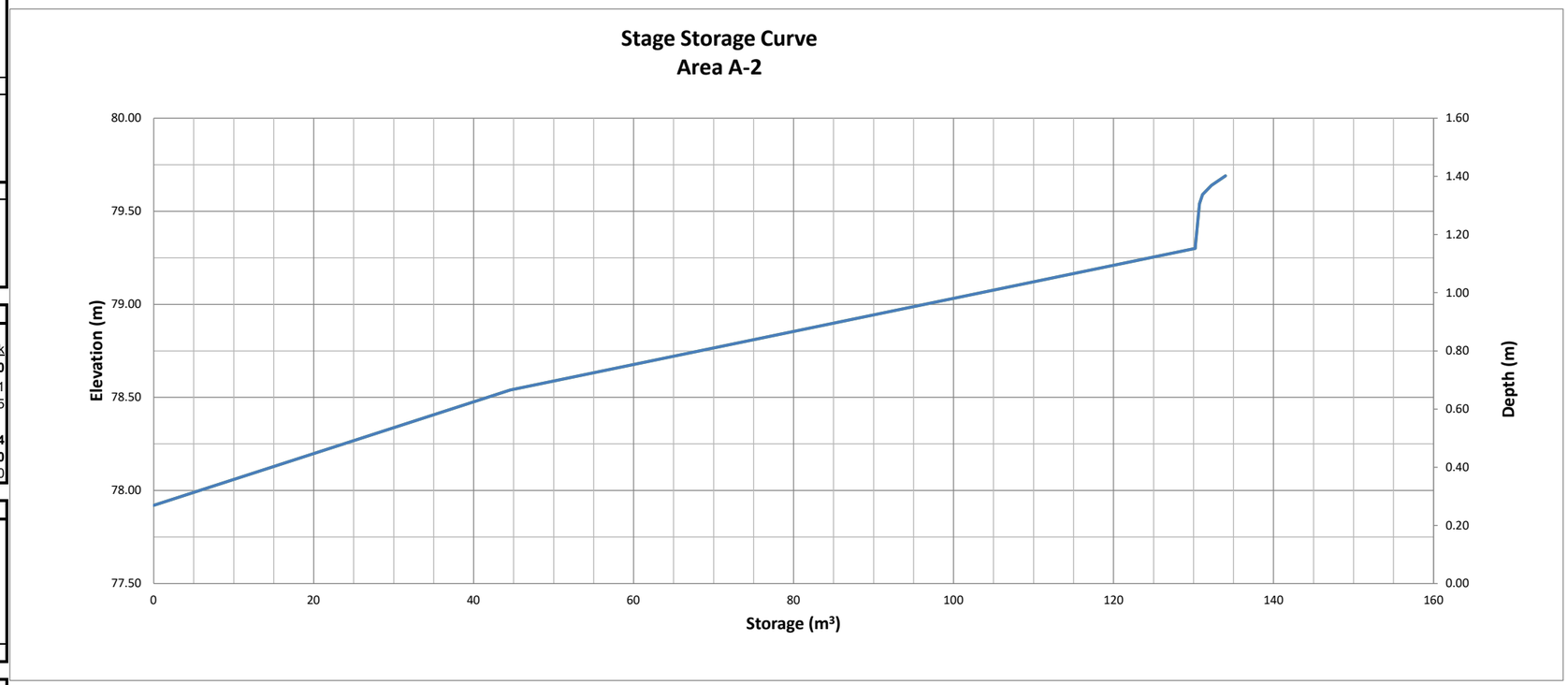
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0170 | **0.0170** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **1.25** | 1.25 |
| A ($m^2$) = | **0.005542045** | **0.00554** |
| D (m) = | **0.084002088** | **0.08400** |
| D (mm) = | **84** | 84.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0121 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.63** |
| A ($m^2$) = | **0.00554** |
| D (m) = | **0.084** |
| D (mm) = | **84** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0104 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.47** |
| A ($m^2$) = | **0.00554** |
| D (m) = | **0.084** |
| D (mm) = | **84** |



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-3** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 0.95 | L/s |
| C = | 0.90 | | Vol(max) = | 7.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 12.70 | 11.75 | 3.52 |
| 10 | 76.81 | 9.42 | 8.47 | 5.08 |
| 15 | 61.77 | 7.57 | 6.62 | 5.96 |
| 20 | 52.03 | 6.38 | 5.43 | 6.51 |
| 25 | 45.17 | 5.54 | 4.59 | 6.88 |
| 30 | 40.04 | 4.91 | 3.96 | 7.13 |
| 35 | 36.06 | 4.42 | 3.47 | 7.29 |
| 40 | 32.86 | 4.03 | 3.08 | 7.39 |
| 45 | 30.24 | 3.71 | 2.76 | 7.44 |
| 50 | 28.04 | 3.44 | 2.49 | 7.46 |
| 55 | 26.17 | 3.21 | 2.26 | 7.45 |
| 60 | 24.56 | 3.01 | 2.06 | 7.42 |
| 65 | 23.15 | 2.84 | 1.89 | 7.36 |
| 70 | 21.91 | 2.69 | 1.74 | 7.29 |
| 75 | 20.81 | 2.55 | 1.60 | 7.21 |
| 90 | 18.14 | 2.22 | 1.27 | 6.88 |
| 105 | 16.13 | 1.98 | 1.03 | 6.48 |
| 120 | 14.56 | 1.79 | 0.84 | 6.01 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-3** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 1.26 | L/s |
| C = | 0.90 | | Vol(max) = | 10.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 17.31 | 16.05 | 4.81 |
| 10 | 104.19 | 12.77 | 11.51 | 6.91 |
| 15 | 83.56 | 10.24 | 8.98 | 8.09 |
| 20 | 70.25 | 8.61 | 7.35 | 8.82 |
| 25 | 60.90 | 7.47 | 6.21 | 9.31 |
| 30 | 53.93 | 6.61 | 5.35 | 9.63 |
| 35 | 48.52 | 5.95 | 4.69 | 9.85 |
| 40 | 44.18 | 5.42 | 4.16 | 9.98 |
| 45 | 40.63 | 4.98 | 3.72 | 10.05 |
| 50 | 37.65 | 4.62 | 3.36 | 10.07 |
| 55 | 35.12 | 4.31 | 3.05 | 10.05 |
| 60 | 32.94 | 4.04 | 2.78 | 10.00 |
| 65 | 31.04 | 3.81 | 2.55 | 9.93 |
| 70 | 29.37 | 3.60 | 2.34 | 9.83 |
| 75 | 27.89 | 3.42 | 2.16 | 9.72 |
| 90 | 24.29 | 2.98 | 1.72 | 9.28 |
| 105 | 21.58 | 2.65 | 1.39 | 8.73 |
| 120 | 19.47 | 2.39 | 1.13 | 8.11 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-3** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 20.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 33.06 | 31.17 | 9.35 |
| 10 | 178.56 | 24.32 | 22.43 | 13.46 |
| 15 | 142.89 | 19.47 | 17.58 | 15.82 |
| 20 | 119.95 | 16.34 | 14.45 | 17.34 |
| 25 | 103.85 | 14.15 | 12.26 | 18.38 |
| 30 | 91.87 | 12.51 | 10.62 | 19.12 |
| 35 | 82.58 | 11.25 | 9.36 | 19.65 |
| 40 | 75.15 | 10.24 | 8.35 | 20.03 |
| 45 | 69.05 | 9.41 | 7.52 | 20.29 |
| 50 | 63.95 | 8.71 | 6.82 | 20.47 |
| 55 | 59.62 | 8.12 | 6.23 | 20.57 |
| 60 | 55.89 | 7.61 | 5.72 | 20.61 |
| 80 | 44.99 | 6.13 | 4.24 | 20.35 |
| 100 | 37.90 | 5.16 | 3.27 | 19.64 |
| 120 | 32.89 | 4.48 | 2.59 | 18.65 |
| 140 | 29.15 | 3.97 | 2.08 | 17.48 |
| 160 | 26.24 | 3.57 | 1.68 | 16.17 |
| 180 | 23.90 | 3.26 | 1.37 | 14.75 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-3** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 26.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 39.67 | 37.78 | 11.34 |
| 10 | 214.27 | 29.19 | 27.30 | 16.38 |
| 15 | 171.47 | 23.36 | 21.47 | 19.32 |
| 20 | 143.94 | 19.61 | 17.72 | 21.26 |
| 25 | 124.62 | 16.98 | 15.09 | 22.63 |
| 30 | 110.24 | 15.02 | 13.13 | 23.63 |
| 35 | 99.09 | 13.50 | 11.61 | 24.38 |
| 40 | 90.17 | 12.28 | 10.39 | 24.94 |
| 45 | 82.86 | 11.29 | 9.40 | 25.37 |
| 50 | 76.74 | 10.45 | 8.56 | 25.69 |
| 55 | 71.55 | 9.75 | 7.86 | 25.93 |
| 60 | 67.07 | 9.14 | 7.25 | 26.09 |
| 65 | 63.18 | 8.61 | 6.72 | 26.19 |
| 70 | 59.75 | 8.14 | 6.25 | 26.25 |
| 75 | 56.71 | 7.72 | 5.83 | 26.26 |
| 90 | 49.33 | 6.72 | 4.83 | 26.08 |
| 105 | 43.80 | 5.97 | 4.08 | 25.68 |
| 120 | 39.47 | 5.38 | 3.49 | 25.11 |

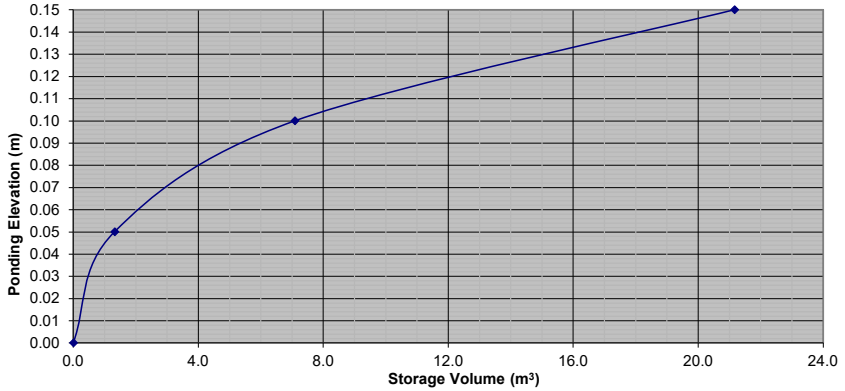
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to fully exposed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.95 | 0.95 | 8 | 7.5 | |
| 1:5 Year | 1.26 | 1.26 | 10 | 10.1 | 21.2 |
| 1:100 Year | 1.89 | 1.89 | 15 | 20.6 | |

**Roof Drain Storage Table for Area RD 1**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 52.8 | 1.3 |
| 0.10 | 177.9 | 7.1 |
| 0.15 | 384.8 | 21.2 |

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



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-3** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 0.95 | L/s |
| C = | 0.90 | | Vol(max) = | 7.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 12.70 | 11.75 | 3.52 |
| 10 | 76.81 | 9.42 | 8.47 | 5.08 |
| 15 | 61.77 | 7.57 | 6.62 | 5.96 |
| 20 | 52.03 | 6.38 | 5.43 | 6.51 |
| 25 | 45.17 | 5.54 | 4.59 | 6.88 |
| 30 | 40.04 | 4.91 | 3.96 | 7.13 |
| 35 | 36.06 | 4.42 | 3.47 | 7.29 |
| 40 | 32.86 | 4.03 | 3.08 | 7.39 |
| 45 | 30.24 | 3.71 | 2.76 | 7.44 |
| 50 | 28.04 | 3.44 | 2.49 | 7.46 |
| 55 | 26.17 | 3.21 | 2.26 | 7.45 |
| 60 | 24.56 | 3.01 | 2.06 | 7.42 |
| 65 | 23.15 | 2.84 | 1.89 | 7.36 |
| 70 | 21.91 | 2.69 | 1.74 | 7.29 |
| 75 | 20.81 | 2.55 | 1.60 | 7.21 |
| 90 | 18.14 | 2.22 | 1.27 | 6.88 |
| 105 | 16.13 | 1.98 | 1.03 | 6.48 |
| 120 | 14.56 | 1.79 | 0.84 | 6.01 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-3** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 1.26 | L/s |
| C = | 0.90 | | Vol(max) = | 10.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 17.31 | 16.05 | 4.81 |
| 10 | 104.19 | 12.77 | 11.51 | 6.91 |
| 15 | 83.56 | 10.24 | 8.98 | 8.09 |
| 20 | 70.25 | 8.61 | 7.35 | 8.82 |
| 25 | 60.90 | 7.47 | 6.21 | 9.31 |
| 30 | 53.93 | 6.61 | 5.35 | 9.63 |
| 35 | 48.52 | 5.95 | 4.69 | 9.85 |
| 40 | 44.18 | 5.42 | 4.16 | 9.98 |
| 45 | 40.63 | 4.98 | 3.72 | 10.05 |
| 50 | 37.65 | 4.62 | 3.36 | 10.07 |
| 55 | 35.12 | 4.31 | 3.05 | 10.05 |
| 60 | 32.94 | 4.04 | 2.78 | 10.00 |
| 65 | 31.04 | 3.81 | 2.55 | 9.93 |
| 70 | 29.37 | 3.60 | 2.34 | 9.83 |
| 75 | 27.89 | 3.42 | 2.16 | 9.72 |
| 90 | 24.29 | 2.98 | 1.72 | 9.28 |
| 105 | 21.58 | 2.65 | 1.39 | 8.73 |
| 120 | 19.47 | 2.39 | 1.13 | 8.11 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-3** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 20.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 33.06 | 31.17 | 9.35 |
| 10 | 178.56 | 24.32 | 22.43 | 13.46 |
| 15 | 142.89 | 19.47 | 17.58 | 15.82 |
| 20 | 119.95 | 16.34 | 14.45 | 17.34 |
| 25 | 103.85 | 14.15 | 12.26 | 18.38 |
| 30 | 91.87 | 12.51 | 10.62 | 19.12 |
| 35 | 82.58 | 11.25 | 9.36 | 19.65 |
| 40 | 75.15 | 10.24 | 8.35 | 20.03 |
| 45 | 69.05 | 9.41 | 7.52 | 20.29 |
| 50 | 63.95 | 8.71 | 6.82 | 20.47 |
| 55 | 59.62 | 8.12 | 6.23 | 20.57 |
| 60 | 55.89 | 7.61 | 5.72 | 20.61 |
| 80 | 44.99 | 6.13 | 4.24 | 20.35 |
| 100 | 37.90 | 5.16 | 3.27 | 19.64 |
| 120 | 32.89 | 4.48 | 2.59 | 18.65 |
| 140 | 29.15 | 3.97 | 2.08 | 17.48 |
| 160 | 26.24 | 3.57 | 1.68 | 16.17 |
| 180 | 23.90 | 3.26 | 1.37 | 14.75 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-3** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.049 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 26.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 39.67 | 37.78 | 11.34 |
| 10 | 214.27 | 29.19 | 27.30 | 16.38 |
| 15 | 171.47 | 23.36 | 21.47 | 19.32 |
| 20 | 143.94 | 19.61 | 17.72 | 21.26 |
| 25 | 124.62 | 16.98 | 15.09 | 22.63 |
| 30 | 110.24 | 15.02 | 13.13 | 23.63 |
| 35 | 99.09 | 13.50 | 11.61 | 24.38 |
| 40 | 90.17 | 12.28 | 10.39 | 24.94 |
| 45 | 82.86 | 11.29 | 9.40 | 25.37 |
| 50 | 76.74 | 10.45 | 8.56 | 25.69 |
| 55 | 71.55 | 9.75 | 7.86 | 25.93 |
| 60 | 67.07 | 9.14 | 7.25 | 26.09 |
| 65 | 63.18 | 8.61 | 6.72 | 26.19 |
| 70 | 59.75 | 8.14 | 6.25 | 26.25 |
| 75 | 56.71 | 7.72 | 5.83 | 26.26 |
| 90 | 49.33 | 6.72 | 4.83 | 26.08 |
| 105 | 43.80 | 5.97 | 4.08 | 25.68 |
| 120 | 39.47 | 5.38 | 3.49 | 25.11 |

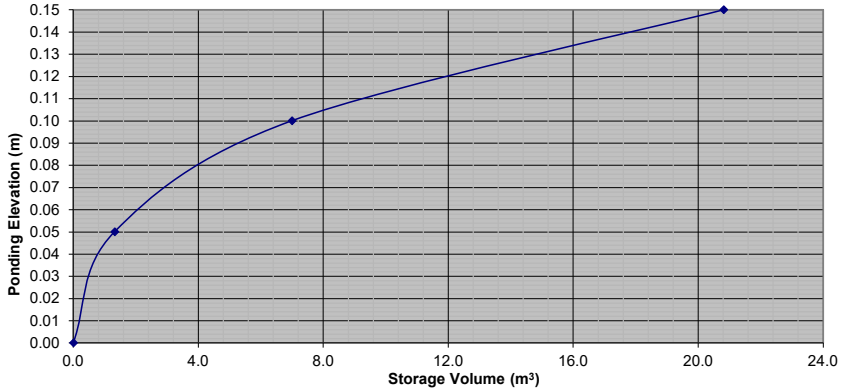
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to fully exposed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.95 | 0.95 | 8 | 7.5 | |
| 1:5 Year | 1.26 | 1.26 | 10 | 10.1 | 20.8 |
| 1:100 Year | 1.89 | 1.89 | 15 | 20.6 | |

**Roof Drain Storage Table for Area RD 2**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 52.8 | 1.3 |
| 0.10 | 174.1 | 7.0 |
| 0.15 | 378.7 | 20.8 |

**Stage Storage Curve: Area A-3**
**Controlled Roof Drain #2**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-4** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.037 | ha | Qallow = | 0.95 | L/s |
| C = | 0.90 | | Vol(max) = | 5.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 9.59 | 8.64 | 2.59 |
| 10 | 76.81 | 7.11 | 6.16 | 3.70 |
| 15 | 61.77 | 5.72 | 4.77 | 4.29 |
| 20 | 52.03 | 4.82 | 3.87 | 4.64 |
| 25 | 45.17 | 4.18 | 3.23 | 4.85 |
| 30 | 40.04 | 3.71 | 2.76 | 4.96 |
| 35 | 36.06 | 3.34 | 2.39 | 5.02 |
| 40 | 32.86 | 3.04 | 2.09 | 5.02 |
| 45 | 30.24 | 2.80 | 1.85 | 4.99 |
| 50 | 28.04 | 2.60 | 1.65 | 4.94 |
| 55 | 26.17 | 2.42 | 1.47 | 4.86 |
| 60 | 24.56 | 2.27 | 1.32 | 4.76 |
| 65 | 23.15 | 2.14 | 1.19 | 4.65 |
| 70 | 21.91 | 2.03 | 1.08 | 4.53 |
| 75 | 20.81 | 1.93 | 0.98 | 4.40 |
| 90 | 18.14 | 1.68 | 0.73 | 3.94 |
| 105 | 16.13 | 1.49 | 0.54 | 3.42 |
| 120 | 14.56 | 1.35 | 0.40 | 2.87 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-4** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.037 | ha | Qallow = | 1.26 | L/s |
| C = | 0.90 | | Vol(max) = | 6.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 13.07 | 11.81 | 3.54 |
| 10 | 104.19 | 9.65 | 8.39 | 5.03 |
| 15 | 83.56 | 7.74 | 6.48 | 5.83 |
| 20 | 70.25 | 6.50 | 5.24 | 6.29 |
| 25 | 60.90 | 5.64 | 4.38 | 6.57 |
| 30 | 53.93 | 4.99 | 3.73 | 6.72 |
| 35 | 48.52 | 4.49 | 3.23 | 6.79 |
| 40 | 44.18 | 4.09 | 2.83 | 6.79 |
| 45 | 40.63 | 3.76 | 2.50 | 6.75 |
| 50 | 37.65 | 3.49 | 2.23 | 6.68 |
| 55 | 35.12 | 3.25 | 1.99 | 6.57 |
| 60 | 32.94 | 3.05 | 1.79 | 6.44 |
| 65 | 31.04 | 2.87 | 1.61 | 6.29 |
| 70 | 29.37 | 2.72 | 1.46 | 6.13 |
| 75 | 27.89 | 2.58 | 1.32 | 5.95 |
| 90 | 24.29 | 2.25 | 0.99 | 5.34 |
| 105 | 21.58 | 2.00 | 0.74 | 4.65 |
| 120 | 19.47 | 1.80 | 0.54 | 3.90 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-4** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.037 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 14.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 24.96 | 23.07 | 6.92 |
| 10 | 178.56 | 18.37 | 16.48 | 9.89 |
| 15 | 142.89 | 14.70 | 12.81 | 11.53 |
| 20 | 119.95 | 12.34 | 10.45 | 12.54 |
| 25 | 103.85 | 10.68 | 8.79 | 13.19 |
| 30 | 91.87 | 9.45 | 7.56 | 13.61 |
| 35 | 82.58 | 8.49 | 6.60 | 13.87 |
| 40 | 75.15 | 7.73 | 5.84 | 14.01 |
| 45 | 69.05 | 7.10 | 5.21 | 14.07 |
| 50 | 63.95 | 6.58 | 4.69 | 14.06 |
| 55 | 59.62 | 6.13 | 4.24 | 14.00 |
| 60 | 55.89 | 5.75 | 3.86 | 13.89 |
| 80 | 44.99 | 4.63 | 2.74 | 13.14 |
| 100 | 37.90 | 3.90 | 2.01 | 12.05 |
| 120 | 32.89 | 3.38 | 1.49 | 10.75 |
| 140 | 29.15 | 3.00 | 1.11 | 9.31 |
| 160 | 26.24 | 2.70 | 0.81 | 7.77 |
| 180 | 23.90 | 2.46 | 0.57 | 6.14 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-4** **Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.037 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 18.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 29.96 | 28.07 | 8.42 |
| 10 | 214.27 | 22.04 | 20.15 | 12.09 |
| 15 | 171.47 | 17.64 | 15.75 | 14.17 |
| 20 | 143.94 | 14.81 | 12.92 | 15.50 |
| 25 | 124.62 | 12.82 | 10.93 | 16.39 |
| 30 | 110.24 | 11.34 | 9.45 | 17.01 |
| 35 | 99.09 | 10.19 | 8.30 | 17.44 |
| 40 | 90.17 | 9.28 | 7.39 | 17.72 |
| 45 | 82.86 | 8.52 | 6.63 | 17.91 |
| 50 | 76.74 | 7.89 | 6.00 | 18.01 |
| 55 | 71.55 | 7.36 | 5.47 | 18.05 |
| 60 | 67.07 | 6.90 | 5.01 | 18.03 |
| 65 | 63.18 | 6.50 | 4.61 | 17.97 |
| 70 | 59.75 | 6.15 | 4.26 | 17.87 |
| 75 | 56.71 | 5.83 | 3.94 | 17.74 |
| 90 | 49.33 | 5.07 | 3.18 | 17.20 |
| 105 | 43.80 | 4.50 | 2.61 | 16.47 |
| 120 | 39.47 | 4.06 | 2.17 | 15.63 |

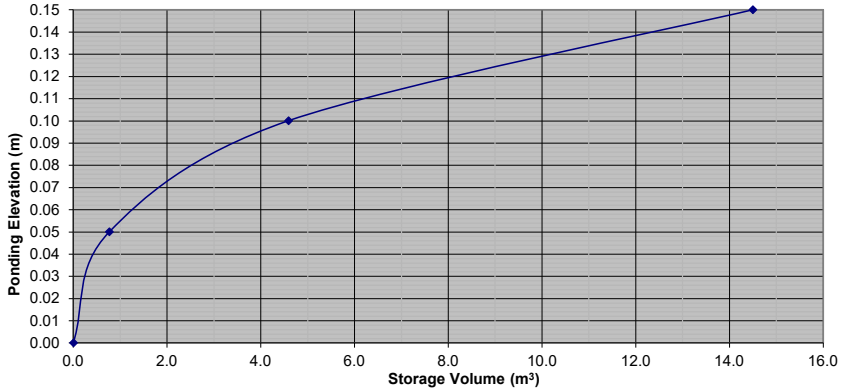
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to fully exposed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.95 | 0.95 | 8 | 5.0 | |
| 1:5 Year | 1.26 | 1.26 | 10 | 6.8 | 14.5 |
| 1:100 Year | 1.89 | 1.89 | 15 | 14.1 | |

**Roof Drain Storage Table for Area RD 1**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 30.6 | 0.8 |
| 0.10 | 122.3 | 4.6 |
| 0.15 | 274.1 | 14.5 |

**Stage Storage Curve: Area A-4**
**Controlled Roof Drain #1**




Prepared By: Novatech

M:\2023\123043\DATA\Calculations\SWM\123043-SWM-r2.xlsx

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-4 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.038 | ha | Qallow = | 0.95 | L/s |
| C = | 0.90 | | Vol(max) = | 5.2 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 9.85 | 8.90 | 2.67 |
| 10 | 76.81 | 7.30 | 6.35 | 3.81 |
| 15 | 61.77 | 5.87 | 4.92 | 4.43 |
| 20 | 52.03 | 4.95 | 4.00 | 4.80 |
| 25 | 45.17 | 4.29 | 3.34 | 5.02 |
| 30 | 40.04 | 3.81 | 2.86 | 5.14 |
| 35 | 36.06 | 3.43 | 2.48 | 5.20 |
| 40 | 32.86 | 3.12 | 2.17 | 5.22 |
| 45 | 30.24 | 2.88 | 1.93 | 5.20 |
| 50 | 28.04 | 2.67 | 1.72 | 5.15 |
| 55 | 26.17 | 2.49 | 1.54 | 5.08 |
| 60 | 24.56 | 2.33 | 1.38 | 4.99 |
| 65 | 23.15 | 2.20 | 1.25 | 4.88 |
| 70 | 21.91 | 2.08 | 1.13 | 4.76 |
| 75 | 20.81 | 1.98 | 1.03 | 4.63 |
| 90 | 18.14 | 1.72 | 0.77 | 4.18 |
| 105 | 16.13 | 1.53 | 0.58 | 3.68 |
| 120 | 14.56 | 1.38 | 0.43 | 3.13 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-4 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.038 | ha | Qallow = | 1.26 | L/s |
| C = | 0.90 | | Vol(max) = | 7.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 13.42 | 12.16 | 3.65 |
| 10 | 104.19 | 9.91 | 8.65 | 5.19 |
| 15 | 83.56 | 7.94 | 6.68 | 6.02 |
| 20 | 70.25 | 6.68 | 5.42 | 6.50 |
| 25 | 60.90 | 5.79 | 4.53 | 6.79 |
| 30 | 53.93 | 5.13 | 3.87 | 6.96 |
| 35 | 48.52 | 4.61 | 3.35 | 7.04 |
| 40 | 44.18 | 4.20 | 2.94 | 7.06 |
| 45 | 40.63 | 3.86 | 2.60 | 7.03 |
| 50 | 37.65 | 3.58 | 2.32 | 6.96 |
| 55 | 35.12 | 3.34 | 2.08 | 6.86 |
| 60 | 32.94 | 3.13 | 1.87 | 6.74 |
| 65 | 31.04 | 2.95 | 1.69 | 6.60 |
| 70 | 29.37 | 2.79 | 1.53 | 6.44 |
| 75 | 27.89 | 2.65 | 1.39 | 6.26 |
| 90 | 24.29 | 2.31 | 1.05 | 5.67 |
| 105 | 21.58 | 2.05 | 0.79 | 4.99 |
| 120 | 19.47 | 1.85 | 0.59 | 4.25 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-4 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.038 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 14.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 25.64 | 23.75 | 7.12 |
| 10 | 178.56 | 18.86 | 16.97 | 10.18 |
| 15 | 142.89 | 15.10 | 13.21 | 11.88 |
| 20 | 119.95 | 12.67 | 10.78 | 12.94 |
| 25 | 103.85 | 10.97 | 9.08 | 13.62 |
| 30 | 91.87 | 9.70 | 7.81 | 14.07 |
| 35 | 82.58 | 8.72 | 6.83 | 14.35 |
| 40 | 75.15 | 7.94 | 6.05 | 14.52 |
| 45 | 69.05 | 7.29 | 5.40 | 14.59 |
| 50 | 63.95 | 6.76 | 4.87 | 14.60 |
| 55 | 59.62 | 6.30 | 4.41 | 14.55 |
| 60 | 55.89 | 5.90 | 4.01 | 14.45 |
| 80 | 44.99 | 4.75 | 2.86 | 13.74 |
| 100 | 37.90 | 4.00 | 2.11 | 12.68 |
| 120 | 32.89 | 3.48 | 1.59 | 11.41 |
| 140 | 29.15 | 3.08 | 1.19 | 9.99 |
| 160 | 26.24 | 2.77 | 0.88 | 8.47 |
| 180 | 23.90 | 2.53 | 0.64 | 6.86 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-4 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.038 | ha | Qallow = | 1.89 | L/s |
| C = | 1.00 | | Vol(max) = | 18.7 | m3 |

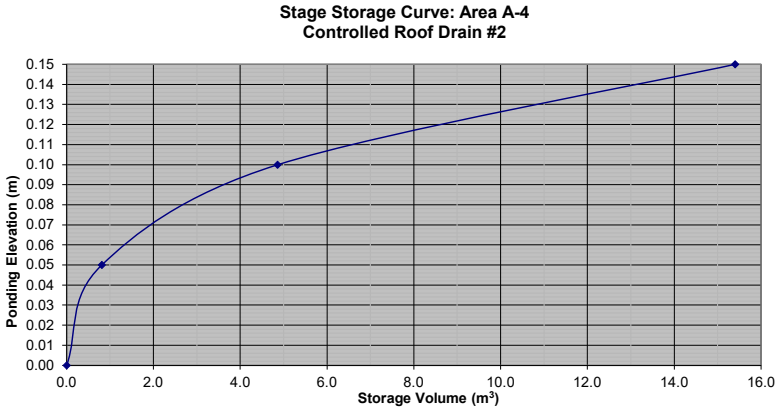
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 30.77 | 28.88 | 8.66 |
| 10 | 214.27 | 22.64 | 20.75 | 12.45 |
| 15 | 171.47 | 18.11 | 16.22 | 14.60 |
| 20 | 143.94 | 15.21 | 13.32 | 15.98 |
| 25 | 124.62 | 13.16 | 11.27 | 16.91 |
| 30 | 110.24 | 11.65 | 9.76 | 17.56 |
| 35 | 99.09 | 10.47 | 8.58 | 18.01 |
| 40 | 90.17 | 9.53 | 7.64 | 18.33 |
| 45 | 82.86 | 8.75 | 6.86 | 18.53 |
| 50 | 76.74 | 8.11 | 6.22 | 18.65 |
| 55 | 71.55 | 7.56 | 5.67 | 18.71 |
| 60 | 67.07 | 7.09 | 5.20 | 18.70 |
| 65 | 63.18 | 6.67 | 4.78 | 18.66 |
| 70 | 59.75 | 6.31 | 4.42 | 18.57 |
| 75 | 56.71 | 5.99 | 4.10 | 18.45 |
| 90 | 49.33 | 5.21 | 3.32 | 17.94 |
| 105 | 43.80 | 4.63 | 2.74 | 17.24 |
| 120 | 39.47 | 4.17 | 2.28 | 16.42 |

**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 | 0.95 | 0.95 | 8 | 5.2 | |
| 1:5 Year | 1.26 | 1.26 | 10 | 7.1 | 15.4 |
| 1:100 Year | 1.89 | 1.89 | 15 | 14.6 | |

**Roof Drain Storage Table for Area RD 2**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 32.5 | 0.8 |
| 0.10 | 129.3 | 4.9 |
| 0.15 | 292.5 | 15.4 |



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.010 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.2 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 2.54 | 2.22 | 0.67 |
| 10 | 76.81 | 1.88 | 1.56 | 0.94 |
| 15 | 61.77 | 1.51 | 1.19 | 1.08 |
| 20 | 52.03 | 1.28 | 0.96 | 1.15 |
| 25 | 45.17 | 1.11 | 0.79 | 1.18 |
| 30 | 40.04 | 0.98 | 0.66 | 1.19 |
| 35 | 36.06 | 0.88 | 0.56 | 1.18 |
| 40 | 32.86 | 0.81 | 0.49 | 1.17 |
| 45 | 30.24 | 0.74 | 0.42 | 1.14 |
| 50 | 28.04 | 0.69 | 0.37 | 1.10 |
| 55 | 26.17 | 0.64 | 0.32 | 1.06 |
| 60 | 24.56 | 0.60 | 0.28 | 1.02 |
| 65 | 23.15 | 0.57 | 0.25 | 0.97 |
| 70 | 21.91 | 0.54 | 0.22 | 0.91 |
| 75 | 20.81 | 0.51 | 0.19 | 0.86 |
| 90 | 18.14 | 0.44 | 0.12 | 0.67 |
| 105 | 16.13 | 0.40 | 0.08 | 0.48 |
| 120 | 14.56 | 0.36 | 0.04 | 0.27 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.010 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 3.46 | 3.14 | 0.94 |
| 10 | 104.19 | 2.55 | 2.23 | 1.34 |
| 15 | 83.56 | 2.05 | 1.73 | 1.56 |
| 20 | 70.25 | 1.72 | 1.40 | 1.68 |
| 25 | 60.90 | 1.49 | 1.17 | 1.76 |
| 30 | 53.93 | 1.32 | 1.00 | 1.80 |
| 35 | 48.52 | 1.19 | 0.87 | 1.83 |
| 40 | 44.18 | 1.08 | 0.76 | 1.83 |
| 45 | 40.63 | 1.00 | 0.68 | 1.83 |
| 50 | 37.65 | 0.92 | 0.60 | 1.81 |
| 55 | 35.12 | 0.86 | 0.54 | 1.79 |
| 60 | 32.94 | 0.81 | 0.49 | 1.76 |
| 65 | 31.04 | 0.76 | 0.44 | 1.72 |
| 70 | 29.37 | 0.72 | 0.40 | 1.68 |
| 75 | 27.89 | 0.68 | 0.36 | 1.64 |
| 90 | 24.29 | 0.60 | 0.28 | 1.49 |
| 105 | 21.58 | 0.53 | 0.21 | 1.32 |
| 120 | 19.47 | 0.48 | 0.16 | 1.13 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.010 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 4.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 6.61 | 6.29 | 1.89 |
| 10 | 178.56 | 4.86 | 4.54 | 2.73 |
| 15 | 142.89 | 3.89 | 3.57 | 3.22 |
| 20 | 119.95 | 3.27 | 2.95 | 3.54 |
| 25 | 103.85 | 2.83 | 2.51 | 3.76 |
| 30 | 91.87 | 2.50 | 2.18 | 3.93 |
| 35 | 82.58 | 2.25 | 1.93 | 4.05 |
| 40 | 75.15 | 2.05 | 1.73 | 4.15 |
| 45 | 69.05 | 1.88 | 1.56 | 4.22 |
| 50 | 63.95 | 1.74 | 1.42 | 4.27 |
| 55 | 59.62 | 1.62 | 1.30 | 4.30 |
| 60 | 55.89 | 1.52 | 1.20 | 4.33 |
| 80 | 44.99 | 1.23 | 0.91 | 4.35 |
| 100 | 37.90 | 1.03 | 0.71 | 4.28 |
| 120 | 32.89 | 0.90 | 0.58 | 4.15 |
| 140 | 29.15 | 0.79 | 0.47 | 3.98 |
| 160 | 26.24 | 0.71 | 0.39 | 3.79 |
| 180 | 23.90 | 0.65 | 0.33 | 3.58 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.010 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 5.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 7.93 | 7.61 | 2.28 |
| 10 | 214.27 | 5.84 | 5.52 | 3.31 |
| 15 | 171.47 | 4.67 | 4.35 | 3.92 |
| 20 | 143.94 | 3.92 | 3.60 | 4.32 |
| 25 | 124.62 | 3.40 | 3.08 | 4.61 |
| 30 | 110.24 | 3.00 | 2.68 | 4.83 |
| 35 | 99.09 | 2.70 | 2.38 | 5.00 |
| 40 | 90.17 | 2.46 | 2.14 | 5.13 |
| 45 | 82.86 | 2.26 | 1.94 | 5.23 |
| 50 | 76.74 | 2.09 | 1.77 | 5.31 |
| 55 | 71.55 | 1.95 | 1.63 | 5.38 |
| 60 | 67.07 | 1.83 | 1.51 | 5.43 |
| 65 | 63.18 | 1.72 | 1.40 | 5.46 |
| 70 | 59.75 | 1.63 | 1.31 | 5.49 |
| 75 | 56.71 | 1.54 | 1.22 | 5.51 |
| 90 | 49.33 | 1.34 | 1.02 | 5.53 |
| 105 | 43.80 | 1.19 | 0.87 | 5.50 |
| 120 | 39.47 | 1.08 | 0.76 | 5.44 |

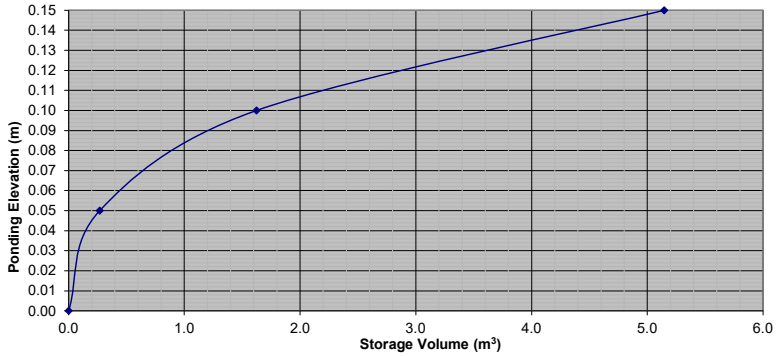
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 1.2 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 1.8 | 5.1 |
| 1:100 Year | 0.32 | 0.32 | 15 | 4.3 | |

**Roof Drain Storage Table for Area RD 1**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 10.8 | 0.3 |
| 0.10 | 43.3 | 1.6 |
| 0.15 | 97.6 | 5.1 |

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



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.014 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 3.50 | 3.18 | 0.95 |
| 10 | 76.81 | 2.59 | 2.27 | 1.36 |
| 15 | 61.77 | 2.09 | 1.77 | 1.59 |
| 20 | 52.03 | 1.76 | 1.44 | 1.72 |
| 25 | 45.17 | 1.53 | 1.21 | 1.81 |
| 30 | 40.04 | 1.35 | 1.03 | 1.86 |
| 35 | 36.06 | 1.22 | 0.90 | 1.89 |
| 40 | 32.86 | 1.11 | 0.79 | 1.90 |
| 45 | 30.24 | 1.02 | 0.70 | 1.89 |
| 50 | 28.04 | 0.95 | 0.63 | 1.88 |
| 55 | 26.17 | 0.88 | 0.56 | 1.86 |
| 60 | 24.56 | 0.83 | 0.51 | 1.83 |
| 65 | 23.15 | 0.78 | 0.46 | 1.80 |
| 70 | 21.91 | 0.74 | 0.42 | 1.76 |
| 75 | 20.81 | 0.70 | 0.38 | 1.72 |
| 90 | 18.14 | 0.61 | 0.29 | 1.58 |
| 105 | 16.13 | 0.54 | 0.22 | 1.42 |
| 120 | 14.56 | 0.49 | 0.17 | 1.24 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.014 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 2.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 4.77 | 4.45 | 1.33 |
| 10 | 104.19 | 3.52 | 3.20 | 1.92 |
| 15 | 83.56 | 2.82 | 2.50 | 2.25 |
| 20 | 70.25 | 2.37 | 2.05 | 2.46 |
| 25 | 60.90 | 2.06 | 1.74 | 2.61 |
| 30 | 53.93 | 1.82 | 1.50 | 2.70 |
| 35 | 48.52 | 1.64 | 1.32 | 2.77 |
| 40 | 44.18 | 1.49 | 1.17 | 2.81 |
| 45 | 40.63 | 1.37 | 1.05 | 2.84 |
| 50 | 37.65 | 1.27 | 0.95 | 2.86 |
| 55 | 35.12 | 1.19 | 0.87 | 2.86 |
| 60 | 32.94 | 1.11 | 0.79 | 2.85 |
| 65 | 31.04 | 1.05 | 0.73 | 2.84 |
| 70 | 29.37 | 0.99 | 0.67 | 2.82 |
| 75 | 27.89 | 0.94 | 0.62 | 2.80 |
| 90 | 24.29 | 0.82 | 0.50 | 2.70 |
| 105 | 21.58 | 0.73 | 0.41 | 2.58 |
| 120 | 19.47 | 0.66 | 0.34 | 2.43 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.014 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 6.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 9.11 | 8.79 | 2.64 |
| 10 | 178.56 | 6.70 | 6.38 | 3.83 |
| 15 | 142.89 | 5.36 | 5.04 | 4.54 |
| 20 | 119.95 | 4.50 | 4.18 | 5.02 |
| 25 | 103.85 | 3.90 | 3.58 | 5.37 |
| 30 | 91.87 | 3.45 | 3.13 | 5.63 |
| 35 | 82.58 | 3.10 | 2.78 | 5.84 |
| 40 | 75.15 | 2.82 | 2.50 | 6.00 |
| 45 | 69.05 | 2.59 | 2.27 | 6.13 |
| 50 | 63.95 | 2.40 | 2.08 | 6.24 |
| 55 | 59.62 | 2.24 | 1.92 | 6.33 |
| 60 | 55.89 | 2.10 | 1.78 | 6.40 |
| 80 | 44.99 | 1.69 | 1.37 | 6.57 |
| 100 | 37.90 | 1.42 | 1.10 | 6.62 |
| 120 | 32.89 | 1.23 | 0.91 | 6.58 |
| 140 | 29.15 | 1.09 | 0.77 | 6.50 |
| 160 | 26.24 | 0.98 | 0.66 | 6.38 |
| 180 | 23.90 | 0.90 | 0.58 | 6.23 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.014 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 8.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 10.93 | 10.61 | 3.18 |
| 10 | 214.27 | 8.04 | 7.72 | 4.63 |
| 15 | 171.47 | 6.44 | 6.12 | 5.50 |
| 20 | 143.94 | 5.40 | 5.08 | 6.10 |
| 25 | 124.62 | 4.68 | 4.36 | 6.54 |
| 30 | 110.24 | 4.14 | 3.82 | 6.87 |
| 35 | 99.09 | 3.72 | 3.40 | 7.14 |
| 40 | 90.17 | 3.38 | 3.06 | 7.35 |
| 45 | 82.86 | 3.11 | 2.79 | 7.53 |
| 50 | 76.74 | 2.88 | 2.56 | 7.68 |
| 55 | 71.55 | 2.69 | 2.37 | 7.81 |
| 60 | 67.07 | 2.52 | 2.20 | 7.91 |
| 65 | 63.18 | 2.37 | 2.05 | 8.00 |
| 70 | 59.75 | 2.24 | 1.92 | 8.07 |
| 75 | 56.71 | 2.13 | 1.81 | 8.14 |
| 90 | 49.33 | 1.85 | 1.53 | 8.27 |
| 105 | 43.80 | 1.64 | 1.32 | 8.34 |
| 120 | 39.47 | 1.48 | 1.16 | 8.36 |

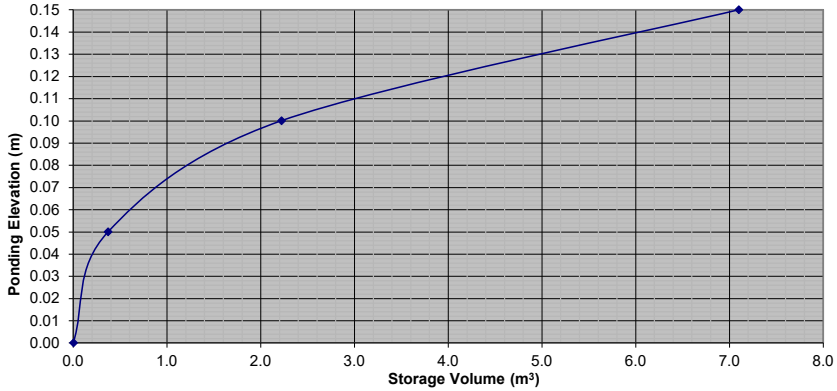
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 1.9 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 2.9 | 7.1 |
| 1:100 Year | 0.32 | 0.32 | 15 | 6.6 | |

**Roof Drain Storage Table for Area RD 2**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 14.8 | 0.4 |
| 0.10 | 59.1 | 2.2 |
| 0.15 | 136.1 | 7.1 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #2**




Prepared By: Novatech

M:\2023\123043\DATA\Calculations\SWM\123043-SWM-r2.xlsx

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #3**

OTTAWA IDF CURVE
Area = 0.007 ha Qallow = 0.32 L/s
C = 0.90 Vol(max) = 0.7 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 1.74 | 1.42 | 0.42 |
| 10 | 76.81 | 1.29 | 0.97 | 0.58 |
| 15 | 61.77 | 1.04 | 0.72 | 0.64 |
| 20 | 52.03 | 0.87 | 0.55 | 0.66 |
| 25 | 45.17 | 0.76 | 0.44 | 0.66 |
| 30 | 40.04 | 0.67 | 0.35 | 0.63 |
| 35 | 36.06 | 0.60 | 0.28 | 0.60 |
| 40 | 32.86 | 0.55 | 0.23 | 0.55 |
| 45 | 30.24 | 0.51 | 0.19 | 0.50 |
| 50 | 28.04 | 0.47 | 0.15 | 0.45 |
| 55 | 26.17 | 0.44 | 0.12 | 0.39 |
| 60 | 24.56 | 0.41 | 0.09 | 0.33 |
| 65 | 23.15 | 0.39 | 0.07 | 0.27 |
| 70 | 21.91 | 0.37 | 0.05 | 0.20 |
| 75 | 20.81 | 0.35 | 0.03 | 0.13 |
| 90 | 18.14 | 0.30 | -0.02 | -0.09 |
| 105 | 16.13 | 0.27 | -0.05 | -0.31 |
| 120 | 14.56 | 0.24 | -0.08 | -0.55 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #3**

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

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 2.37 | 2.05 | 0.61 |
| 10 | 104.19 | 1.75 | 1.43 | 0.86 |
| 15 | 83.56 | 1.40 | 1.08 | 0.97 |
| 20 | 70.25 | 1.18 | 0.86 | 1.03 |
| 25 | 60.90 | 1.02 | 0.70 | 1.05 |
| 30 | 53.93 | 0.90 | 0.58 | 1.05 |
| 35 | 48.52 | 0.81 | 0.49 | 1.04 |
| 40 | 44.18 | 0.74 | 0.42 | 1.01 |
| 45 | 40.63 | 0.68 | 0.36 | 0.97 |
| 50 | 37.65 | 0.63 | 0.31 | 0.93 |
| 55 | 35.12 | 0.59 | 0.27 | 0.89 |
| 60 | 32.94 | 0.55 | 0.23 | 0.84 |
| 65 | 31.04 | 0.52 | 0.20 | 0.78 |
| 70 | 29.37 | 0.49 | 0.17 | 0.72 |
| 75 | 27.89 | 0.47 | 0.15 | 0.66 |
| 90 | 24.29 | 0.41 | 0.09 | 0.47 |
| 105 | 21.58 | 0.36 | 0.04 | 0.26 |
| 120 | 19.47 | 0.33 | 0.01 | 0.05 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #3**

OTTAWA IDF CURVE
Area = 0.007 ha Qallow = 0.32 L/s
C = 1.00 Vol(max) = 2.6 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 4.52 | 4.20 | 1.26 |
| 10 | 178.56 | 3.33 | 3.01 | 1.80 |
| 15 | 142.89 | 2.66 | 2.34 | 2.11 |
| 20 | 119.95 | 2.23 | 1.91 | 2.30 |
| 25 | 103.85 | 1.93 | 1.61 | 2.42 |
| 30 | 91.87 | 1.71 | 1.39 | 2.50 |
| 35 | 82.58 | 1.54 | 1.22 | 2.56 |
| 40 | 75.15 | 1.40 | 1.08 | 2.59 |
| 45 | 69.05 | 1.29 | 0.97 | 2.61 |
| 50 | 63.95 | 1.19 | 0.87 | 2.61 |
| 55 | 59.62 | 1.11 | 0.79 | 2.61 |
| 60 | 55.89 | 1.04 | 0.72 | 2.60 |
| 80 | 44.99 | 0.84 | 0.52 | 2.49 |
| 100 | 37.90 | 0.71 | 0.39 | 2.32 |
| 120 | 32.89 | 0.61 | 0.29 | 2.11 |
| 140 | 29.15 | 0.54 | 0.22 | 1.87 |
| 160 | 26.24 | 0.49 | 0.17 | 1.62 |
| 180 | 23.90 | 0.45 | 0.13 | 1.35 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #3**

OTTAWA IDF CURVE
Area = 0.007 ha Qallow = 0.32 L/s
C = 1.00 Vol(max) = 3.3 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 5.42 | 5.10 | 1.53 |
| 10 | 214.27 | 3.99 | 3.67 | 2.20 |
| 15 | 171.47 | 3.19 | 2.87 | 2.59 |
| 20 | 143.94 | 2.68 | 2.36 | 2.83 |
| 25 | 124.62 | 2.32 | 2.00 | 3.00 |
| 30 | 110.24 | 2.05 | 1.73 | 3.12 |
| 35 | 99.09 | 1.85 | 1.53 | 3.20 |
| 40 | 90.17 | 1.68 | 1.36 | 3.26 |
| 45 | 82.86 | 1.54 | 1.22 | 3.30 |
| 50 | 76.74 | 1.43 | 1.11 | 3.33 |
| 55 | 71.55 | 1.33 | 1.01 | 3.34 |
| 60 | 67.07 | 1.25 | 0.93 | 3.35 |
| 65 | 63.18 | 1.18 | 0.86 | 3.34 |
| 70 | 59.75 | 1.11 | 0.79 | 3.33 |
| 75 | 56.71 | 1.06 | 0.74 | 3.31 |
| 90 | 49.33 | 0.92 | 0.60 | 3.23 |
| 105 | 43.80 | 0.82 | 0.50 | 3.12 |
| 120 | 39.47 | 0.74 | 0.42 | 2.99 |

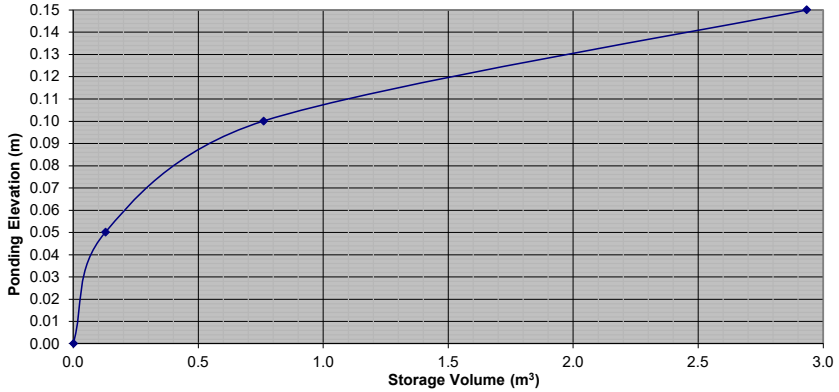
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.7 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 1.1 | 2.9 |
| 1:100 Year | 0.32 | 0.32 | 15 | 2.6 | |

**Roof Drain Storage Table for Area RD 3**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 5.1 | 0.1 |
| 0.10 | 20.2 | 0.8 |
| 0.15 | 66.7 | 2.9 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #3**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #4**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.006 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 1.65 | 1.33 | 0.40 |
| 10 | 76.81 | 1.22 | 0.90 | 0.54 |
| 15 | 61.77 | 0.98 | 0.66 | 0.60 |
| 20 | 52.03 | 0.83 | 0.51 | 0.61 |
| 25 | 45.17 | 0.72 | 0.40 | 0.60 |
| 30 | 40.04 | 0.64 | 0.32 | 0.57 |
| 35 | 36.06 | 0.57 | 0.25 | 0.53 |
| 40 | 32.86 | 0.52 | 0.20 | 0.49 |
| 45 | 30.24 | 0.48 | 0.16 | 0.43 |
| 50 | 28.04 | 0.45 | 0.13 | 0.38 |
| 55 | 26.17 | 0.42 | 0.10 | 0.32 |
| 60 | 24.56 | 0.39 | 0.07 | 0.25 |
| 65 | 23.15 | 0.37 | 0.05 | 0.19 |
| 70 | 21.91 | 0.35 | 0.03 | 0.12 |
| 75 | 20.81 | 0.33 | 0.01 | 0.05 |
| 90 | 18.14 | 0.29 | -0.03 | -0.17 |
| 105 | 16.13 | 0.26 | -0.06 | -0.40 |
| 120 | 14.56 | 0.23 | -0.09 | -0.64 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #4**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.006 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 2.24 | 1.92 | 0.58 |
| 10 | 104.19 | 1.66 | 1.34 | 0.80 |
| 15 | 83.56 | 1.33 | 1.01 | 0.91 |
| 20 | 70.25 | 1.12 | 0.80 | 0.96 |
| 25 | 60.90 | 0.97 | 0.65 | 0.97 |
| 30 | 53.93 | 0.86 | 0.54 | 0.97 |
| 35 | 48.52 | 0.77 | 0.45 | 0.95 |
| 40 | 44.18 | 0.70 | 0.38 | 0.92 |
| 45 | 40.63 | 0.65 | 0.33 | 0.88 |
| 50 | 37.65 | 0.60 | 0.28 | 0.83 |
| 55 | 35.12 | 0.56 | 0.24 | 0.79 |
| 60 | 32.94 | 0.52 | 0.20 | 0.73 |
| 65 | 31.04 | 0.49 | 0.17 | 0.68 |
| 70 | 29.37 | 0.47 | 0.15 | 0.62 |
| 75 | 27.89 | 0.44 | 0.12 | 0.55 |
| 90 | 24.29 | 0.39 | 0.07 | 0.36 |
| 105 | 21.58 | 0.34 | 0.02 | 0.14 |
| 120 | 19.47 | 0.31 | -0.01 | -0.08 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #4**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.006 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 2.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 4.28 | 3.96 | 1.19 |
| 10 | 178.56 | 3.15 | 2.83 | 1.70 |
| 15 | 142.89 | 2.52 | 2.20 | 1.98 |
| 20 | 119.95 | 2.12 | 1.80 | 2.16 |
| 25 | 103.85 | 1.83 | 1.51 | 2.27 |
| 30 | 91.87 | 1.62 | 1.30 | 2.34 |
| 35 | 82.58 | 1.46 | 1.14 | 2.39 |
| 40 | 75.15 | 1.33 | 1.01 | 2.42 |
| 45 | 69.05 | 1.22 | 0.90 | 2.43 |
| 50 | 63.95 | 1.13 | 0.81 | 2.43 |
| 55 | 59.62 | 1.05 | 0.73 | 2.42 |
| 60 | 55.89 | 0.99 | 0.67 | 2.40 |
| 80 | 44.99 | 0.79 | 0.47 | 2.28 |
| 100 | 37.90 | 0.67 | 0.35 | 2.09 |
| 120 | 32.89 | 0.58 | 0.26 | 1.88 |
| 140 | 29.15 | 0.51 | 0.19 | 1.63 |
| 160 | 26.24 | 0.46 | 0.14 | 1.37 |
| 180 | 23.90 | 0.42 | 0.10 | 1.10 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #4**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.006 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 3.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 5.14 | 4.82 | 1.45 |
| 10 | 214.27 | 3.78 | 3.46 | 2.08 |
| 15 | 171.47 | 3.03 | 2.71 | 2.44 |
| 20 | 143.94 | 2.54 | 2.22 | 2.67 |
| 25 | 124.62 | 2.20 | 1.88 | 2.82 |
| 30 | 110.24 | 1.95 | 1.63 | 2.93 |
| 35 | 99.09 | 1.75 | 1.43 | 3.00 |
| 40 | 90.17 | 1.59 | 1.27 | 3.05 |
| 45 | 82.86 | 1.46 | 1.14 | 3.09 |
| 50 | 76.74 | 1.35 | 1.03 | 3.10 |
| 55 | 71.55 | 1.26 | 0.94 | 3.11 |
| 60 | 67.07 | 1.18 | 0.86 | 3.11 |
| 65 | 63.18 | 1.12 | 0.80 | 3.10 |
| 70 | 59.75 | 1.05 | 0.73 | 3.09 |
| 75 | 56.71 | 1.00 | 0.68 | 3.06 |
| 90 | 49.33 | 0.87 | 0.55 | 2.97 |
| 105 | 43.80 | 0.77 | 0.45 | 2.85 |
| 120 | 39.47 | 0.70 | 0.38 | 2.71 |

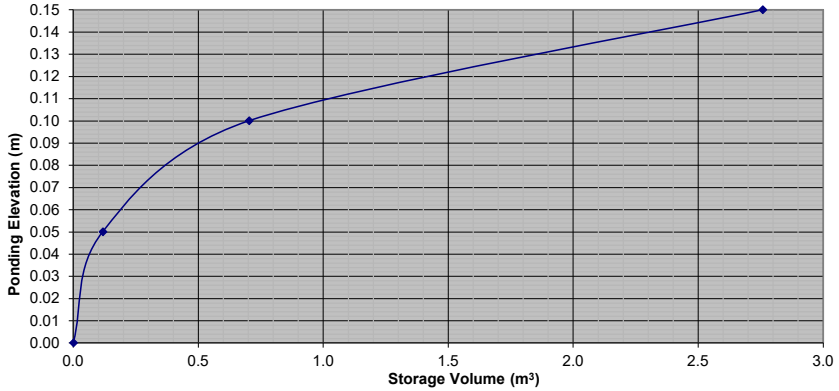
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.6 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 1.0 | 2.8 |
| 1:100 Year | 0.32 | 0.32 | 15 | 2.4 | |

**Roof Drain Storage Table for Area RD 4**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 4.7 | 0.1 |
| 0.10 | 18.7 | 0.7 |
| 0.15 | 63.5 | 2.8 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #4**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.008 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 1.97 | 1.65 | 0.49 |
| 10 | 76.81 | 1.46 | 1.14 | 0.68 |
| 15 | 61.77 | 1.17 | 0.85 | 0.77 |
| 20 | 52.03 | 0.99 | 0.67 | 0.80 |
| 25 | 45.17 | 0.86 | 0.54 | 0.81 |
| 30 | 40.04 | 0.76 | 0.44 | 0.79 |
| 35 | 36.06 | 0.69 | 0.37 | 0.77 |
| 40 | 32.86 | 0.62 | 0.30 | 0.73 |
| 45 | 30.24 | 0.58 | 0.26 | 0.69 |
| 50 | 28.04 | 0.53 | 0.21 | 0.64 |
| 55 | 26.17 | 0.50 | 0.18 | 0.59 |
| 60 | 24.56 | 0.47 | 0.15 | 0.53 |
| 65 | 23.15 | 0.44 | 0.12 | 0.47 |
| 70 | 21.91 | 0.42 | 0.10 | 0.41 |
| 75 | 20.81 | 0.40 | 0.08 | 0.34 |
| 90 | 18.14 | 0.34 | 0.02 | 0.13 |
| 105 | 16.13 | 0.31 | -0.01 | -0.08 |
| 120 | 14.56 | 0.28 | -0.04 | -0.31 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.008 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 2.68 | 2.36 | 0.71 |
| 10 | 104.19 | 1.98 | 1.66 | 1.00 |
| 15 | 83.56 | 1.59 | 1.27 | 1.14 |
| 20 | 70.25 | 1.34 | 1.02 | 1.22 |
| 25 | 60.90 | 1.16 | 0.84 | 1.26 |
| 30 | 53.93 | 1.03 | 0.71 | 1.27 |
| 35 | 48.52 | 0.92 | 0.60 | 1.27 |
| 40 | 44.18 | 0.84 | 0.52 | 1.25 |
| 45 | 40.63 | 0.77 | 0.45 | 1.22 |
| 50 | 37.65 | 0.72 | 0.40 | 1.19 |
| 55 | 35.12 | 0.67 | 0.35 | 1.15 |
| 60 | 32.94 | 0.63 | 0.31 | 1.10 |
| 65 | 31.04 | 0.59 | 0.27 | 1.05 |
| 70 | 29.37 | 0.56 | 0.24 | 1.00 |
| 75 | 27.89 | 0.53 | 0.21 | 0.95 |
| 90 | 24.29 | 0.46 | 0.14 | 0.77 |
| 105 | 21.58 | 0.41 | 0.09 | 0.57 |
| 120 | 19.47 | 0.37 | 0.05 | 0.36 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.008 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 3.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 5.13 | 4.81 | 1.44 |
| 10 | 178.56 | 3.77 | 3.45 | 2.07 |
| 15 | 142.89 | 3.02 | 2.70 | 2.43 |
| 20 | 119.95 | 2.53 | 2.21 | 2.66 |
| 25 | 103.85 | 2.19 | 1.87 | 2.81 |
| 30 | 91.87 | 1.94 | 1.62 | 2.92 |
| 35 | 82.58 | 1.74 | 1.42 | 2.99 |
| 40 | 75.15 | 1.59 | 1.27 | 3.04 |
| 45 | 69.05 | 1.46 | 1.14 | 3.08 |
| 50 | 63.95 | 1.35 | 1.03 | 3.09 |
| 55 | 59.62 | 1.26 | 0.94 | 3.10 |
| 60 | 55.89 | 1.18 | 0.86 | 3.10 |
| 80 | 44.99 | 0.95 | 0.63 | 3.03 |
| 100 | 37.90 | 0.80 | 0.48 | 2.88 |
| 120 | 32.89 | 0.70 | 0.38 | 2.70 |
| 140 | 29.15 | 0.62 | 0.30 | 2.49 |
| 160 | 26.24 | 0.55 | 0.23 | 2.25 |
| 180 | 23.90 | 0.51 | 0.19 | 2.00 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.008 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 4.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 6.15 | 5.83 | 1.75 |
| 10 | 214.27 | 4.53 | 4.21 | 2.52 |
| 15 | 171.47 | 3.62 | 3.30 | 2.97 |
| 20 | 143.94 | 3.04 | 2.72 | 3.27 |
| 25 | 124.62 | 2.63 | 2.31 | 3.47 |
| 30 | 110.24 | 2.33 | 2.01 | 3.62 |
| 35 | 99.09 | 2.09 | 1.77 | 3.72 |
| 40 | 90.17 | 1.91 | 1.59 | 3.80 |
| 45 | 82.86 | 1.75 | 1.43 | 3.86 |
| 50 | 76.74 | 1.62 | 1.30 | 3.90 |
| 55 | 71.55 | 1.51 | 1.19 | 3.93 |
| 60 | 67.07 | 1.42 | 1.10 | 3.95 |
| 65 | 63.18 | 1.33 | 1.01 | 3.96 |
| 70 | 59.75 | 1.26 | 0.94 | 3.96 |
| 75 | 56.71 | 1.20 | 0.88 | 3.95 |
| 90 | 49.33 | 1.04 | 0.72 | 3.90 |
| 105 | 43.80 | 0.93 | 0.61 | 3.81 |
| 120 | 39.47 | 0.83 | 0.51 | 3.70 |

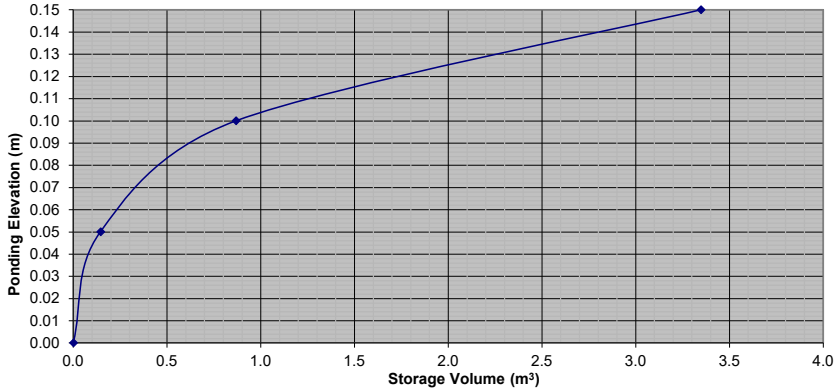
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.8 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 1.3 | 3.3 |
| 1:100 Year | 0.32 | 0.32 | 15 | 3.1 | |

**Roof Drain Storage Table for Area RD 5**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 5.8 | 0.1 |
| 0.10 | 23.1 | 0.9 |
| 0.15 | 76.1 | 3.3 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #5**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.004 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.2 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 0.93 | 0.61 | 0.18 |
| 10 | 76.81 | 0.69 | 0.37 | 0.22 |
| 15 | 61.77 | 0.56 | 0.24 | 0.21 |
| 20 | 52.03 | 0.47 | 0.15 | 0.18 |
| 25 | 45.17 | 0.41 | 0.09 | 0.13 |
| 30 | 40.04 | 0.36 | 0.04 | 0.07 |
| 35 | 36.06 | 0.32 | 0.00 | 0.01 |
| 40 | 32.86 | 0.30 | -0.02 | -0.06 |
| 45 | 30.24 | 0.27 | -0.05 | -0.13 |
| 50 | 28.04 | 0.25 | -0.07 | -0.20 |
| 55 | 26.17 | 0.24 | -0.08 | -0.28 |
| 60 | 24.56 | 0.22 | -0.10 | -0.36 |
| 65 | 23.15 | 0.21 | -0.11 | -0.43 |
| 70 | 21.91 | 0.20 | -0.12 | -0.52 |
| 75 | 20.81 | 0.19 | -0.13 | -0.60 |
| 90 | 18.14 | 0.16 | -0.16 | -0.85 |
| 105 | 16.13 | 0.15 | -0.17 | -1.10 |
| 120 | 14.56 | 0.13 | -0.19 | -1.36 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.004 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 1.27 | 0.95 | 0.29 |
| 10 | 104.19 | 0.94 | 0.62 | 0.37 |
| 15 | 83.56 | 0.75 | 0.43 | 0.39 |
| 20 | 70.25 | 0.63 | 0.31 | 0.38 |
| 25 | 60.90 | 0.55 | 0.23 | 0.34 |
| 30 | 53.93 | 0.49 | 0.17 | 0.30 |
| 35 | 48.52 | 0.44 | 0.12 | 0.25 |
| 40 | 44.18 | 0.40 | 0.08 | 0.19 |
| 45 | 40.63 | 0.37 | 0.05 | 0.12 |
| 50 | 37.65 | 0.34 | 0.02 | 0.06 |
| 55 | 35.12 | 0.32 | 0.00 | -0.01 |
| 60 | 32.94 | 0.30 | -0.02 | -0.08 |
| 65 | 31.04 | 0.28 | -0.04 | -0.16 |
| 70 | 29.37 | 0.26 | -0.06 | -0.23 |
| 75 | 27.89 | 0.25 | -0.07 | -0.31 |
| 90 | 24.29 | 0.22 | -0.10 | -0.55 |
| 105 | 21.58 | 0.19 | -0.13 | -0.79 |
| 120 | 19.47 | 0.18 | -0.14 | -1.04 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.004 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 1.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 2.43 | 2.11 | 0.63 |
| 10 | 178.56 | 1.79 | 1.47 | 0.88 |
| 15 | 142.89 | 1.43 | 1.11 | 1.00 |
| 20 | 119.95 | 1.20 | 0.88 | 1.06 |
| 25 | 103.85 | 1.04 | 0.72 | 1.08 |
| 30 | 91.87 | 0.92 | 0.60 | 1.08 |
| 35 | 82.58 | 0.83 | 0.51 | 1.06 |
| 40 | 75.15 | 0.75 | 0.43 | 1.04 |
| 45 | 69.05 | 0.69 | 0.37 | 1.00 |
| 50 | 63.95 | 0.64 | 0.32 | 0.96 |
| 55 | 59.62 | 0.60 | 0.28 | 0.91 |
| 60 | 55.89 | 0.56 | 0.24 | 0.86 |
| 80 | 44.99 | 0.45 | 0.13 | 0.63 |
| 100 | 37.90 | 0.38 | 0.06 | 0.36 |
| 120 | 32.89 | 0.33 | 0.01 | 0.07 |
| 140 | 29.15 | 0.29 | -0.03 | -0.24 |
| 160 | 26.24 | 0.26 | -0.06 | -0.55 |
| 180 | 23.90 | 0.24 | -0.08 | -0.87 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.004 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 1.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 2.91 | 2.59 | 0.78 |
| 10 | 214.27 | 2.14 | 1.82 | 1.09 |
| 15 | 171.47 | 1.72 | 1.40 | 1.26 |
| 20 | 143.94 | 1.44 | 1.12 | 1.34 |
| 25 | 124.62 | 1.25 | 0.93 | 1.39 |
| 30 | 110.24 | 1.10 | 0.78 | 1.41 |
| 35 | 99.09 | 0.99 | 0.67 | 1.41 |
| 40 | 90.17 | 0.90 | 0.58 | 1.40 |
| 45 | 82.86 | 0.83 | 0.51 | 1.38 |
| 50 | 76.74 | 0.77 | 0.45 | 1.34 |
| 55 | 71.55 | 0.72 | 0.40 | 1.31 |
| 60 | 67.07 | 0.67 | 0.35 | 1.26 |
| 65 | 63.18 | 0.63 | 0.31 | 1.22 |
| 70 | 59.75 | 0.60 | 0.28 | 1.17 |
| 75 | 56.71 | 0.57 | 0.25 | 1.11 |
| 90 | 49.33 | 0.49 | 0.17 | 0.94 |
| 105 | 43.80 | 0.44 | 0.12 | 0.75 |
| 120 | 39.47 | 0.40 | 0.08 | 0.54 |

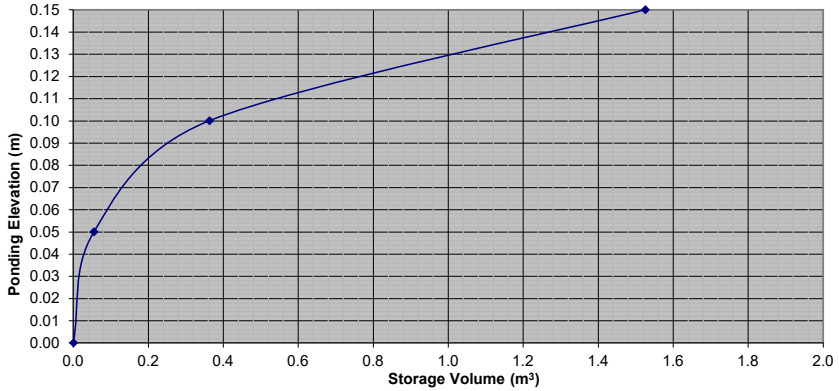
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.2 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 0.4 | 1.5 |
| 1:100 Year | 0.32 | 0.32 | 15 | 1.1 | |

**Roof Drain Storage Table for Area RD 6**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 2.2 | 0.1 |
| 0.10 | 10.1 | 0.4 |
| 0.15 | 36.4 | 1.5 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #6**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 3.01 | 2.69 | 0.81 |
| 10 | 76.81 | 2.23 | 1.91 | 1.15 |
| 15 | 61.77 | 1.79 | 1.47 | 1.33 |
| 20 | 52.03 | 1.51 | 1.19 | 1.43 |
| 25 | 45.17 | 1.31 | 0.99 | 1.49 |
| 30 | 40.04 | 1.16 | 0.84 | 1.52 |
| 35 | 36.06 | 1.05 | 0.73 | 1.53 |
| 40 | 32.86 | 0.95 | 0.63 | 1.52 |
| 45 | 30.24 | 0.88 | 0.56 | 1.51 |
| 50 | 28.04 | 0.81 | 0.49 | 1.48 |
| 55 | 26.17 | 0.76 | 0.44 | 1.45 |
| 60 | 24.56 | 0.71 | 0.39 | 1.41 |
| 65 | 23.15 | 0.67 | 0.35 | 1.37 |
| 70 | 21.91 | 0.64 | 0.32 | 1.33 |
| 75 | 20.81 | 0.60 | 0.28 | 1.28 |
| 90 | 18.14 | 0.53 | 0.21 | 1.12 |
| 105 | 16.13 | 0.47 | 0.15 | 0.93 |
| 120 | 14.56 | 0.42 | 0.10 | 0.74 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 2.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 4.10 | 3.78 | 1.13 |
| 10 | 104.19 | 3.02 | 2.70 | 1.62 |
| 15 | 83.56 | 2.43 | 2.11 | 1.89 |
| 20 | 70.25 | 2.04 | 1.72 | 2.06 |
| 25 | 60.90 | 1.77 | 1.45 | 2.17 |
| 30 | 53.93 | 1.57 | 1.25 | 2.24 |
| 35 | 48.52 | 1.41 | 1.09 | 2.29 |
| 40 | 44.18 | 1.28 | 0.96 | 2.31 |
| 45 | 40.63 | 1.18 | 0.86 | 2.32 |
| 50 | 37.65 | 1.09 | 0.77 | 2.32 |
| 55 | 35.12 | 1.02 | 0.70 | 2.31 |
| 60 | 32.94 | 0.96 | 0.64 | 2.29 |
| 65 | 31.04 | 0.90 | 0.58 | 2.27 |
| 70 | 29.37 | 0.85 | 0.53 | 2.24 |
| 75 | 27.89 | 0.81 | 0.49 | 2.20 |
| 90 | 24.29 | 0.70 | 0.38 | 2.08 |
| 105 | 21.58 | 0.63 | 0.31 | 1.93 |
| 120 | 19.47 | 0.57 | 0.25 | 1.76 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 5.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 7.83 | 7.51 | 2.25 |
| 10 | 178.56 | 5.76 | 5.44 | 3.26 |
| 15 | 142.89 | 4.61 | 4.29 | 3.86 |
| 20 | 119.95 | 3.87 | 3.55 | 4.26 |
| 25 | 103.85 | 3.35 | 3.03 | 4.54 |
| 30 | 91.87 | 2.96 | 2.64 | 4.76 |
| 35 | 82.58 | 2.66 | 2.34 | 4.92 |
| 40 | 75.15 | 2.42 | 2.10 | 5.05 |
| 45 | 69.05 | 2.23 | 1.91 | 5.15 |
| 50 | 63.95 | 2.06 | 1.74 | 5.23 |
| 55 | 59.62 | 1.92 | 1.60 | 5.29 |
| 60 | 55.89 | 1.80 | 1.48 | 5.34 |
| 80 | 44.99 | 1.45 | 1.13 | 5.43 |
| 100 | 37.90 | 1.22 | 0.90 | 5.41 |
| 120 | 32.89 | 1.06 | 0.74 | 5.33 |
| 140 | 29.15 | 0.94 | 0.62 | 5.21 |
| 160 | 26.24 | 0.85 | 0.53 | 5.05 |
| 180 | 23.90 | 0.77 | 0.45 | 4.87 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 6.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 9.39 | 9.07 | 2.72 |
| 10 | 214.27 | 6.91 | 6.59 | 3.95 |
| 15 | 171.47 | 5.53 | 5.21 | 4.69 |
| 20 | 143.94 | 4.64 | 4.32 | 5.19 |
| 25 | 124.62 | 4.02 | 3.70 | 5.55 |
| 30 | 110.24 | 3.56 | 3.24 | 5.82 |
| 35 | 99.09 | 3.20 | 2.88 | 6.04 |
| 40 | 90.17 | 2.91 | 2.59 | 6.21 |
| 45 | 82.86 | 2.67 | 2.35 | 6.35 |
| 50 | 76.74 | 2.47 | 2.15 | 6.46 |
| 55 | 71.55 | 2.31 | 1.99 | 6.56 |
| 60 | 67.07 | 2.16 | 1.84 | 6.63 |
| 65 | 63.18 | 2.04 | 1.72 | 6.70 |
| 70 | 59.75 | 1.93 | 1.61 | 6.75 |
| 75 | 56.71 | 1.83 | 1.51 | 6.79 |
| 90 | 49.33 | 1.59 | 1.27 | 6.86 |
| 105 | 43.80 | 1.41 | 1.09 | 6.88 |
| 120 | 39.47 | 1.27 | 0.95 | 6.86 |

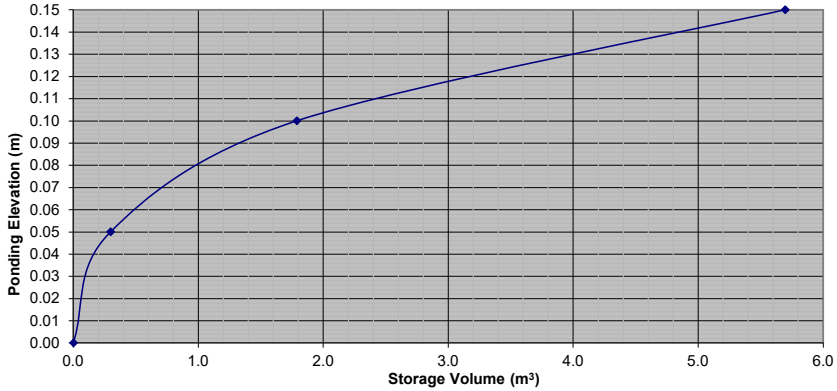
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 1.5 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 2.3 | 5.7 |
| 1:100 Year | 0.32 | 0.32 | 15 | 5.4 | |

**Roof Drain Storage Table for Area RD 7**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 11.9 | 0.3 |
| 0.10 | 47.7 | 1.8 |
| 0.15 | 108.6 | 5.7 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #7**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 3.08 | 2.76 | 0.83 |
| 10 | 76.81 | 2.29 | 1.97 | 1.18 |
| 15 | 61.77 | 1.84 | 1.52 | 1.37 |
| 20 | 52.03 | 1.55 | 1.23 | 1.48 |
| 25 | 45.17 | 1.34 | 1.02 | 1.54 |
| 30 | 40.04 | 1.19 | 0.87 | 1.57 |
| 35 | 36.06 | 1.07 | 0.75 | 1.58 |
| 40 | 32.86 | 0.98 | 0.66 | 1.58 |
| 45 | 30.24 | 0.90 | 0.58 | 1.57 |
| 50 | 28.04 | 0.83 | 0.51 | 1.54 |
| 55 | 26.17 | 0.78 | 0.46 | 1.52 |
| 60 | 24.56 | 0.73 | 0.41 | 1.48 |
| 65 | 23.15 | 0.69 | 0.37 | 1.44 |
| 70 | 21.91 | 0.65 | 0.33 | 1.40 |
| 75 | 20.81 | 0.62 | 0.30 | 1.35 |
| 90 | 18.14 | 0.54 | 0.22 | 1.19 |
| 105 | 16.13 | 0.48 | 0.16 | 1.01 |
| 120 | 14.56 | 0.43 | 0.11 | 0.82 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 2.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 4.20 | 3.88 | 1.17 |
| 10 | 104.19 | 3.10 | 2.78 | 1.67 |
| 15 | 83.56 | 2.49 | 2.17 | 1.95 |
| 20 | 70.25 | 2.09 | 1.77 | 2.13 |
| 25 | 60.90 | 1.81 | 1.49 | 2.24 |
| 30 | 53.93 | 1.61 | 1.29 | 2.31 |
| 35 | 48.52 | 1.44 | 1.12 | 2.36 |
| 40 | 44.18 | 1.32 | 1.00 | 2.39 |
| 45 | 40.63 | 1.21 | 0.89 | 2.40 |
| 50 | 37.65 | 1.12 | 0.80 | 2.40 |
| 55 | 35.12 | 1.05 | 0.73 | 2.39 |
| 60 | 32.94 | 0.98 | 0.66 | 2.38 |
| 65 | 31.04 | 0.92 | 0.60 | 2.36 |
| 70 | 29.37 | 0.87 | 0.55 | 2.33 |
| 75 | 27.89 | 0.83 | 0.51 | 2.30 |
| 90 | 24.29 | 0.72 | 0.40 | 2.18 |
| 105 | 21.58 | 0.64 | 0.32 | 2.03 |
| 120 | 19.47 | 0.58 | 0.26 | 1.87 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 5.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 8.03 | 7.71 | 2.31 |
| 10 | 178.56 | 5.91 | 5.59 | 3.35 |
| 15 | 142.89 | 4.73 | 4.41 | 3.97 |
| 20 | 119.95 | 3.97 | 3.65 | 4.38 |
| 25 | 103.85 | 3.44 | 3.12 | 4.67 |
| 30 | 91.87 | 3.04 | 2.72 | 4.89 |
| 35 | 82.58 | 2.73 | 2.41 | 5.06 |
| 40 | 75.15 | 2.49 | 2.17 | 5.20 |
| 45 | 69.05 | 2.28 | 1.96 | 5.30 |
| 50 | 63.95 | 2.12 | 1.80 | 5.39 |
| 55 | 59.62 | 1.97 | 1.65 | 5.45 |
| 60 | 55.89 | 1.85 | 1.53 | 5.50 |
| 80 | 44.99 | 1.49 | 1.17 | 5.61 |
| 100 | 37.90 | 1.25 | 0.93 | 5.60 |
| 120 | 32.89 | 1.09 | 0.77 | 5.53 |
| 140 | 29.15 | 0.96 | 0.64 | 5.41 |
| 160 | 26.24 | 0.87 | 0.55 | 5.26 |
| 180 | 23.90 | 0.79 | 0.47 | 5.08 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.012 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 7.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 9.63 | 9.31 | 2.79 |
| 10 | 214.27 | 7.09 | 6.77 | 4.06 |
| 15 | 171.47 | 5.67 | 5.35 | 4.82 |
| 20 | 143.94 | 4.76 | 4.44 | 5.33 |
| 25 | 124.62 | 4.12 | 3.80 | 5.70 |
| 30 | 110.24 | 3.65 | 3.33 | 5.99 |
| 35 | 99.09 | 3.28 | 2.96 | 6.21 |
| 40 | 90.17 | 2.98 | 2.66 | 6.39 |
| 45 | 82.86 | 2.74 | 2.42 | 6.54 |
| 50 | 76.74 | 2.54 | 2.22 | 6.66 |
| 55 | 71.55 | 2.37 | 2.05 | 6.75 |
| 60 | 67.07 | 2.22 | 1.90 | 6.84 |
| 65 | 63.18 | 2.09 | 1.77 | 6.90 |
| 70 | 59.75 | 1.98 | 1.66 | 6.96 |
| 75 | 56.71 | 1.88 | 1.56 | 7.00 |
| 90 | 49.33 | 1.63 | 1.31 | 7.09 |
| 105 | 43.80 | 1.45 | 1.13 | 7.11 |
| 120 | 39.47 | 1.31 | 0.99 | 7.10 |

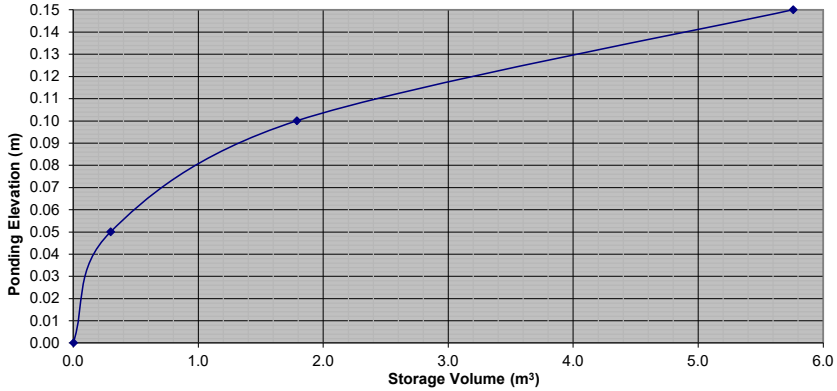
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 1.6 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 2.4 | 5.8 |
| 1:100 Year | 0.32 | 0.32 | 15 | 5.6 | |

**Roof Drain Storage Table for Area RD 8**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 11.9 | 0.3 |
| 0.10 | 47.7 | 1.8 |
| 0.15 | 111.1 | 5.8 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #8**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #9**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 2.72 | 2.40 | 0.72 |
| 10 | 76.81 | 2.02 | 1.70 | 1.02 |
| 15 | 61.77 | 1.62 | 1.30 | 1.17 |
| 20 | 52.03 | 1.37 | 1.05 | 1.26 |
| 25 | 45.17 | 1.19 | 0.87 | 1.30 |
| 30 | 40.04 | 1.05 | 0.73 | 1.32 |
| 35 | 36.06 | 0.95 | 0.63 | 1.32 |
| 40 | 32.86 | 0.86 | 0.54 | 1.30 |
| 45 | 30.24 | 0.79 | 0.47 | 1.28 |
| 50 | 28.04 | 0.74 | 0.42 | 1.25 |
| 55 | 26.17 | 0.69 | 0.37 | 1.21 |
| 60 | 24.56 | 0.65 | 0.33 | 1.17 |
| 65 | 23.15 | 0.61 | 0.29 | 1.12 |
| 70 | 21.91 | 0.58 | 0.26 | 1.07 |
| 75 | 20.81 | 0.55 | 0.23 | 1.02 |
| 90 | 18.14 | 0.48 | 0.16 | 0.85 |
| 105 | 16.13 | 0.42 | 0.10 | 0.65 |
| 120 | 14.56 | 0.38 | 0.06 | 0.45 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #9**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 2.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 3.71 | 3.39 | 1.02 |
| 10 | 104.19 | 2.74 | 2.42 | 1.45 |
| 15 | 83.56 | 2.20 | 1.88 | 1.69 |
| 20 | 70.25 | 1.85 | 1.53 | 1.83 |
| 25 | 60.90 | 1.60 | 1.28 | 1.92 |
| 30 | 53.93 | 1.42 | 1.10 | 1.97 |
| 35 | 48.52 | 1.27 | 0.95 | 2.00 |
| 40 | 44.18 | 1.16 | 0.84 | 2.02 |
| 45 | 40.63 | 1.07 | 0.75 | 2.02 |
| 50 | 37.65 | 0.99 | 0.67 | 2.01 |
| 55 | 35.12 | 0.92 | 0.60 | 1.99 |
| 60 | 32.94 | 0.87 | 0.55 | 1.96 |
| 65 | 31.04 | 0.82 | 0.50 | 1.93 |
| 70 | 29.37 | 0.77 | 0.45 | 1.90 |
| 75 | 27.89 | 0.73 | 0.41 | 1.86 |
| 90 | 24.29 | 0.64 | 0.32 | 1.72 |
| 105 | 21.58 | 0.57 | 0.25 | 1.56 |
| 120 | 19.47 | 0.51 | 0.19 | 1.38 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #9**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 4.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 7.08 | 6.76 | 2.03 |
| 10 | 178.56 | 5.21 | 4.89 | 2.94 |
| 15 | 142.89 | 4.17 | 3.85 | 3.47 |
| 20 | 119.95 | 3.50 | 3.18 | 3.82 |
| 25 | 103.85 | 3.03 | 2.71 | 4.07 |
| 30 | 91.87 | 2.68 | 2.36 | 4.25 |
| 35 | 82.58 | 2.41 | 2.09 | 4.39 |
| 40 | 75.15 | 2.19 | 1.87 | 4.50 |
| 45 | 69.05 | 2.02 | 1.70 | 4.58 |
| 50 | 63.95 | 1.87 | 1.55 | 4.64 |
| 55 | 59.62 | 1.74 | 1.42 | 4.69 |
| 60 | 55.89 | 1.63 | 1.31 | 4.72 |
| 80 | 44.99 | 1.31 | 0.99 | 4.77 |
| 100 | 37.90 | 1.11 | 0.79 | 4.72 |
| 120 | 32.89 | 0.96 | 0.64 | 4.61 |
| 140 | 29.15 | 0.85 | 0.53 | 4.46 |
| 160 | 26.24 | 0.77 | 0.45 | 4.28 |
| 180 | 23.90 | 0.70 | 0.38 | 4.08 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #9**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 6.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 8.50 | 8.18 | 2.45 |
| 10 | 214.27 | 6.25 | 5.93 | 3.56 |
| 15 | 171.47 | 5.01 | 4.69 | 4.22 |
| 20 | 143.94 | 4.20 | 3.88 | 4.66 |
| 25 | 124.62 | 3.64 | 3.32 | 4.98 |
| 30 | 110.24 | 3.22 | 2.90 | 5.22 |
| 35 | 99.09 | 2.89 | 2.57 | 5.40 |
| 40 | 90.17 | 2.63 | 2.31 | 5.55 |
| 45 | 82.86 | 2.42 | 2.10 | 5.67 |
| 50 | 76.74 | 2.24 | 1.92 | 5.76 |
| 55 | 71.55 | 2.09 | 1.77 | 5.84 |
| 60 | 67.07 | 1.96 | 1.64 | 5.90 |
| 65 | 63.18 | 1.84 | 1.52 | 5.94 |
| 70 | 59.75 | 1.74 | 1.42 | 5.98 |
| 75 | 56.71 | 1.66 | 1.34 | 6.01 |
| 90 | 49.33 | 1.44 | 1.12 | 6.05 |
| 105 | 43.80 | 1.28 | 0.96 | 6.04 |
| 120 | 39.47 | 1.15 | 0.83 | 5.99 |

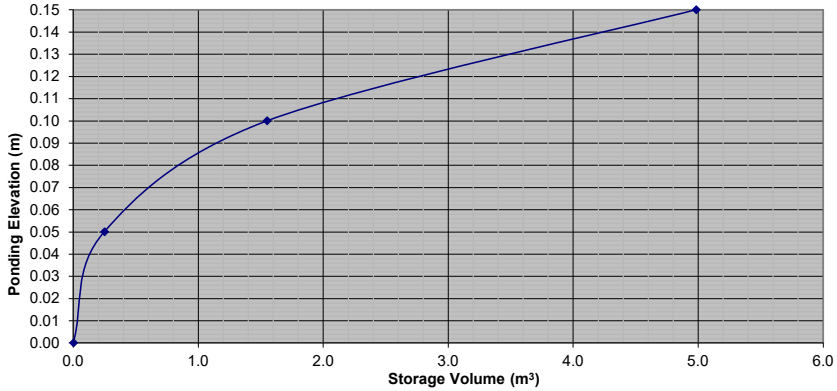
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 1.3 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 2.0 | 5.0 |
| 1:100 Year | 0.32 | 0.32 | 14 | 4.8 | |

**Roof Drain Storage Table for Area RD 9**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 9.9 | 0.2 |
| 0.10 | 42.2 | 1.6 |
| 0.15 | 95.1 | 5.0 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #9**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #10**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 2.82 | 2.50 | 0.75 |
| 10 | 76.81 | 2.09 | 1.77 | 1.06 |
| 15 | 61.77 | 1.68 | 1.36 | 1.23 |
| 20 | 52.03 | 1.42 | 1.10 | 1.32 |
| 25 | 45.17 | 1.23 | 0.91 | 1.37 |
| 30 | 40.04 | 1.09 | 0.77 | 1.39 |
| 35 | 36.06 | 0.98 | 0.66 | 1.39 |
| 40 | 32.86 | 0.90 | 0.58 | 1.38 |
| 45 | 30.24 | 0.82 | 0.50 | 1.36 |
| 50 | 28.04 | 0.76 | 0.44 | 1.33 |
| 55 | 26.17 | 0.71 | 0.39 | 1.30 |
| 60 | 24.56 | 0.67 | 0.35 | 1.26 |
| 65 | 23.15 | 0.63 | 0.31 | 1.21 |
| 70 | 21.91 | 0.60 | 0.28 | 1.17 |
| 75 | 20.81 | 0.57 | 0.25 | 1.11 |
| 90 | 18.14 | 0.49 | 0.17 | 0.94 |
| 105 | 16.13 | 0.44 | 0.12 | 0.76 |
| 120 | 14.56 | 0.40 | 0.08 | 0.56 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #10**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 2.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 3.85 | 3.53 | 1.06 |
| 10 | 104.19 | 2.84 | 2.52 | 1.51 |
| 15 | 83.56 | 2.28 | 1.96 | 1.76 |
| 20 | 70.25 | 1.92 | 1.60 | 1.92 |
| 25 | 60.90 | 1.66 | 1.34 | 2.01 |
| 30 | 53.93 | 1.47 | 1.15 | 2.07 |
| 35 | 48.52 | 1.32 | 1.00 | 2.11 |
| 40 | 44.18 | 1.20 | 0.88 | 2.12 |
| 45 | 40.63 | 1.11 | 0.79 | 2.13 |
| 50 | 37.65 | 1.03 | 0.71 | 2.12 |
| 55 | 35.12 | 0.96 | 0.64 | 2.10 |
| 60 | 32.94 | 0.90 | 0.58 | 2.08 |
| 65 | 31.04 | 0.85 | 0.53 | 2.05 |
| 70 | 29.37 | 0.80 | 0.48 | 2.02 |
| 75 | 27.89 | 0.76 | 0.44 | 1.98 |
| 90 | 24.29 | 0.66 | 0.34 | 1.85 |
| 105 | 21.58 | 0.59 | 0.27 | 1.69 |
| 120 | 19.47 | 0.53 | 0.21 | 1.52 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #10**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 5.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 7.35 | 7.03 | 2.11 |
| 10 | 178.56 | 5.41 | 5.09 | 3.05 |
| 15 | 142.89 | 4.33 | 4.01 | 3.61 |
| 20 | 119.95 | 3.63 | 3.31 | 3.98 |
| 25 | 103.85 | 3.15 | 2.83 | 4.24 |
| 30 | 91.87 | 2.78 | 2.46 | 4.43 |
| 35 | 82.58 | 2.50 | 2.18 | 4.58 |
| 40 | 75.15 | 2.28 | 1.96 | 4.70 |
| 45 | 69.05 | 2.09 | 1.77 | 4.79 |
| 50 | 63.95 | 1.94 | 1.62 | 4.85 |
| 55 | 59.62 | 1.81 | 1.49 | 4.91 |
| 60 | 55.89 | 1.69 | 1.37 | 4.95 |
| 80 | 44.99 | 1.36 | 1.04 | 5.01 |
| 100 | 37.90 | 1.15 | 0.83 | 4.97 |
| 120 | 32.89 | 1.00 | 0.68 | 4.87 |
| 140 | 29.15 | 0.88 | 0.56 | 4.73 |
| 160 | 26.24 | 0.80 | 0.48 | 4.56 |
| 180 | 23.90 | 0.72 | 0.40 | 4.37 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5 Controlled Roof Drain #10**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 6.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 8.83 | 8.51 | 2.55 |
| 10 | 214.27 | 6.49 | 6.17 | 3.70 |
| 15 | 171.47 | 5.20 | 4.88 | 4.39 |
| 20 | 143.94 | 4.36 | 4.04 | 4.85 |
| 25 | 124.62 | 3.78 | 3.46 | 5.18 |
| 30 | 110.24 | 3.34 | 3.02 | 5.44 |
| 35 | 99.09 | 3.00 | 2.68 | 5.63 |
| 40 | 90.17 | 2.73 | 2.41 | 5.79 |
| 45 | 82.86 | 2.51 | 2.19 | 5.92 |
| 50 | 76.74 | 2.33 | 2.01 | 6.02 |
| 55 | 71.55 | 2.17 | 1.85 | 6.10 |
| 60 | 67.07 | 2.03 | 1.71 | 6.16 |
| 65 | 63.18 | 1.91 | 1.59 | 6.22 |
| 70 | 59.75 | 1.81 | 1.49 | 6.26 |
| 75 | 56.71 | 1.72 | 1.40 | 6.29 |
| 90 | 49.33 | 1.49 | 1.17 | 6.34 |
| 105 | 43.80 | 1.33 | 1.01 | 6.34 |
| 120 | 39.47 | 1.20 | 0.88 | 6.31 |

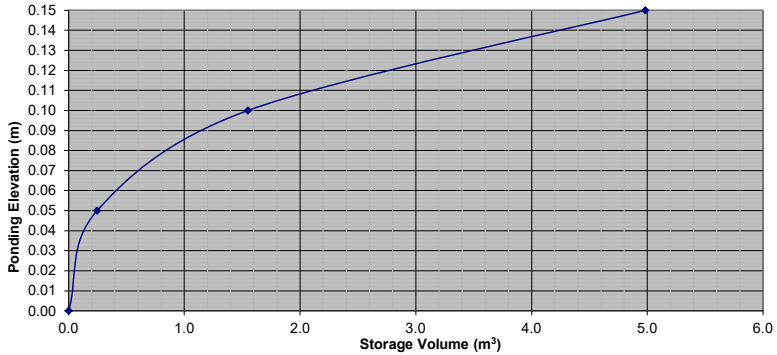
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 1.4 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 2.1 | 5.0 |
| 1:100 Year | 0.32 | 0.32 | 14 | 5.0 | |

**Roof Drain Storage Table for Area RD 10**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 9.9 | 0.2 |
| 0.10 | 42.2 | 1.6 |
| 0.15 | 95.1 | 5.0 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #10**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #11**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.020 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 2.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 5.16 | 4.45 | 1.33 |
| 10 | 76.81 | 3.82 | 3.11 | 1.87 |
| 15 | 61.77 | 3.08 | 2.37 | 2.13 |
| 20 | 52.03 | 2.59 | 1.88 | 2.26 |
| 25 | 45.17 | 2.25 | 1.54 | 2.31 |
| 30 | 40.04 | 1.99 | 1.28 | 2.31 |
| 35 | 36.06 | 1.80 | 1.09 | 2.28 |
| 40 | 32.86 | 1.64 | 0.93 | 2.22 |
| 45 | 30.24 | 1.51 | 0.80 | 2.15 |
| 50 | 28.04 | 1.40 | 0.69 | 2.06 |
| 55 | 26.17 | 1.30 | 0.59 | 1.96 |
| 60 | 24.56 | 1.22 | 0.51 | 1.85 |
| 65 | 23.15 | 1.15 | 0.44 | 1.73 |
| 70 | 21.91 | 1.09 | 0.38 | 1.60 |
| 75 | 20.81 | 1.04 | 0.33 | 1.47 |
| 90 | 18.14 | 0.90 | 0.19 | 1.04 |
| 105 | 16.13 | 0.80 | 0.09 | 0.59 |
| 120 | 14.56 | 0.73 | 0.02 | 0.11 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #11**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.020 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 3.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 7.03 | 6.24 | 1.87 |
| 10 | 104.19 | 5.19 | 4.40 | 2.64 |
| 15 | 83.56 | 4.16 | 3.37 | 3.03 |
| 20 | 70.25 | 3.50 | 2.71 | 3.25 |
| 25 | 60.90 | 3.03 | 2.24 | 3.36 |
| 30 | 53.93 | 2.69 | 1.90 | 3.41 |
| 35 | 48.52 | 2.42 | 1.63 | 3.41 |
| 40 | 44.18 | 2.20 | 1.41 | 3.38 |
| 45 | 40.63 | 2.02 | 1.23 | 3.33 |
| 50 | 37.65 | 1.87 | 1.08 | 3.25 |
| 55 | 35.12 | 1.75 | 0.96 | 3.16 |
| 60 | 32.94 | 1.64 | 0.85 | 3.06 |
| 65 | 31.04 | 1.55 | 0.76 | 2.95 |
| 70 | 29.37 | 1.46 | 0.67 | 2.82 |
| 75 | 27.89 | 1.39 | 0.60 | 2.69 |
| 90 | 24.29 | 1.21 | 0.42 | 2.26 |
| 105 | 21.58 | 1.07 | 0.28 | 1.79 |
| 120 | 19.47 | 0.97 | 0.18 | 1.29 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #11**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.020 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 7.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 13.43 | 12.48 | 3.74 |
| 10 | 178.56 | 9.88 | 8.93 | 5.36 |
| 15 | 142.89 | 7.91 | 6.96 | 6.26 |
| 20 | 119.95 | 6.64 | 5.69 | 6.82 |
| 25 | 103.85 | 5.75 | 4.80 | 7.19 |
| 30 | 91.87 | 5.08 | 4.13 | 7.44 |
| 35 | 82.58 | 4.57 | 3.62 | 7.60 |
| 40 | 75.15 | 4.16 | 3.21 | 7.70 |
| 45 | 69.05 | 3.82 | 2.87 | 7.75 |
| 50 | 63.95 | 3.54 | 2.59 | 7.76 |
| 55 | 59.62 | 3.30 | 2.35 | 7.75 |
| 60 | 55.89 | 3.09 | 2.14 | 7.71 |
| 80 | 44.99 | 2.49 | 1.54 | 7.39 |
| 100 | 37.90 | 2.10 | 1.15 | 6.88 |
| 120 | 32.89 | 1.82 | 0.87 | 6.26 |
| 140 | 29.15 | 1.61 | 0.66 | 5.57 |
| 160 | 26.24 | 1.45 | 0.50 | 4.82 |
| 180 | 23.90 | 1.32 | 0.37 | 4.02 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #11**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.020 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 9.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 16.11 | 15.16 | 4.55 |
| 10 | 214.27 | 11.85 | 10.90 | 6.54 |
| 15 | 171.47 | 9.49 | 8.54 | 7.68 |
| 20 | 143.94 | 7.96 | 7.01 | 8.42 |
| 25 | 124.62 | 6.89 | 5.94 | 8.92 |
| 30 | 110.24 | 6.10 | 5.15 | 9.27 |
| 35 | 99.09 | 5.48 | 4.53 | 9.52 |
| 40 | 90.17 | 4.99 | 4.04 | 9.69 |
| 45 | 82.86 | 4.58 | 3.63 | 9.81 |
| 50 | 76.74 | 4.25 | 3.30 | 9.89 |
| 55 | 71.55 | 3.96 | 3.01 | 9.93 |
| 60 | 67.07 | 3.71 | 2.76 | 9.94 |
| 65 | 63.18 | 3.50 | 2.55 | 9.93 |
| 70 | 59.75 | 3.31 | 2.36 | 9.89 |
| 75 | 56.71 | 3.14 | 2.19 | 9.84 |
| 90 | 49.33 | 2.73 | 1.78 | 9.61 |
| 105 | 43.80 | 2.42 | 1.47 | 9.28 |
| 120 | 39.47 | 2.18 | 1.23 | 8.88 |

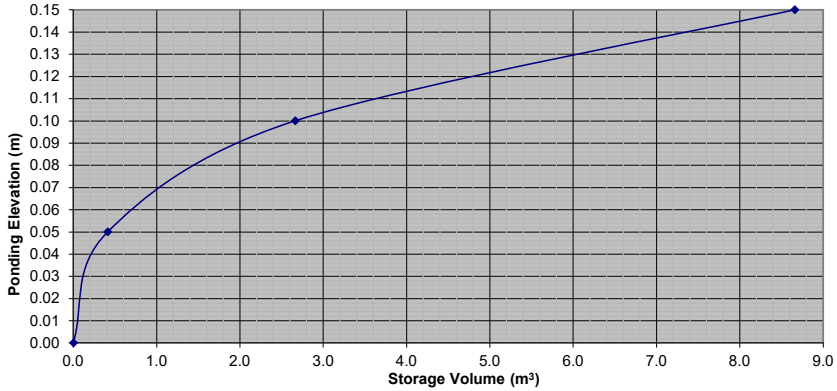
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to 1/4 open

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 2.3 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 3.4 | 8.7 |
| 1:100 Year | 0.95 | 0.95 | 15 | 7.8 | |

**Roof Drain Storage Table for Area RD 11**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 16.5 | 0.4 |
| 0.10 | 73.5 | 2.7 |
| 0.15 | 166.3 | 8.7 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #11**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #12**

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.71 L/s
C = 0.90 Vol(max) = 3.2 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 6.45 | 5.74 | 1.72 |
| 10 | 76.81 | 4.78 | 4.07 | 2.44 |
| 15 | 61.77 | 3.85 | 3.14 | 2.82 |
| 20 | 52.03 | 3.24 | 2.53 | 3.04 |
| 25 | 45.17 | 2.81 | 2.10 | 3.16 |
| 30 | 40.04 | 2.49 | 1.78 | 3.21 |
| 35 | 36.06 | 2.25 | 1.54 | 3.23 |
| 40 | 32.86 | 2.05 | 1.34 | 3.21 |
| 45 | 30.24 | 1.88 | 1.17 | 3.17 |
| 50 | 28.04 | 1.75 | 1.04 | 3.11 |
| 55 | 26.17 | 1.63 | 0.92 | 3.04 |
| 60 | 24.56 | 1.53 | 0.82 | 2.95 |
| 65 | 23.15 | 1.44 | 0.73 | 2.86 |
| 70 | 21.91 | 1.37 | 0.66 | 2.75 |
| 75 | 20.81 | 1.30 | 0.59 | 2.64 |
| 90 | 18.14 | 1.13 | 0.42 | 2.27 |
| 105 | 16.13 | 1.01 | 0.30 | 1.86 |
| 120 | 14.56 | 0.91 | 0.20 | 1.42 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #12**

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.79 L/s
C = 0.90 Vol(max) = 4.7 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 8.80 | 8.01 | 2.40 |
| 10 | 104.19 | 6.49 | 5.70 | 3.42 |
| 15 | 83.56 | 5.21 | 4.42 | 3.97 |
| 20 | 70.25 | 4.38 | 3.59 | 4.30 |
| 25 | 60.90 | 3.79 | 3.00 | 4.51 |
| 30 | 53.93 | 3.36 | 2.57 | 4.63 |
| 35 | 48.52 | 3.02 | 2.23 | 4.69 |
| 40 | 44.18 | 2.75 | 1.96 | 4.71 |
| 45 | 40.63 | 2.53 | 1.74 | 4.70 |
| 50 | 37.65 | 2.35 | 1.56 | 4.67 |
| 55 | 35.12 | 2.19 | 1.40 | 4.61 |
| 60 | 32.94 | 2.05 | 1.26 | 4.54 |
| 65 | 31.04 | 1.93 | 1.14 | 4.46 |
| 70 | 29.37 | 1.83 | 1.04 | 4.37 |
| 75 | 27.89 | 1.74 | 0.95 | 4.26 |
| 90 | 24.29 | 1.51 | 0.72 | 3.91 |
| 105 | 21.58 | 1.34 | 0.55 | 3.49 |
| 120 | 19.47 | 1.21 | 0.42 | 3.04 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #12**

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 10.5 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 16.80 | 15.85 | 4.76 |
| 10 | 178.56 | 12.36 | 11.41 | 6.85 |
| 15 | 142.89 | 9.89 | 8.94 | 8.05 |
| 20 | 119.95 | 8.30 | 7.35 | 8.82 |
| 25 | 103.85 | 7.19 | 6.24 | 9.36 |
| 30 | 91.87 | 6.36 | 5.41 | 9.74 |
| 35 | 82.58 | 5.72 | 4.77 | 10.01 |
| 40 | 75.15 | 5.20 | 4.25 | 10.20 |
| 45 | 69.05 | 4.78 | 3.83 | 10.34 |
| 50 | 63.95 | 4.43 | 3.48 | 10.43 |
| 55 | 59.62 | 4.13 | 3.18 | 10.49 |
| 60 | 55.89 | 3.87 | 2.92 | 10.51 |
| 80 | 44.99 | 3.11 | 2.16 | 10.39 |
| 100 | 37.90 | 2.62 | 1.67 | 10.04 |
| 120 | 32.89 | 2.28 | 1.33 | 9.55 |
| 140 | 29.15 | 2.02 | 1.07 | 8.97 |
| 160 | 26.24 | 1.82 | 0.87 | 8.32 |
| 180 | 23.90 | 1.65 | 0.70 | 7.61 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5 Controlled Roof Drain #12**

OTTAWA IDF CURVE
Area = 0.025 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 13.4 m3

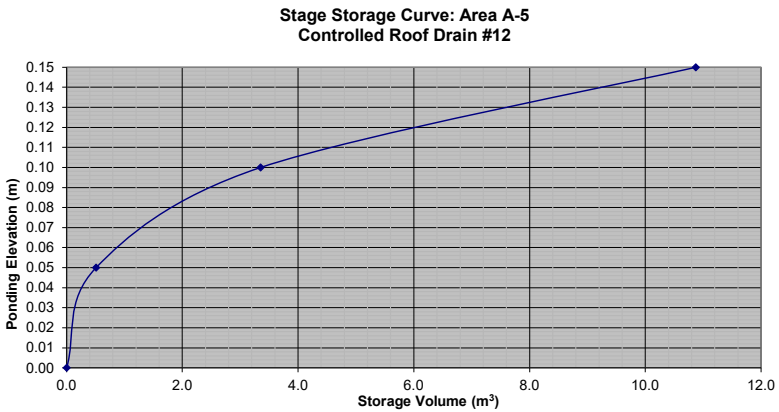
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 20.16 | 19.21 | 5.76 |
| 10 | 214.27 | 14.83 | 13.88 | 8.33 |
| 15 | 171.47 | 11.87 | 10.92 | 9.83 |
| 20 | 143.94 | 9.96 | 9.01 | 10.82 |
| 25 | 124.62 | 8.63 | 7.68 | 11.51 |
| 30 | 110.24 | 7.63 | 6.68 | 12.03 |
| 35 | 99.09 | 6.86 | 5.91 | 12.41 |
| 40 | 90.17 | 6.24 | 5.29 | 12.70 |
| 45 | 82.86 | 5.74 | 4.79 | 12.92 |
| 50 | 76.74 | 5.31 | 4.36 | 13.09 |
| 55 | 71.55 | 4.95 | 4.00 | 13.21 |
| 60 | 67.07 | 4.64 | 3.69 | 13.29 |
| 65 | 63.18 | 4.37 | 3.42 | 13.35 |
| 70 | 59.75 | 4.14 | 3.19 | 13.38 |
| 75 | 56.71 | 3.93 | 2.98 | 13.39 |
| 90 | 49.33 | 3.41 | 2.46 | 13.31 |
| 105 | 43.80 | 3.03 | 2.08 | 13.11 |
| 120 | 39.47 | 2.73 | 1.78 | 12.83 |

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

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 3.2 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 4.7 | 10.9 |
| 1:100 Year | 0.95 | 0.95 | 15 | 10.5 | |

**Roof Drain Storage Table for Area RD 12**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 20.3 | 0.5 |
| 0.10 | 93.4 | 3.4 |
| 0.15 | 207.4 | 10.9 |



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #13**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 2.2 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 5.00 | 4.29 | 1.29 |
| 10 | 76.81 | 3.71 | 3.00 | 1.80 |
| 15 | 61.77 | 2.98 | 2.27 | 2.05 |
| 20 | 52.03 | 2.51 | 1.80 | 2.16 |
| 25 | 45.17 | 2.18 | 1.47 | 2.21 |
| 30 | 40.04 | 1.93 | 1.22 | 2.20 |
| 35 | 36.06 | 1.74 | 1.03 | 2.17 |
| 40 | 32.86 | 1.59 | 0.88 | 2.10 |
| 45 | 30.24 | 1.46 | 0.75 | 2.03 |
| 50 | 28.04 | 1.35 | 0.64 | 1.93 |
| 55 | 26.17 | 1.26 | 0.55 | 1.83 |
| 60 | 24.56 | 1.19 | 0.48 | 1.71 |
| 65 | 23.15 | 1.12 | 0.41 | 1.59 |
| 70 | 21.91 | 1.06 | 0.35 | 1.46 |
| 75 | 20.81 | 1.01 | 0.30 | 1.33 |
| 90 | 18.14 | 0.88 | 0.17 | 0.90 |
| 105 | 16.13 | 0.78 | 0.07 | 0.44 |
| 120 | 14.56 | 0.70 | -0.01 | -0.05 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #13**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 3.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 6.82 | 6.03 | 1.81 |
| 10 | 104.19 | 5.03 | 4.24 | 2.54 |
| 15 | 83.56 | 4.03 | 3.24 | 2.92 |
| 20 | 70.25 | 3.39 | 2.60 | 3.12 |
| 25 | 60.90 | 2.94 | 2.15 | 3.23 |
| 30 | 53.93 | 2.60 | 1.81 | 3.27 |
| 35 | 48.52 | 2.34 | 1.55 | 3.26 |
| 40 | 44.18 | 2.13 | 1.34 | 3.22 |
| 45 | 40.63 | 1.96 | 1.17 | 3.16 |
| 50 | 37.65 | 1.82 | 1.03 | 3.08 |
| 55 | 35.12 | 1.70 | 0.91 | 2.99 |
| 60 | 32.94 | 1.59 | 0.80 | 2.88 |
| 65 | 31.04 | 1.50 | 0.71 | 2.77 |
| 70 | 29.37 | 1.42 | 0.63 | 2.64 |
| 75 | 27.89 | 1.35 | 0.56 | 2.51 |
| 90 | 24.29 | 1.17 | 0.38 | 2.07 |
| 105 | 21.58 | 1.04 | 0.25 | 1.59 |
| 120 | 19.47 | 0.94 | 0.15 | 1.08 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #13**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 7.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 13.02 | 12.07 | 3.62 |
| 10 | 178.56 | 9.58 | 8.63 | 5.18 |
| 15 | 142.89 | 7.67 | 6.72 | 6.05 |
| 20 | 119.95 | 6.44 | 5.49 | 6.58 |
| 25 | 103.85 | 5.57 | 4.62 | 6.93 |
| 30 | 91.87 | 4.93 | 3.98 | 7.16 |
| 35 | 82.58 | 4.43 | 3.48 | 7.31 |
| 40 | 75.15 | 4.03 | 3.08 | 7.40 |
| 45 | 69.05 | 3.70 | 2.75 | 7.44 |
| 50 | 63.95 | 3.43 | 2.48 | 7.44 |
| 55 | 59.62 | 3.20 | 2.25 | 7.42 |
| 60 | 55.89 | 3.00 | 2.05 | 7.38 |
| 80 | 44.99 | 2.41 | 1.46 | 7.03 |
| 100 | 37.90 | 2.03 | 1.08 | 6.50 |
| 120 | 32.89 | 1.76 | 0.81 | 5.87 |
| 140 | 29.15 | 1.56 | 0.61 | 5.16 |
| 160 | 26.24 | 1.41 | 0.46 | 4.40 |
| 180 | 23.90 | 1.28 | 0.33 | 3.59 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5 Controlled Roof Drain #13**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 9.5 | m3 |

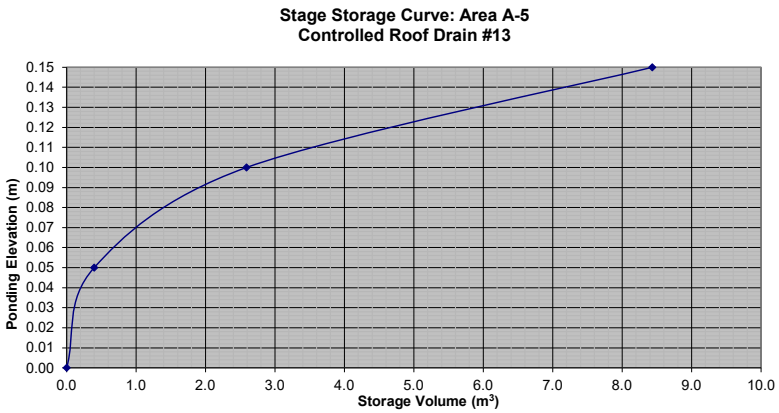
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 15.63 | 14.68 | 4.40 |
| 10 | 214.27 | 11.50 | 10.55 | 6.33 |
| 15 | 171.47 | 9.20 | 8.25 | 7.43 |
| 20 | 143.94 | 7.72 | 6.77 | 8.13 |
| 25 | 124.62 | 6.69 | 5.74 | 8.60 |
| 30 | 110.24 | 5.91 | 4.96 | 8.94 |
| 35 | 99.09 | 5.32 | 4.37 | 9.17 |
| 40 | 90.17 | 4.84 | 3.89 | 9.33 |
| 45 | 82.86 | 4.45 | 3.50 | 9.44 |
| 50 | 76.74 | 4.12 | 3.17 | 9.50 |
| 55 | 71.55 | 3.84 | 2.89 | 9.53 |
| 60 | 67.07 | 3.60 | 2.65 | 9.54 |
| 65 | 63.18 | 3.39 | 2.44 | 9.51 |
| 70 | 59.75 | 3.21 | 2.26 | 9.47 |
| 75 | 56.71 | 3.04 | 2.09 | 9.42 |
| 90 | 49.33 | 2.65 | 1.70 | 9.16 |
| 105 | 43.80 | 2.35 | 1.40 | 8.82 |
| 120 | 39.47 | 2.12 | 1.17 | 8.41 |

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

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 2.2 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 3.3 | 8.4 |
| 1:100 Year | 0.95 | 0.95 | 15 | 7.4 | |

**Roof Drain Storage Table for Area RD 13**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 15.9 | 0.4 |
| 0.10 | 71.9 | 2.6 |
| 0.15 | 161.7 | 8.4 |



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #14**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 3.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 6.19 | 5.48 | 1.65 |
| 10 | 76.81 | 4.59 | 3.88 | 2.33 |
| 15 | 61.77 | 3.69 | 2.98 | 2.69 |
| 20 | 52.03 | 3.11 | 2.40 | 2.88 |
| 25 | 45.17 | 2.70 | 1.99 | 2.99 |
| 30 | 40.04 | 2.39 | 1.68 | 3.03 |
| 35 | 36.06 | 2.16 | 1.45 | 3.04 |
| 40 | 32.86 | 1.97 | 1.26 | 3.01 |
| 45 | 30.24 | 1.81 | 1.10 | 2.97 |
| 50 | 28.04 | 1.68 | 0.97 | 2.90 |
| 55 | 26.17 | 1.56 | 0.85 | 2.82 |
| 60 | 24.56 | 1.47 | 0.76 | 2.73 |
| 65 | 23.15 | 1.38 | 0.67 | 2.63 |
| 70 | 21.91 | 1.31 | 0.60 | 2.52 |
| 75 | 20.81 | 1.24 | 0.53 | 2.41 |
| 90 | 18.14 | 1.08 | 0.37 | 2.02 |
| 105 | 16.13 | 0.96 | 0.25 | 1.60 |
| 120 | 14.56 | 0.87 | 0.16 | 1.16 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #14**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 4.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 8.44 | 7.65 | 2.30 |
| 10 | 104.19 | 6.23 | 5.44 | 3.26 |
| 15 | 83.56 | 5.00 | 4.21 | 3.79 |
| 20 | 70.25 | 4.20 | 3.41 | 4.09 |
| 25 | 60.90 | 3.64 | 2.85 | 4.28 |
| 30 | 53.93 | 3.22 | 2.43 | 4.38 |
| 35 | 48.52 | 2.90 | 2.11 | 4.43 |
| 40 | 44.18 | 2.64 | 1.85 | 4.45 |
| 45 | 40.63 | 2.43 | 1.64 | 4.43 |
| 50 | 37.65 | 2.25 | 1.46 | 4.38 |
| 55 | 35.12 | 2.10 | 1.31 | 4.32 |
| 60 | 32.94 | 1.97 | 1.18 | 4.25 |
| 65 | 31.04 | 1.86 | 1.07 | 4.16 |
| 70 | 29.37 | 1.76 | 0.97 | 4.06 |
| 75 | 27.89 | 1.67 | 0.88 | 3.95 |
| 90 | 24.29 | 1.45 | 0.66 | 3.58 |
| 105 | 21.58 | 1.29 | 0.50 | 3.15 |
| 120 | 19.47 | 1.16 | 0.37 | 2.69 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #14**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 9.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 16.13 | 15.18 | 4.55 |
| 10 | 178.56 | 11.86 | 10.91 | 6.55 |
| 15 | 142.89 | 9.49 | 8.54 | 7.69 |
| 20 | 119.95 | 7.97 | 7.02 | 8.42 |
| 25 | 103.85 | 6.90 | 5.95 | 8.92 |
| 30 | 91.87 | 6.10 | 5.15 | 9.28 |
| 35 | 82.58 | 5.49 | 4.54 | 9.53 |
| 40 | 75.15 | 4.99 | 4.04 | 9.70 |
| 45 | 69.05 | 4.59 | 3.64 | 9.82 |
| 50 | 63.95 | 4.25 | 3.30 | 9.90 |
| 55 | 59.62 | 3.96 | 3.01 | 9.94 |
| 60 | 55.89 | 3.71 | 2.76 | 9.95 |
| 80 | 44.99 | 2.99 | 2.04 | 9.79 |
| 100 | 37.90 | 2.52 | 1.57 | 9.41 |
| 120 | 32.89 | 2.19 | 1.24 | 8.90 |
| 140 | 29.15 | 1.94 | 0.99 | 8.29 |
| 160 | 26.24 | 1.74 | 0.79 | 7.62 |
| 180 | 23.90 | 1.59 | 0.64 | 6.89 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #14**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 12.7 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 19.35 | 18.40 | 5.52 |
| 10 | 214.27 | 14.24 | 13.29 | 7.97 |
| 15 | 171.47 | 11.39 | 10.44 | 9.40 |
| 20 | 143.94 | 9.56 | 8.61 | 10.34 |
| 25 | 124.62 | 8.28 | 7.33 | 10.99 |
| 30 | 110.24 | 7.32 | 6.37 | 11.47 |
| 35 | 99.09 | 6.58 | 5.63 | 11.83 |
| 40 | 90.17 | 5.99 | 5.04 | 12.10 |
| 45 | 82.86 | 5.51 | 4.56 | 12.30 |
| 50 | 76.74 | 5.10 | 4.15 | 12.45 |
| 55 | 71.55 | 4.75 | 3.80 | 12.55 |
| 60 | 67.07 | 4.46 | 3.51 | 12.62 |
| 65 | 63.18 | 4.20 | 3.25 | 12.67 |
| 70 | 59.75 | 3.97 | 3.02 | 12.68 |
| 75 | 56.71 | 3.77 | 2.82 | 12.68 |
| 90 | 49.33 | 3.28 | 2.33 | 12.57 |
| 105 | 43.80 | 2.91 | 1.96 | 12.35 |
| 120 | 39.47 | 2.62 | 1.67 | 12.04 |

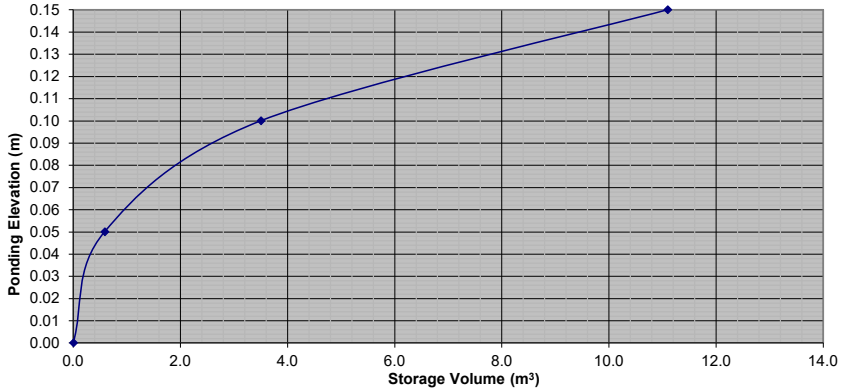
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to 1/4 open

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 3.0 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 4.4 | 11.1 |
| 1:100 Year | 0.95 | 0.95 | 15 | 9.9 | |

**Roof Drain Storage Table for Area RD 14**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 23.3 | 0.6 |
| 0.10 | 93.4 | 3.5 |
| 0.15 | 210.3 | 11.1 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #14**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #15**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 2.2 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 5.03 | 4.32 | 1.30 |
| 10 | 76.81 | 3.73 | 3.02 | 1.81 |
| 15 | 61.77 | 3.00 | 2.29 | 2.06 |
| 20 | 52.03 | 2.53 | 1.82 | 2.18 |
| 25 | 45.17 | 2.19 | 1.48 | 2.22 |
| 30 | 40.04 | 1.94 | 1.23 | 2.22 |
| 35 | 36.06 | 1.75 | 1.04 | 2.18 |
| 40 | 32.86 | 1.60 | 0.89 | 2.12 |
| 45 | 30.24 | 1.47 | 0.76 | 2.05 |
| 50 | 28.04 | 1.36 | 0.65 | 1.95 |
| 55 | 26.17 | 1.27 | 0.56 | 1.85 |
| 60 | 24.56 | 1.19 | 0.48 | 1.74 |
| 65 | 23.15 | 1.12 | 0.41 | 1.61 |
| 70 | 21.91 | 1.06 | 0.35 | 1.49 |
| 75 | 20.81 | 1.01 | 0.30 | 1.35 |
| 90 | 18.14 | 0.88 | 0.17 | 0.92 |
| 105 | 16.13 | 0.78 | 0.07 | 0.46 |
| 120 | 14.56 | 0.71 | 0.00 | -0.02 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #15**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 3.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 6.85 | 6.06 | 1.82 |
| 10 | 104.19 | 5.06 | 4.27 | 2.56 |
| 15 | 83.56 | 4.06 | 3.27 | 2.94 |
| 20 | 70.25 | 3.41 | 2.62 | 3.14 |
| 25 | 60.90 | 2.96 | 2.17 | 3.25 |
| 30 | 53.93 | 2.62 | 1.83 | 3.29 |
| 35 | 48.52 | 2.35 | 1.56 | 3.29 |
| 40 | 44.18 | 2.14 | 1.35 | 3.25 |
| 45 | 40.63 | 1.97 | 1.18 | 3.19 |
| 50 | 37.65 | 1.83 | 1.04 | 3.11 |
| 55 | 35.12 | 1.70 | 0.91 | 3.02 |
| 60 | 32.94 | 1.60 | 0.81 | 2.91 |
| 65 | 31.04 | 1.51 | 0.72 | 2.80 |
| 70 | 29.37 | 1.43 | 0.64 | 2.67 |
| 75 | 27.89 | 1.35 | 0.56 | 2.54 |
| 90 | 24.29 | 1.18 | 0.39 | 2.10 |
| 105 | 21.58 | 1.05 | 0.26 | 1.62 |
| 120 | 19.47 | 0.94 | 0.15 | 1.12 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #15**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 7.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 13.09 | 12.14 | 3.64 |
| 10 | 178.56 | 9.63 | 8.68 | 5.21 |
| 15 | 142.89 | 7.71 | 6.76 | 6.08 |
| 20 | 119.95 | 6.47 | 5.52 | 6.62 |
| 25 | 103.85 | 5.60 | 4.65 | 6.98 |
| 30 | 91.87 | 4.95 | 4.00 | 7.21 |
| 35 | 82.58 | 4.45 | 3.50 | 7.36 |
| 40 | 75.15 | 4.05 | 3.10 | 7.45 |
| 45 | 69.05 | 3.72 | 2.77 | 7.49 |
| 50 | 63.95 | 3.45 | 2.50 | 7.50 |
| 55 | 59.62 | 3.22 | 2.27 | 7.48 |
| 60 | 55.89 | 3.01 | 2.06 | 7.43 |
| 80 | 44.99 | 2.43 | 1.48 | 7.09 |
| 100 | 37.90 | 2.04 | 1.09 | 6.57 |
| 120 | 32.89 | 1.77 | 0.82 | 5.93 |
| 140 | 29.15 | 1.57 | 0.62 | 5.23 |
| 160 | 26.24 | 1.42 | 0.47 | 4.47 |
| 180 | 23.90 | 1.29 | 0.34 | 3.66 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #15**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.019 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 9.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 15.71 | 14.76 | 4.43 |
| 10 | 214.27 | 11.56 | 10.61 | 6.36 |
| 15 | 171.47 | 9.25 | 8.30 | 7.47 |
| 20 | 143.94 | 7.76 | 6.81 | 8.18 |
| 25 | 124.62 | 6.72 | 5.77 | 8.66 |
| 30 | 110.24 | 5.95 | 5.00 | 8.99 |
| 35 | 99.09 | 5.34 | 4.39 | 9.23 |
| 40 | 90.17 | 4.86 | 3.91 | 9.39 |
| 45 | 82.86 | 4.47 | 3.52 | 9.50 |
| 50 | 76.74 | 4.14 | 3.19 | 9.57 |
| 55 | 71.55 | 3.86 | 2.91 | 9.60 |
| 60 | 67.07 | 3.62 | 2.67 | 9.60 |
| 65 | 63.18 | 3.41 | 2.46 | 9.58 |
| 70 | 59.75 | 3.22 | 2.27 | 9.54 |
| 75 | 56.71 | 3.06 | 2.11 | 9.49 |
| 90 | 49.33 | 2.66 | 1.71 | 9.24 |
| 105 | 43.80 | 2.36 | 1.41 | 8.90 |
| 120 | 39.47 | 2.13 | 1.18 | 8.49 |

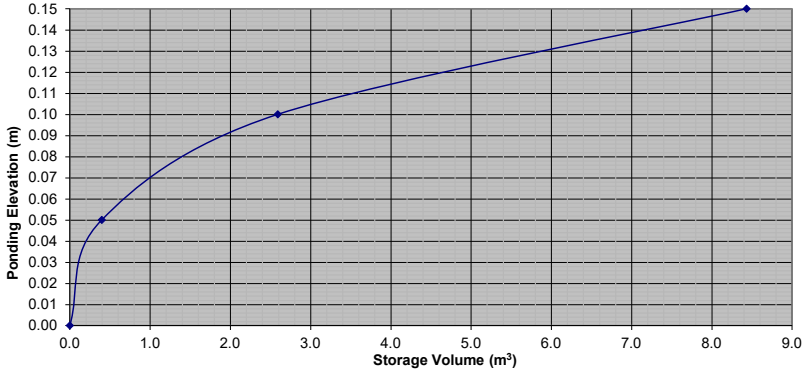
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to 1/4 open

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 2.2 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 3.3 | 8.4 |
| 1:100 Year | 0.95 | 0.95 | 15 | 7.5 | |

**Roof Drain Storage Table for Area RD 15**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 15.9 | 0.4 |
| 0.10 | 71.9 | 2.6 |
| 0.15 | 161.7 | 8.4 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #15**



Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #16**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 3.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 6.17 | 5.46 | 1.64 |
| 10 | 76.81 | 4.57 | 3.86 | 2.32 |
| 15 | 61.77 | 3.68 | 2.97 | 2.67 |
| 20 | 52.03 | 3.10 | 2.39 | 2.87 |
| 25 | 45.17 | 2.69 | 1.98 | 2.97 |
| 30 | 40.04 | 2.38 | 1.67 | 3.01 |
| 35 | 36.06 | 2.15 | 1.44 | 3.02 |
| 40 | 32.86 | 1.96 | 1.25 | 2.99 |
| 45 | 30.24 | 1.80 | 1.09 | 2.94 |
| 50 | 28.04 | 1.67 | 0.96 | 2.88 |
| 55 | 26.17 | 1.56 | 0.85 | 2.80 |
| 60 | 24.56 | 1.46 | 0.75 | 2.71 |
| 65 | 23.15 | 1.38 | 0.67 | 2.61 |
| 70 | 21.91 | 1.30 | 0.59 | 2.50 |
| 75 | 20.81 | 1.24 | 0.53 | 2.38 |
| 90 | 18.14 | 1.08 | 0.37 | 2.00 |
| 105 | 16.13 | 0.96 | 0.25 | 1.58 |
| 120 | 14.56 | 0.87 | 0.16 | 1.13 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #16**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 4.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 8.41 | 7.62 | 2.29 |
| 10 | 104.19 | 6.20 | 5.41 | 3.25 |
| 15 | 83.56 | 4.98 | 4.19 | 3.77 |
| 20 | 70.25 | 4.18 | 3.39 | 4.07 |
| 25 | 60.90 | 3.63 | 2.84 | 4.25 |
| 30 | 53.93 | 3.21 | 2.42 | 4.36 |
| 35 | 48.52 | 2.89 | 2.10 | 4.41 |
| 40 | 44.18 | 2.63 | 1.84 | 4.42 |
| 45 | 40.63 | 2.42 | 1.63 | 4.40 |
| 50 | 37.65 | 2.24 | 1.45 | 4.36 |
| 55 | 35.12 | 2.09 | 1.30 | 4.29 |
| 60 | 32.94 | 1.96 | 1.17 | 4.22 |
| 65 | 31.04 | 1.85 | 1.06 | 4.13 |
| 70 | 29.37 | 1.75 | 0.96 | 4.03 |
| 75 | 27.89 | 1.66 | 0.87 | 3.92 |
| 90 | 24.29 | 1.45 | 0.66 | 3.54 |
| 105 | 21.58 | 1.29 | 0.50 | 3.12 |
| 120 | 19.47 | 1.16 | 0.37 | 2.66 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5** **Controlled Roof Drain #16**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 9.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 16.06 | 15.11 | 4.53 |
| 10 | 178.56 | 11.81 | 10.86 | 6.52 |
| 15 | 142.89 | 9.45 | 8.50 | 7.65 |
| 20 | 119.95 | 7.94 | 6.99 | 8.38 |
| 25 | 103.85 | 6.87 | 5.92 | 8.88 |
| 30 | 91.87 | 6.08 | 5.13 | 9.23 |
| 35 | 82.58 | 5.46 | 4.51 | 9.48 |
| 40 | 75.15 | 4.97 | 4.02 | 9.65 |
| 45 | 69.05 | 4.57 | 3.62 | 9.77 |
| 50 | 63.95 | 4.23 | 3.28 | 9.84 |
| 55 | 59.62 | 3.94 | 2.99 | 9.88 |
| 60 | 55.89 | 3.70 | 2.75 | 9.89 |
| 80 | 44.99 | 2.98 | 2.03 | 9.73 |
| 100 | 37.90 | 2.51 | 1.56 | 9.35 |
| 120 | 32.89 | 2.18 | 1.23 | 8.83 |
| 140 | 29.15 | 1.93 | 0.98 | 8.22 |
| 160 | 26.24 | 1.74 | 0.79 | 7.55 |
| 180 | 23.90 | 1.58 | 0.63 | 6.82 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5** **Controlled Roof Drain #16**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.024 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 12.6 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 19.27 | 18.32 | 5.50 |
| 10 | 214.27 | 14.18 | 13.23 | 7.94 |
| 15 | 171.47 | 11.35 | 10.40 | 9.36 |
| 20 | 143.94 | 9.52 | 8.57 | 10.29 |
| 25 | 124.62 | 8.25 | 7.30 | 10.94 |
| 30 | 110.24 | 7.29 | 6.34 | 11.42 |
| 35 | 99.09 | 6.56 | 5.61 | 11.77 |
| 40 | 90.17 | 5.97 | 5.02 | 12.04 |
| 45 | 82.86 | 5.48 | 4.53 | 12.24 |
| 50 | 76.74 | 5.08 | 4.13 | 12.38 |
| 55 | 71.55 | 4.73 | 3.78 | 12.49 |
| 60 | 67.07 | 4.44 | 3.49 | 12.56 |
| 65 | 63.18 | 4.18 | 3.23 | 12.60 |
| 70 | 59.75 | 3.95 | 3.00 | 12.61 |
| 75 | 56.71 | 3.75 | 2.80 | 12.61 |
| 90 | 49.33 | 3.26 | 2.31 | 12.50 |
| 105 | 43.80 | 2.90 | 1.95 | 12.27 |
| 120 | 39.47 | 2.61 | 1.66 | 11.96 |

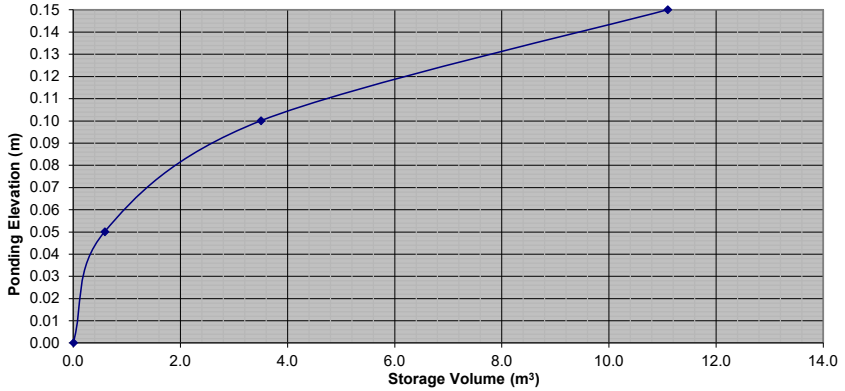
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to 1/4 open

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 3.0 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 4.4 | 11.1 |
| 1:100 Year | 0.95 | 0.95 | 15 | 9.9 | |

**Roof Drain Storage Table for Area RD 16**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 23.3 | 0.6 |
| 0.10 | 93.4 | 3.5 |
| 0.15 | 210.3 | 11.1 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #16**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #17**

OTTAWA IDF CURVE
Area = 0.028 ha Qallow = 0.71 L/s
C = 0.90 Vol(max) = 3.7 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 7.15 | 6.44 | 1.93 |
| 10 | 76.81 | 5.30 | 4.59 | 2.76 |
| 15 | 61.77 | 4.27 | 3.56 | 3.20 |
| 20 | 52.03 | 3.59 | 2.88 | 3.46 |
| 25 | 45.17 | 3.12 | 2.41 | 3.61 |
| 30 | 40.04 | 2.77 | 2.06 | 3.70 |
| 35 | 36.06 | 2.49 | 1.78 | 3.74 |
| 40 | 32.86 | 2.27 | 1.56 | 3.74 |
| 45 | 30.24 | 2.09 | 1.38 | 3.72 |
| 50 | 28.04 | 1.94 | 1.23 | 3.68 |
| 55 | 26.17 | 1.81 | 1.10 | 3.62 |
| 60 | 24.56 | 1.70 | 0.99 | 3.55 |
| 65 | 23.15 | 1.60 | 0.89 | 3.47 |
| 70 | 21.91 | 1.51 | 0.80 | 3.37 |
| 75 | 20.81 | 1.44 | 0.73 | 3.27 |
| 90 | 18.14 | 1.25 | 0.54 | 2.93 |
| 105 | 16.13 | 1.11 | 0.40 | 2.55 |
| 120 | 14.56 | 1.01 | 0.30 | 2.13 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #17**

OTTAWA IDF CURVE
Area = 0.028 ha Qallow = 0.79 L/s
C = 0.90 Vol(max) = 5.4 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 9.75 | 8.96 | 2.69 |
| 10 | 104.19 | 7.20 | 6.41 | 3.84 |
| 15 | 83.56 | 5.77 | 4.98 | 4.48 |
| 20 | 70.25 | 4.85 | 4.06 | 4.87 |
| 25 | 60.90 | 4.21 | 3.42 | 5.12 |
| 30 | 53.93 | 3.72 | 2.93 | 5.28 |
| 35 | 48.52 | 3.35 | 2.56 | 5.38 |
| 40 | 44.18 | 3.05 | 2.26 | 5.43 |
| 45 | 40.63 | 2.81 | 2.02 | 5.44 |
| 50 | 37.65 | 2.60 | 1.81 | 5.43 |
| 55 | 35.12 | 2.43 | 1.64 | 5.40 |
| 60 | 32.94 | 2.27 | 1.48 | 5.35 |
| 65 | 31.04 | 2.14 | 1.35 | 5.28 |
| 70 | 29.37 | 2.03 | 1.24 | 5.20 |
| 75 | 27.89 | 1.93 | 1.14 | 5.11 |
| 90 | 24.29 | 1.68 | 0.89 | 4.79 |
| 105 | 21.58 | 1.49 | 0.70 | 4.41 |
| 120 | 19.47 | 1.34 | 0.55 | 3.99 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #17**

OTTAWA IDF CURVE
Area = 0.028 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 12.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 18.62 | 17.67 | 5.30 |
| 10 | 178.56 | 13.70 | 12.75 | 7.65 |
| 15 | 142.89 | 10.96 | 10.01 | 9.01 |
| 20 | 119.95 | 9.20 | 8.25 | 9.90 |
| 25 | 103.85 | 7.97 | 7.02 | 10.53 |
| 30 | 91.87 | 7.05 | 6.10 | 10.98 |
| 35 | 82.58 | 6.34 | 5.39 | 11.31 |
| 40 | 75.15 | 5.77 | 4.82 | 11.56 |
| 45 | 69.05 | 5.30 | 4.35 | 11.74 |
| 50 | 63.95 | 4.91 | 3.96 | 11.87 |
| 55 | 59.62 | 4.57 | 3.62 | 11.96 |
| 60 | 55.89 | 4.29 | 3.34 | 12.02 |
| 80 | 44.99 | 3.45 | 2.50 | 12.01 |
| 100 | 37.90 | 2.91 | 1.96 | 11.75 |
| 120 | 32.89 | 2.52 | 1.57 | 11.33 |
| 140 | 29.15 | 2.24 | 1.29 | 10.81 |
| 160 | 26.24 | 2.01 | 1.06 | 10.21 |
| 180 | 23.90 | 1.83 | 0.88 | 9.55 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5 Controlled Roof Drain #17**

OTTAWA IDF CURVE
Area = 0.028 ha Qallow = 0.95 L/s
C = 1.00 Vol(max) = 15.3 m3

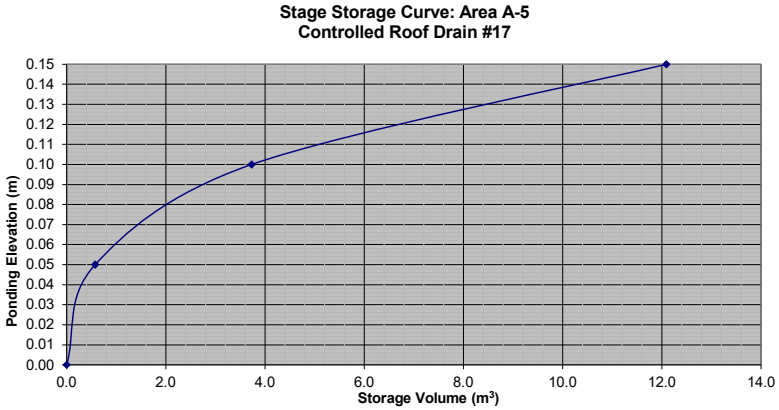
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 22.35 | 21.40 | 6.42 |
| 10 | 214.27 | 16.44 | 15.49 | 9.29 |
| 15 | 171.47 | 13.16 | 12.21 | 10.99 |
| 20 | 143.94 | 11.04 | 10.09 | 12.11 |
| 25 | 124.62 | 9.56 | 8.61 | 12.92 |
| 30 | 110.24 | 8.46 | 7.51 | 13.52 |
| 35 | 99.09 | 7.60 | 6.65 | 13.97 |
| 40 | 90.17 | 6.92 | 5.97 | 14.33 |
| 45 | 82.86 | 6.36 | 5.41 | 14.60 |
| 50 | 76.74 | 5.89 | 4.94 | 14.82 |
| 55 | 71.55 | 5.49 | 4.54 | 14.98 |
| 60 | 67.07 | 5.15 | 4.20 | 15.11 |
| 65 | 63.18 | 4.85 | 3.90 | 15.20 |
| 70 | 59.75 | 4.58 | 3.63 | 15.26 |
| 75 | 56.71 | 4.35 | 3.40 | 15.30 |
| 90 | 49.33 | 3.79 | 2.84 | 15.31 |
| 105 | 43.80 | 3.36 | 2.41 | 15.19 |
| 120 | 39.47 | 3.03 | 2.08 | 14.97 |

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

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 3.7 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 5.4 | 12.1 |
| 1:100 Year | 0.95 | 0.95 | 15 | 12.0 | |

**Roof Drain Storage Table for Area RD 17**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 23.1 | 0.6 |
| 0.10 | 102.9 | 3.7 |
| 0.15 | 231.5 | 12.1 |



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #18**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.034 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 4.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 8.84 | 8.05 | 2.41 |
| 10 | 76.81 | 6.55 | 5.76 | 3.46 |
| 15 | 61.77 | 5.27 | 4.48 | 4.03 |
| 20 | 52.03 | 4.44 | 3.65 | 4.38 |
| 25 | 45.17 | 3.85 | 3.06 | 4.60 |
| 30 | 40.04 | 3.42 | 2.63 | 4.73 |
| 35 | 36.06 | 3.08 | 2.29 | 4.80 |
| 40 | 32.86 | 2.80 | 2.01 | 4.83 |
| 45 | 30.24 | 2.58 | 1.79 | 4.83 |
| 50 | 28.04 | 2.39 | 1.60 | 4.81 |
| 55 | 26.17 | 2.23 | 1.44 | 4.76 |
| 60 | 24.56 | 2.10 | 1.31 | 4.70 |
| 65 | 23.15 | 1.98 | 1.19 | 4.62 |
| 70 | 21.91 | 1.87 | 1.08 | 4.53 |
| 75 | 20.81 | 1.78 | 0.99 | 4.44 |
| 90 | 18.14 | 1.55 | 0.76 | 4.09 |
| 105 | 16.13 | 1.38 | 0.59 | 3.69 |
| 120 | 14.56 | 1.24 | 0.45 | 3.26 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #18**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.034 | ha | Qallow = | 0.95 | L/s |
| C = | 0.90 | | Vol(max) = | 6.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 12.05 | 11.10 | 3.33 |
| 10 | 104.19 | 8.89 | 7.94 | 4.76 |
| 15 | 83.56 | 7.13 | 6.18 | 5.56 |
| 20 | 70.25 | 5.99 | 5.04 | 6.05 |
| 25 | 60.90 | 5.20 | 4.25 | 6.37 |
| 30 | 53.93 | 4.60 | 3.65 | 6.57 |
| 35 | 48.52 | 4.14 | 3.19 | 6.70 |
| 40 | 44.18 | 3.77 | 2.82 | 6.77 |
| 45 | 40.63 | 3.47 | 2.52 | 6.79 |
| 50 | 37.65 | 3.21 | 2.26 | 6.79 |
| 55 | 35.12 | 3.00 | 2.05 | 6.75 |
| 60 | 32.94 | 2.81 | 1.86 | 6.70 |
| 65 | 31.04 | 2.65 | 1.70 | 6.62 |
| 70 | 29.37 | 2.51 | 1.56 | 6.54 |
| 75 | 27.89 | 2.38 | 1.43 | 6.43 |
| 90 | 24.29 | 2.07 | 1.12 | 6.06 |
| 105 | 21.58 | 1.84 | 0.89 | 5.62 |
| 120 | 19.47 | 1.66 | 0.71 | 5.12 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-5 Controlled Roof Drain #18**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.034 | ha | Qallow = | 1.26 | L/s |
| C = | 1.00 | | Vol(max) = | 14.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 23.01 | 21.75 | 6.52 |
| 10 | 178.56 | 16.93 | 15.67 | 9.40 |
| 15 | 142.89 | 13.55 | 12.29 | 11.06 |
| 20 | 119.95 | 11.37 | 10.11 | 12.13 |
| 25 | 103.85 | 9.84 | 8.58 | 12.88 |
| 30 | 91.87 | 8.71 | 7.45 | 13.41 |
| 35 | 82.58 | 7.83 | 6.57 | 13.79 |
| 40 | 75.15 | 7.12 | 5.86 | 14.07 |
| 45 | 69.05 | 6.55 | 5.29 | 14.27 |
| 50 | 63.95 | 6.06 | 4.80 | 14.41 |
| 55 | 59.62 | 5.65 | 4.39 | 14.49 |
| 60 | 55.89 | 5.30 | 4.04 | 14.54 |
| 80 | 44.99 | 4.27 | 3.01 | 14.42 |
| 100 | 37.90 | 3.59 | 2.33 | 14.00 |
| 120 | 32.89 | 3.12 | 1.86 | 13.38 |
| 140 | 29.15 | 2.76 | 1.50 | 12.63 |
| 160 | 26.24 | 2.49 | 1.23 | 11.78 |
| 180 | 23.90 | 2.27 | 1.01 | 10.86 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-5 Controlled Roof Drain #18**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.034 | ha | Qallow = | 1.26 | L/s |
| C = | 1.00 | | Vol(max) = | 18.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 27.61 | 26.35 | 7.90 |
| 10 | 214.27 | 20.31 | 19.05 | 11.43 |
| 15 | 171.47 | 16.26 | 15.00 | 13.50 |
| 20 | 143.94 | 13.65 | 12.39 | 14.86 |
| 25 | 124.62 | 11.81 | 10.55 | 15.83 |
| 30 | 110.24 | 10.45 | 9.19 | 16.54 |
| 35 | 99.09 | 9.39 | 8.13 | 17.08 |
| 40 | 90.17 | 8.55 | 7.29 | 17.49 |
| 45 | 82.86 | 7.86 | 6.60 | 17.81 |
| 50 | 76.74 | 7.28 | 6.02 | 18.05 |
| 55 | 71.55 | 6.78 | 5.52 | 18.22 |
| 60 | 67.07 | 6.36 | 5.10 | 18.35 |
| 65 | 63.18 | 5.99 | 4.73 | 18.44 |
| 70 | 59.75 | 5.66 | 4.40 | 18.50 |
| 75 | 56.71 | 5.38 | 4.12 | 18.52 |
| 90 | 49.33 | 4.68 | 3.42 | 18.45 |
| 105 | 43.80 | 4.15 | 2.89 | 18.22 |
| 120 | 39.47 | 3.74 | 2.48 | 17.87 |

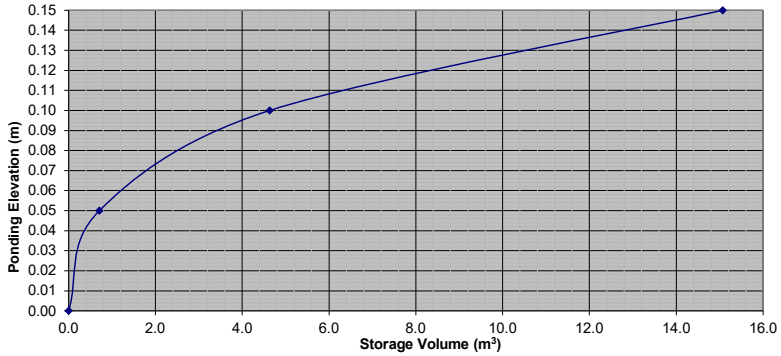
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to 1/2 open

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.79 | 0.79 | 8 | 4.8 | |
| 1:5 Year | 0.95 | 0.95 | 10 | 6.8 | 15.1 |
| 1:100 Year | 1.26 | 1.26 | 15 | 14.5 | |

**Roof Drain Storage Table for Area RD 18**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 28.4 | 0.7 |
| 0.10 | 128.4 | 4.6 |
| 0.15 | 289.2 | 15.1 |

**Stage Storage Curve: Area A-5**
**Controlled Roof Drain #18**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.3 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 2.72 | 2.40 | 0.72 |
| 10 | 76.81 | 2.02 | 1.70 | 1.02 |
| 15 | 61.77 | 1.62 | 1.30 | 1.17 |
| 20 | 52.03 | 1.37 | 1.05 | 1.26 |
| 25 | 45.17 | 1.19 | 0.87 | 1.30 |
| 30 | 40.04 | 1.05 | 0.73 | 1.32 |
| 35 | 36.06 | 0.95 | 0.63 | 1.32 |
| 40 | 32.86 | 0.86 | 0.54 | 1.30 |
| 45 | 30.24 | 0.79 | 0.47 | 1.28 |
| 50 | 28.04 | 0.74 | 0.42 | 1.25 |
| 55 | 26.17 | 0.69 | 0.37 | 1.21 |
| 60 | 24.56 | 0.65 | 0.33 | 1.17 |
| 65 | 23.15 | 0.61 | 0.29 | 1.12 |
| 70 | 21.91 | 0.58 | 0.26 | 1.07 |
| 75 | 20.81 | 0.55 | 0.23 | 1.02 |
| 90 | 18.14 | 0.48 | 0.16 | 0.85 |
| 105 | 16.13 | 0.42 | 0.10 | 0.65 |
| 120 | 14.56 | 0.38 | 0.06 | 0.45 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 2.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 3.71 | 3.39 | 1.02 |
| 10 | 104.19 | 2.74 | 2.42 | 1.45 |
| 15 | 83.56 | 2.20 | 1.88 | 1.69 |
| 20 | 70.25 | 1.85 | 1.53 | 1.83 |
| 25 | 60.90 | 1.60 | 1.28 | 1.92 |
| 30 | 53.93 | 1.42 | 1.10 | 1.97 |
| 35 | 48.52 | 1.27 | 0.95 | 2.00 |
| 40 | 44.18 | 1.16 | 0.84 | 2.02 |
| 45 | 40.63 | 1.07 | 0.75 | 2.02 |
| 50 | 37.65 | 0.99 | 0.67 | 2.01 |
| 55 | 35.12 | 0.92 | 0.60 | 1.99 |
| 60 | 32.94 | 0.87 | 0.55 | 1.96 |
| 65 | 31.04 | 0.82 | 0.50 | 1.93 |
| 70 | 29.37 | 0.77 | 0.45 | 1.90 |
| 75 | 27.89 | 0.73 | 0.41 | 1.86 |
| 90 | 24.29 | 0.64 | 0.32 | 1.72 |
| 105 | 21.58 | 0.57 | 0.25 | 1.56 |
| 120 | 19.47 | 0.51 | 0.19 | 1.38 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 4.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 7.08 | 6.76 | 2.03 |
| 10 | 178.56 | 5.21 | 4.89 | 2.94 |
| 15 | 142.89 | 4.17 | 3.85 | 3.47 |
| 20 | 119.95 | 3.50 | 3.18 | 3.82 |
| 25 | 103.85 | 3.03 | 2.71 | 4.07 |
| 30 | 91.87 | 2.68 | 2.36 | 4.25 |
| 35 | 82.58 | 2.41 | 2.09 | 4.39 |
| 40 | 75.15 | 2.19 | 1.87 | 4.50 |
| 45 | 69.05 | 2.02 | 1.70 | 4.58 |
| 50 | 63.95 | 1.87 | 1.55 | 4.64 |
| 55 | 59.62 | 1.74 | 1.42 | 4.69 |
| 60 | 55.89 | 1.63 | 1.31 | 4.72 |
| 80 | 44.99 | 1.31 | 0.99 | 4.77 |
| 100 | 37.90 | 1.11 | 0.79 | 4.72 |
| 120 | 32.89 | 0.96 | 0.64 | 4.61 |
| 140 | 29.15 | 0.85 | 0.53 | 4.46 |
| 160 | 26.24 | 0.77 | 0.45 | 4.28 |
| 180 | 23.90 | 0.70 | 0.38 | 4.08 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #1**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.011 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 6.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 8.50 | 8.18 | 2.45 |
| 10 | 214.27 | 6.25 | 5.93 | 3.56 |
| 15 | 171.47 | 5.01 | 4.69 | 4.22 |
| 20 | 143.94 | 4.20 | 3.88 | 4.66 |
| 25 | 124.62 | 3.64 | 3.32 | 4.98 |
| 30 | 110.24 | 3.22 | 2.90 | 5.22 |
| 35 | 99.09 | 2.89 | 2.57 | 5.40 |
| 40 | 90.17 | 2.63 | 2.31 | 5.55 |
| 45 | 82.86 | 2.42 | 2.10 | 5.67 |
| 50 | 76.74 | 2.24 | 1.92 | 5.76 |
| 55 | 71.55 | 2.09 | 1.77 | 5.84 |
| 60 | 67.07 | 1.96 | 1.64 | 5.90 |
| 65 | 63.18 | 1.84 | 1.52 | 5.94 |
| 70 | 59.75 | 1.74 | 1.42 | 5.98 |
| 75 | 56.71 | 1.66 | 1.34 | 6.01 |
| 90 | 49.33 | 1.44 | 1.12 | 6.05 |
| 105 | 43.80 | 1.28 | 0.96 | 6.04 |
| 120 | 39.47 | 1.15 | 0.83 | 5.99 |

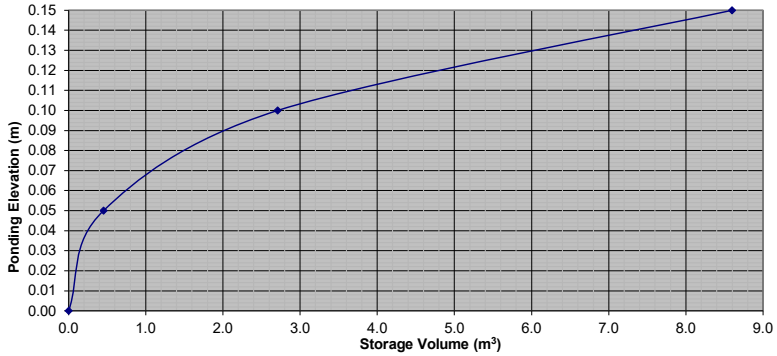
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 1.3 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 2.0 | 8.6 |
| 1:100 Year | 0.32 | 0.32 | 15 | 4.8 | |

**Roof Drain Storage Table for Area RD 1**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 18.1 | 0.5 |
| 0.10 | 72.2 | 2.7 |
| 0.15 | 163.3 | 8.6 |

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



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.029 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 4.1 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 7.59 | 6.88 | 2.06 |
| 10 | 76.81 | 5.63 | 4.92 | 2.95 |
| 15 | 61.77 | 4.53 | 3.82 | 3.44 |
| 20 | 52.03 | 3.81 | 3.10 | 3.73 |
| 25 | 45.17 | 3.31 | 2.60 | 3.90 |
| 30 | 40.04 | 2.94 | 2.23 | 4.01 |
| 35 | 36.06 | 2.64 | 1.93 | 4.06 |
| 40 | 32.86 | 2.41 | 1.70 | 4.08 |
| 45 | 30.24 | 2.22 | 1.51 | 4.07 |
| 50 | 28.04 | 2.06 | 1.35 | 4.04 |
| 55 | 26.17 | 1.92 | 1.21 | 3.99 |
| 60 | 24.56 | 1.80 | 1.09 | 3.93 |
| 65 | 23.15 | 1.70 | 0.99 | 3.85 |
| 70 | 21.91 | 1.61 | 0.90 | 3.76 |
| 75 | 20.81 | 1.53 | 0.82 | 3.67 |
| 90 | 18.14 | 1.33 | 0.62 | 3.35 |
| 105 | 16.13 | 1.18 | 0.47 | 2.98 |
| 120 | 14.56 | 1.07 | 0.36 | 2.57 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.029 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 5.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 10.35 | 9.56 | 2.87 |
| 10 | 104.19 | 7.64 | 6.85 | 4.11 |
| 15 | 83.56 | 6.13 | 5.34 | 4.80 |
| 20 | 70.25 | 5.15 | 4.36 | 5.23 |
| 25 | 60.90 | 4.46 | 3.67 | 5.51 |
| 30 | 53.93 | 3.95 | 3.16 | 5.69 |
| 35 | 48.52 | 3.56 | 2.77 | 5.81 |
| 40 | 44.18 | 3.24 | 2.45 | 5.88 |
| 45 | 40.63 | 2.98 | 2.19 | 5.91 |
| 50 | 37.65 | 2.76 | 1.97 | 5.91 |
| 55 | 35.12 | 2.57 | 1.78 | 5.89 |
| 60 | 32.94 | 2.42 | 1.63 | 5.85 |
| 65 | 31.04 | 2.28 | 1.49 | 5.79 |
| 70 | 29.37 | 2.15 | 1.36 | 5.73 |
| 75 | 27.89 | 2.04 | 1.25 | 5.65 |
| 90 | 24.29 | 1.78 | 0.99 | 5.35 |
| 105 | 21.58 | 1.58 | 0.79 | 4.99 |
| 120 | 19.47 | 1.43 | 0.64 | 4.59 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.029 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 13.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 19.77 | 18.82 | 5.65 |
| 10 | 178.56 | 14.54 | 13.59 | 8.16 |
| 15 | 142.89 | 11.64 | 10.69 | 9.62 |
| 20 | 119.95 | 9.77 | 8.82 | 10.58 |
| 25 | 103.85 | 8.46 | 7.51 | 11.26 |
| 30 | 91.87 | 7.48 | 6.53 | 11.76 |
| 35 | 82.58 | 6.73 | 5.78 | 12.13 |
| 40 | 75.15 | 6.12 | 5.17 | 12.41 |
| 45 | 69.05 | 5.62 | 4.67 | 12.62 |
| 50 | 63.95 | 5.21 | 4.26 | 12.78 |
| 55 | 59.62 | 4.86 | 3.91 | 12.89 |
| 60 | 55.89 | 4.55 | 3.60 | 12.97 |
| 80 | 44.99 | 3.66 | 2.71 | 13.03 |
| 100 | 37.90 | 3.09 | 2.14 | 12.82 |
| 120 | 32.89 | 2.68 | 1.73 | 12.45 |
| 140 | 29.15 | 2.37 | 1.42 | 11.97 |
| 160 | 26.24 | 2.14 | 1.19 | 11.40 |
| 180 | 23.90 | 1.95 | 1.00 | 10.77 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #2**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.029 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 16.6 | m3 |

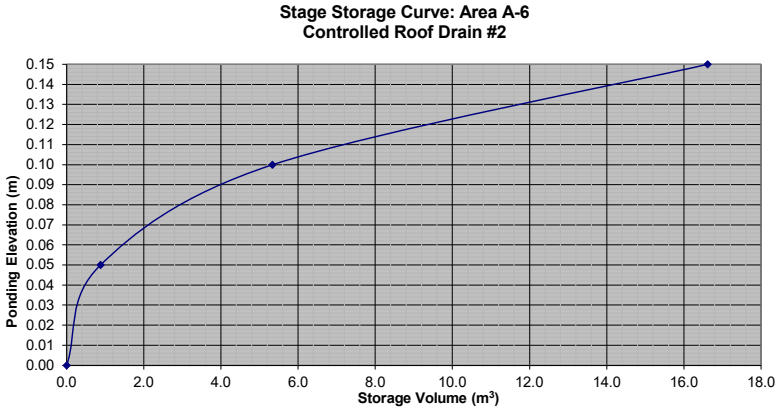
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 23.72 | 22.77 | 6.83 |
| 10 | 214.27 | 17.45 | 16.50 | 9.90 |
| 15 | 171.47 | 13.97 | 13.02 | 11.72 |
| 20 | 143.94 | 11.72 | 10.77 | 12.93 |
| 25 | 124.62 | 10.15 | 9.20 | 13.80 |
| 30 | 110.24 | 8.98 | 8.03 | 14.45 |
| 35 | 99.09 | 8.07 | 7.12 | 14.96 |
| 40 | 90.17 | 7.35 | 6.40 | 15.35 |
| 45 | 82.86 | 6.75 | 5.80 | 15.66 |
| 50 | 76.74 | 6.25 | 5.30 | 15.90 |
| 55 | 71.55 | 5.83 | 4.88 | 16.10 |
| 60 | 67.07 | 5.46 | 4.51 | 16.25 |
| 65 | 63.18 | 5.15 | 4.20 | 16.36 |
| 70 | 59.75 | 4.87 | 3.92 | 16.45 |
| 75 | 56.71 | 4.62 | 3.67 | 16.51 |
| 90 | 49.33 | 4.02 | 3.07 | 16.57 |
| 105 | 43.80 | 3.57 | 2.62 | 16.49 |
| 120 | 39.47 | 3.22 | 2.27 | 16.31 |

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

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 4.1 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 5.9 | 16.6 |
| 1:100 Year | 0.95 | 0.95 | 15 | 13.0 | |

**Roof Drain Storage Table for Area RD 2**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 35.1 | 0.9 |
| 0.10 | 143.3 | 5.3 |
| 0.15 | 307.8 | 16.6 |



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #3**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.007 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.7 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 1.87 | 1.55 | 0.46 |
| 10 | 76.81 | 1.38 | 1.06 | 0.64 |
| 15 | 61.77 | 1.11 | 0.79 | 0.71 |
| 20 | 52.03 | 0.94 | 0.62 | 0.74 |
| 25 | 45.17 | 0.81 | 0.49 | 0.74 |
| 30 | 40.04 | 0.72 | 0.40 | 0.72 |
| 35 | 36.06 | 0.65 | 0.33 | 0.69 |
| 40 | 32.86 | 0.59 | 0.27 | 0.65 |
| 45 | 30.24 | 0.54 | 0.22 | 0.61 |
| 50 | 28.04 | 0.51 | 0.19 | 0.56 |
| 55 | 26.17 | 0.47 | 0.15 | 0.50 |
| 60 | 24.56 | 0.44 | 0.12 | 0.44 |
| 65 | 23.15 | 0.42 | 0.10 | 0.38 |
| 70 | 21.91 | 0.39 | 0.07 | 0.31 |
| 75 | 20.81 | 0.37 | 0.05 | 0.25 |
| 90 | 18.14 | 0.33 | 0.01 | 0.04 |
| 105 | 16.13 | 0.29 | -0.03 | -0.18 |
| 120 | 14.56 | 0.26 | -0.06 | -0.42 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #3**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.007 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 1.2 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 2.54 | 2.22 | 0.67 |
| 10 | 104.19 | 1.88 | 1.56 | 0.93 |
| 15 | 83.56 | 1.51 | 1.19 | 1.07 |
| 20 | 70.25 | 1.27 | 0.95 | 1.13 |
| 25 | 60.90 | 1.10 | 0.78 | 1.17 |
| 30 | 53.93 | 0.97 | 0.65 | 1.17 |
| 35 | 48.52 | 0.87 | 0.55 | 1.16 |
| 40 | 44.18 | 0.80 | 0.48 | 1.14 |
| 45 | 40.63 | 0.73 | 0.41 | 1.11 |
| 50 | 37.65 | 0.68 | 0.36 | 1.07 |
| 55 | 35.12 | 0.63 | 0.31 | 1.03 |
| 60 | 32.94 | 0.59 | 0.27 | 0.98 |
| 65 | 31.04 | 0.56 | 0.24 | 0.93 |
| 70 | 29.37 | 0.53 | 0.21 | 0.88 |
| 75 | 27.89 | 0.50 | 0.18 | 0.82 |
| 90 | 24.29 | 0.44 | 0.12 | 0.63 |
| 105 | 21.58 | 0.39 | 0.07 | 0.43 |
| 120 | 19.47 | 0.35 | 0.03 | 0.22 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #3**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.007 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 2.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 4.86 | 4.54 | 1.36 |
| 10 | 178.56 | 3.57 | 3.25 | 1.95 |
| 15 | 142.89 | 2.86 | 2.54 | 2.29 |
| 20 | 119.95 | 2.40 | 2.08 | 2.50 |
| 25 | 103.85 | 2.08 | 1.76 | 2.64 |
| 30 | 91.87 | 1.84 | 1.52 | 2.73 |
| 35 | 82.58 | 1.65 | 1.33 | 2.80 |
| 40 | 75.15 | 1.50 | 1.18 | 2.84 |
| 45 | 69.05 | 1.38 | 1.06 | 2.87 |
| 50 | 63.95 | 1.28 | 0.96 | 2.88 |
| 55 | 59.62 | 1.19 | 0.87 | 2.88 |
| 60 | 55.89 | 1.12 | 0.80 | 2.88 |
| 80 | 44.99 | 0.90 | 0.58 | 2.79 |
| 100 | 37.90 | 0.76 | 0.44 | 2.63 |
| 120 | 32.89 | 0.66 | 0.34 | 2.44 |
| 140 | 29.15 | 0.58 | 0.26 | 2.21 |
| 160 | 26.24 | 0.53 | 0.21 | 1.97 |
| 180 | 23.90 | 0.48 | 0.16 | 1.71 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #3**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.007 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 3.7 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 5.83 | 5.51 | 1.65 |
| 10 | 214.27 | 4.29 | 3.97 | 2.38 |
| 15 | 171.47 | 3.43 | 3.11 | 2.80 |
| 20 | 143.94 | 2.88 | 2.56 | 3.07 |
| 25 | 124.62 | 2.49 | 2.17 | 3.26 |
| 30 | 110.24 | 2.21 | 1.89 | 3.40 |
| 35 | 99.09 | 1.98 | 1.66 | 3.49 |
| 40 | 90.17 | 1.80 | 1.48 | 3.56 |
| 45 | 82.86 | 1.66 | 1.34 | 3.61 |
| 50 | 76.74 | 1.54 | 1.22 | 3.65 |
| 55 | 71.55 | 1.43 | 1.11 | 3.67 |
| 60 | 67.07 | 1.34 | 1.02 | 3.68 |
| 65 | 63.18 | 1.26 | 0.94 | 3.68 |
| 70 | 59.75 | 1.20 | 0.88 | 3.68 |
| 75 | 56.71 | 1.14 | 0.82 | 3.67 |
| 90 | 49.33 | 0.99 | 0.67 | 3.60 |
| 105 | 43.80 | 0.88 | 0.56 | 3.51 |
| 120 | 39.47 | 0.79 | 0.47 | 3.38 |

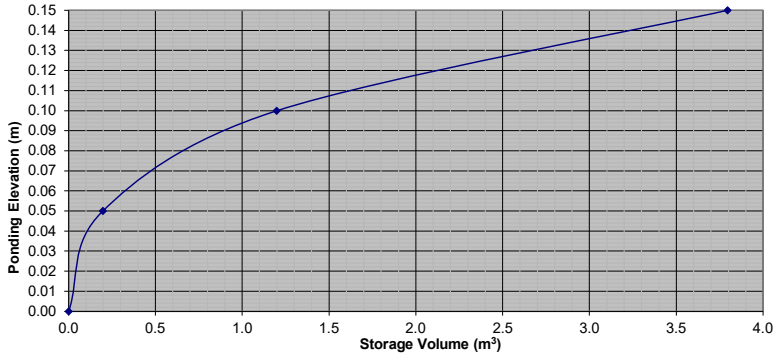
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.7 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 1.2 | 3.8 |
| 1:100 Year | 0.32 | 0.32 | 15 | 2.9 | |

**Roof Drain Storage Table for Area RD 3**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 7.9 | 0.2 |
| 0.10 | 32.1 | 1.2 |
| 0.15 | 71.8 | 3.8 |

**Stage Storage Curve: Area A-6**
**Controlled Roof Drain #3**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #4**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.007 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.7 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 1.81 | 1.49 | 0.45 |
| 10 | 76.81 | 1.35 | 1.03 | 0.62 |
| 15 | 61.77 | 1.08 | 0.76 | 0.69 |
| 20 | 52.03 | 0.91 | 0.59 | 0.71 |
| 25 | 45.17 | 0.79 | 0.47 | 0.71 |
| 30 | 40.04 | 0.70 | 0.38 | 0.69 |
| 35 | 36.06 | 0.63 | 0.31 | 0.65 |
| 40 | 32.86 | 0.58 | 0.26 | 0.61 |
| 45 | 30.24 | 0.53 | 0.21 | 0.57 |
| 50 | 28.04 | 0.49 | 0.17 | 0.51 |
| 55 | 26.17 | 0.46 | 0.14 | 0.46 |
| 60 | 24.56 | 0.43 | 0.11 | 0.40 |
| 65 | 23.15 | 0.41 | 0.09 | 0.33 |
| 70 | 21.91 | 0.38 | 0.06 | 0.27 |
| 75 | 20.81 | 0.36 | 0.04 | 0.20 |
| 90 | 18.14 | 0.32 | 0.00 | -0.01 |
| 105 | 16.13 | 0.28 | -0.04 | -0.24 |
| 120 | 14.56 | 0.26 | -0.06 | -0.47 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #4**

OTTAWA IDF CURVE

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

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

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #4**

OTTAWA IDF CURVE

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

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 4.72 | 4.40 | 1.32 |
| 10 | 178.56 | 3.47 | 3.15 | 1.89 |
| 15 | 142.89 | 2.78 | 2.46 | 2.21 |
| 20 | 119.95 | 2.33 | 2.01 | 2.42 |
| 25 | 103.85 | 2.02 | 1.70 | 2.55 |
| 30 | 91.87 | 1.79 | 1.47 | 2.64 |
| 35 | 82.58 | 1.61 | 1.29 | 2.70 |
| 40 | 75.15 | 1.46 | 1.14 | 2.74 |
| 45 | 69.05 | 1.34 | 1.02 | 2.76 |
| 50 | 63.95 | 1.24 | 0.92 | 2.77 |
| 55 | 59.62 | 1.16 | 0.84 | 2.77 |
| 60 | 55.89 | 1.09 | 0.77 | 2.76 |
| 80 | 44.99 | 0.88 | 0.56 | 2.67 |
| 100 | 37.90 | 0.74 | 0.42 | 2.51 |
| 120 | 32.89 | 0.64 | 0.32 | 2.30 |
| 140 | 29.15 | 0.57 | 0.25 | 2.08 |
| 160 | 26.24 | 0.51 | 0.19 | 1.83 |
| 180 | 23.90 | 0.47 | 0.15 | 1.57 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #4**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.007 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 3.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 5.67 | 5.35 | 1.60 |
| 10 | 214.27 | 4.17 | 3.85 | 2.31 |
| 15 | 171.47 | 3.34 | 3.02 | 2.72 |
| 20 | 143.94 | 2.80 | 2.48 | 2.98 |
| 25 | 124.62 | 2.43 | 2.11 | 3.16 |
| 30 | 110.24 | 2.15 | 1.83 | 3.29 |
| 35 | 99.09 | 1.93 | 1.61 | 3.38 |
| 40 | 90.17 | 1.75 | 1.43 | 3.44 |
| 45 | 82.86 | 1.61 | 1.29 | 3.49 |
| 50 | 76.74 | 1.49 | 1.17 | 3.52 |
| 55 | 71.55 | 1.39 | 1.07 | 3.54 |
| 60 | 67.07 | 1.31 | 0.99 | 3.55 |
| 65 | 63.18 | 1.23 | 0.91 | 3.55 |
| 70 | 59.75 | 1.16 | 0.84 | 3.54 |
| 75 | 56.71 | 1.10 | 0.78 | 3.53 |
| 90 | 49.33 | 0.96 | 0.64 | 3.46 |
| 105 | 43.80 | 0.85 | 0.53 | 3.35 |
| 120 | 39.47 | 0.77 | 0.45 | 3.23 |

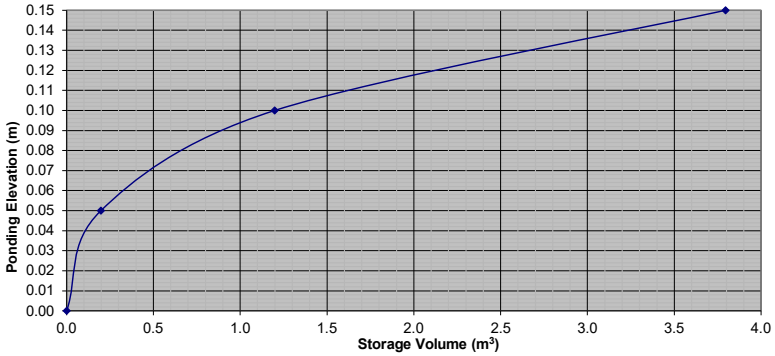
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.7 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 1.1 | 3.8 |
| 1:100 Year | 0.32 | 0.32 | 15 | 2.8 | |

**Roof Drain Storage Table for Area RD 4**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 7.9 | 0.2 |
| 0.10 | 32.1 | 1.2 |
| 0.15 | 71.8 | 3.8 |

**Stage Storage Curve: Area A-6**
**Controlled Roof Drain #4**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.5 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 1.40 | 1.08 | 0.32 |
| 10 | 76.81 | 1.04 | 0.72 | 0.43 |
| 15 | 61.77 | 0.83 | 0.51 | 0.46 |
| 20 | 52.03 | 0.70 | 0.38 | 0.46 |
| 25 | 45.17 | 0.61 | 0.29 | 0.44 |
| 30 | 40.04 | 0.54 | 0.22 | 0.40 |
| 35 | 36.06 | 0.49 | 0.17 | 0.35 |
| 40 | 32.86 | 0.44 | 0.12 | 0.30 |
| 45 | 30.24 | 0.41 | 0.09 | 0.24 |
| 50 | 28.04 | 0.38 | 0.06 | 0.18 |
| 55 | 26.17 | 0.35 | 0.03 | 0.11 |
| 60 | 24.56 | 0.33 | 0.01 | 0.04 |
| 65 | 23.15 | 0.31 | -0.01 | -0.03 |
| 70 | 21.91 | 0.30 | -0.02 | -0.10 |
| 75 | 20.81 | 0.28 | -0.04 | -0.17 |
| 90 | 18.14 | 0.25 | -0.07 | -0.40 |
| 105 | 16.13 | 0.22 | -0.10 | -0.64 |
| 120 | 14.56 | 0.20 | -0.12 | -0.89 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.8 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 1.91 | 1.59 | 0.48 |
| 10 | 104.19 | 1.41 | 1.09 | 0.65 |
| 15 | 83.56 | 1.13 | 0.81 | 0.73 |
| 20 | 70.25 | 0.95 | 0.63 | 0.75 |
| 25 | 60.90 | 0.82 | 0.50 | 0.75 |
| 30 | 53.93 | 0.73 | 0.41 | 0.74 |
| 35 | 48.52 | 0.66 | 0.34 | 0.70 |
| 40 | 44.18 | 0.60 | 0.28 | 0.66 |
| 45 | 40.63 | 0.55 | 0.23 | 0.62 |
| 50 | 37.65 | 0.51 | 0.19 | 0.57 |
| 55 | 35.12 | 0.47 | 0.15 | 0.51 |
| 60 | 32.94 | 0.45 | 0.13 | 0.45 |
| 65 | 31.04 | 0.42 | 0.10 | 0.39 |
| 70 | 29.37 | 0.40 | 0.08 | 0.32 |
| 75 | 27.89 | 0.38 | 0.06 | 0.26 |
| 90 | 24.29 | 0.33 | 0.01 | 0.04 |
| 105 | 21.58 | 0.29 | -0.03 | -0.18 |
| 120 | 19.47 | 0.26 | -0.06 | -0.41 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 1.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 3.64 | 3.32 | 1.00 |
| 10 | 178.56 | 2.68 | 2.36 | 1.42 |
| 15 | 142.89 | 2.15 | 1.83 | 1.64 |
| 20 | 119.95 | 1.80 | 1.48 | 1.78 |
| 25 | 103.85 | 1.56 | 1.24 | 1.86 |
| 30 | 91.87 | 1.38 | 1.06 | 1.91 |
| 35 | 82.58 | 1.24 | 0.92 | 1.93 |
| 40 | 75.15 | 1.13 | 0.81 | 1.94 |
| 45 | 69.05 | 1.04 | 0.72 | 1.93 |
| 50 | 63.95 | 0.96 | 0.64 | 1.92 |
| 55 | 59.62 | 0.90 | 0.58 | 1.90 |
| 60 | 55.89 | 0.84 | 0.52 | 1.87 |
| 80 | 44.99 | 0.68 | 0.36 | 1.71 |
| 100 | 37.90 | 0.57 | 0.25 | 1.49 |
| 120 | 32.89 | 0.49 | 0.17 | 1.25 |
| 140 | 29.15 | 0.44 | 0.12 | 0.99 |
| 160 | 26.24 | 0.39 | 0.07 | 0.71 |
| 180 | 23.90 | 0.36 | 0.04 | 0.42 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #5**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 2.5 | m3 |

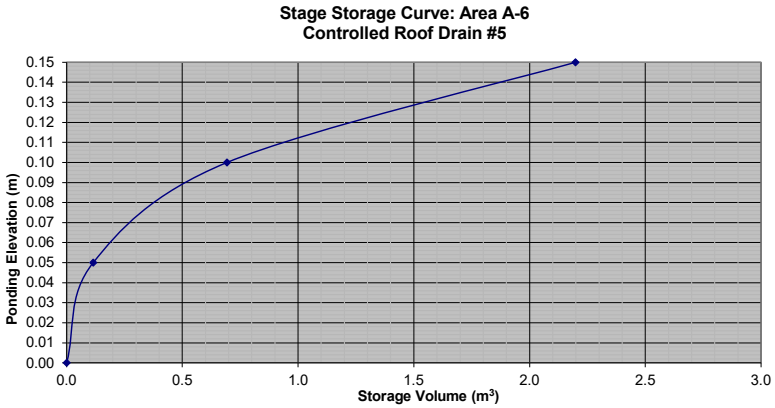
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 4.37 | 4.05 | 1.22 |
| 10 | 214.27 | 3.22 | 2.90 | 1.74 |
| 15 | 171.47 | 2.57 | 2.25 | 2.03 |
| 20 | 143.94 | 2.16 | 1.84 | 2.21 |
| 25 | 124.62 | 1.87 | 1.55 | 2.33 |
| 30 | 110.24 | 1.65 | 1.33 | 2.40 |
| 35 | 99.09 | 1.49 | 1.17 | 2.45 |
| 40 | 90.17 | 1.35 | 1.03 | 2.48 |
| 45 | 82.86 | 1.24 | 0.92 | 2.49 |
| 50 | 76.74 | 1.15 | 0.83 | 2.50 |
| 55 | 71.55 | 1.07 | 0.75 | 2.49 |
| 60 | 67.07 | 1.01 | 0.69 | 2.47 |
| 65 | 63.18 | 0.95 | 0.63 | 2.45 |
| 70 | 59.75 | 0.90 | 0.58 | 2.42 |
| 75 | 56.71 | 0.85 | 0.53 | 2.39 |
| 90 | 49.33 | 0.74 | 0.42 | 2.27 |
| 105 | 43.80 | 0.66 | 0.34 | 2.13 |
| 120 | 39.47 | 0.59 | 0.27 | 1.96 |

**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.5 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 0.8 | 2.2 |
| 1:100 Year | 0.32 | 0.32 | 15 | 1.9 | |

**Roof Drain Storage Table for Area RD 5**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 4.6 | 0.1 |
| 0.10 | 18.5 | 0.7 |
| 0.15 | 41.7 | 2.2 |



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 1.37 | 1.05 | 0.32 |
| 10 | 76.81 | 1.02 | 0.70 | 0.42 |
| 15 | 61.77 | 0.82 | 0.50 | 0.45 |
| 20 | 52.03 | 0.69 | 0.37 | 0.44 |
| 25 | 45.17 | 0.60 | 0.28 | 0.42 |
| 30 | 40.04 | 0.53 | 0.21 | 0.38 |
| 35 | 36.06 | 0.48 | 0.16 | 0.33 |
| 40 | 32.86 | 0.44 | 0.12 | 0.28 |
| 45 | 30.24 | 0.40 | 0.08 | 0.22 |
| 50 | 28.04 | 0.37 | 0.05 | 0.16 |
| 55 | 26.17 | 0.35 | 0.03 | 0.09 |
| 60 | 24.56 | 0.33 | 0.01 | 0.02 |
| 65 | 23.15 | 0.31 | -0.01 | -0.05 |
| 70 | 21.91 | 0.29 | -0.03 | -0.12 |
| 75 | 20.81 | 0.28 | -0.04 | -0.20 |
| 90 | 18.14 | 0.24 | -0.08 | -0.43 |
| 105 | 16.13 | 0.21 | -0.11 | -0.67 |
| 120 | 14.56 | 0.19 | -0.13 | -0.91 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 0.90 | | Vol(max) = | 0.7 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 1.87 | 1.55 | 0.47 |
| 10 | 104.19 | 1.38 | 1.06 | 0.64 |
| 15 | 83.56 | 1.11 | 0.79 | 0.71 |
| 20 | 70.25 | 0.93 | 0.61 | 0.73 |
| 25 | 60.90 | 0.81 | 0.49 | 0.73 |
| 30 | 53.93 | 0.72 | 0.40 | 0.71 |
| 35 | 48.52 | 0.64 | 0.32 | 0.68 |
| 40 | 44.18 | 0.59 | 0.27 | 0.64 |
| 45 | 40.63 | 0.54 | 0.22 | 0.59 |
| 50 | 37.65 | 0.50 | 0.18 | 0.54 |
| 55 | 35.12 | 0.47 | 0.15 | 0.48 |
| 60 | 32.94 | 0.44 | 0.12 | 0.42 |
| 65 | 31.04 | 0.41 | 0.09 | 0.36 |
| 70 | 29.37 | 0.39 | 0.07 | 0.29 |
| 75 | 27.89 | 0.37 | 0.05 | 0.22 |
| 90 | 24.29 | 0.32 | 0.00 | 0.01 |
| 105 | 21.58 | 0.29 | -0.03 | -0.21 |
| 120 | 19.47 | 0.26 | -0.06 | -0.45 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 1.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 3.58 | 3.26 | 0.98 |
| 10 | 178.56 | 2.63 | 2.31 | 1.39 |
| 15 | 142.89 | 2.11 | 1.79 | 1.61 |
| 20 | 119.95 | 1.77 | 1.45 | 1.74 |
| 25 | 103.85 | 1.53 | 1.21 | 1.82 |
| 30 | 91.87 | 1.35 | 1.03 | 1.86 |
| 35 | 82.58 | 1.22 | 0.90 | 1.88 |
| 40 | 75.15 | 1.11 | 0.79 | 1.89 |
| 45 | 69.05 | 1.02 | 0.70 | 1.88 |
| 50 | 63.95 | 0.94 | 0.62 | 1.87 |
| 55 | 59.62 | 0.88 | 0.56 | 1.84 |
| 60 | 55.89 | 0.82 | 0.50 | 1.81 |
| 80 | 44.99 | 0.66 | 0.34 | 1.65 |
| 100 | 37.90 | 0.56 | 0.24 | 1.43 |
| 120 | 32.89 | 0.48 | 0.16 | 1.19 |
| 140 | 29.15 | 0.43 | 0.11 | 0.92 |
| 160 | 26.24 | 0.39 | 0.07 | 0.64 |
| 180 | 23.90 | 0.35 | 0.03 | 0.35 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #6**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.005 | ha | Qallow = | 0.32 | L/s |
| C = | 1.00 | | Vol(max) = | 2.4 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 4.29 | 3.97 | 1.19 |
| 10 | 214.27 | 3.16 | 2.84 | 1.70 |
| 15 | 171.47 | 2.53 | 2.21 | 1.99 |
| 20 | 143.94 | 2.12 | 1.80 | 2.16 |
| 25 | 124.62 | 1.84 | 1.52 | 2.27 |
| 30 | 110.24 | 1.62 | 1.30 | 2.35 |
| 35 | 99.09 | 1.46 | 1.14 | 2.39 |
| 40 | 90.17 | 1.33 | 1.01 | 2.42 |
| 45 | 82.86 | 1.22 | 0.90 | 2.43 |
| 50 | 76.74 | 1.13 | 0.81 | 2.43 |
| 55 | 71.55 | 1.05 | 0.73 | 2.42 |
| 60 | 67.07 | 0.99 | 0.67 | 2.41 |
| 65 | 63.18 | 0.93 | 0.61 | 2.38 |
| 70 | 59.75 | 0.88 | 0.56 | 2.35 |
| 75 | 56.71 | 0.84 | 0.52 | 2.32 |
| 90 | 49.33 | 0.73 | 0.41 | 2.20 |
| 105 | 43.80 | 0.65 | 0.33 | 2.05 |
| 120 | 39.47 | 0.58 | 0.26 | 1.88 |

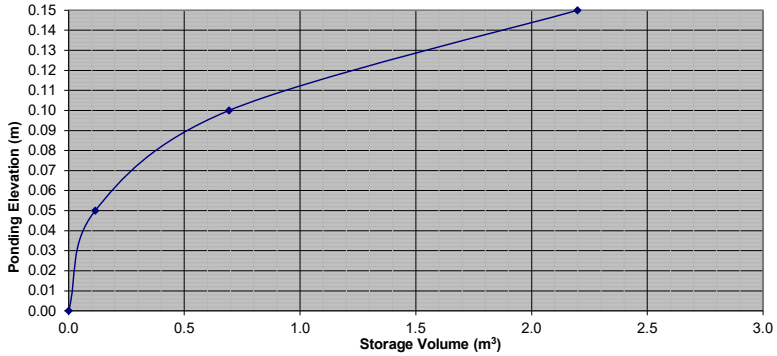
**Watts Accutrol Flow Control Roof Drains:** RD-100-A-ADJ set to closed

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.32 | 0.32 | 8 | 0.4 | |
| 1:5 Year | 0.32 | 0.32 | 10 | 0.7 | 2.2 |
| 1:100 Year | 0.32 | 0.32 | 15 | 1.9 | |

**Roof Drain Storage Table for Area RD 6**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 4.6 | 0.1 |
| 0.10 | 18.5 | 0.7 |
| 0.15 | 41.7 | 2.2 |

**Stage Storage Curve: Area A-6**
**Controlled Roof Drain #6**



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 2.7 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 5.73 | 5.02 | 1.51 |
| 10 | 76.81 | 4.25 | 3.54 | 2.12 |
| 15 | 61.77 | 3.42 | 2.71 | 2.43 |
| 20 | 52.03 | 2.88 | 2.17 | 2.60 |
| 25 | 45.17 | 2.50 | 1.79 | 2.68 |
| 30 | 40.04 | 2.21 | 1.50 | 2.71 |
| 35 | 36.06 | 1.99 | 1.28 | 2.70 |
| 40 | 32.86 | 1.82 | 1.11 | 2.66 |
| 45 | 30.24 | 1.67 | 0.96 | 2.60 |
| 50 | 28.04 | 1.55 | 0.84 | 2.52 |
| 55 | 26.17 | 1.45 | 0.74 | 2.43 |
| 60 | 24.56 | 1.36 | 0.65 | 2.33 |
| 65 | 23.15 | 1.28 | 0.57 | 2.22 |
| 70 | 21.91 | 1.21 | 0.50 | 2.11 |
| 75 | 20.81 | 1.15 | 0.44 | 1.98 |
| 90 | 18.14 | 1.00 | 0.29 | 1.58 |
| 105 | 16.13 | 0.89 | 0.18 | 1.15 |
| 120 | 14.56 | 0.81 | 0.10 | 0.69 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 4.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 7.81 | 7.02 | 2.10 |
| 10 | 104.19 | 5.76 | 4.97 | 2.98 |
| 15 | 83.56 | 4.62 | 3.83 | 3.45 |
| 20 | 70.25 | 3.88 | 3.09 | 3.71 |
| 25 | 60.90 | 3.37 | 2.58 | 3.87 |
| 30 | 53.93 | 2.98 | 2.19 | 3.95 |
| 35 | 48.52 | 2.68 | 1.89 | 3.97 |
| 40 | 44.18 | 2.44 | 1.65 | 3.97 |
| 45 | 40.63 | 2.25 | 1.46 | 3.93 |
| 50 | 37.65 | 2.08 | 1.29 | 3.88 |
| 55 | 35.12 | 1.94 | 1.15 | 3.80 |
| 60 | 32.94 | 1.82 | 1.03 | 3.71 |
| 65 | 31.04 | 1.72 | 0.93 | 3.61 |
| 70 | 29.37 | 1.62 | 0.83 | 3.50 |
| 75 | 27.89 | 1.54 | 0.75 | 3.38 |
| 90 | 24.29 | 1.34 | 0.55 | 2.99 |
| 105 | 21.58 | 1.19 | 0.40 | 2.54 |
| 120 | 19.47 | 1.08 | 0.29 | 2.06 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 9.0 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 14.91 | 13.96 | 4.19 |
| 10 | 178.56 | 10.97 | 10.02 | 6.01 |
| 15 | 142.89 | 8.78 | 7.83 | 7.05 |
| 20 | 119.95 | 7.37 | 6.42 | 7.70 |
| 25 | 103.85 | 6.38 | 5.43 | 8.15 |
| 30 | 91.87 | 5.64 | 4.69 | 8.45 |
| 35 | 82.58 | 5.07 | 4.12 | 8.66 |
| 40 | 75.15 | 4.62 | 3.67 | 8.80 |
| 45 | 69.05 | 4.24 | 3.29 | 8.89 |
| 50 | 63.95 | 3.93 | 2.98 | 8.94 |
| 55 | 59.62 | 3.66 | 2.71 | 8.95 |
| 60 | 55.89 | 3.43 | 2.48 | 8.94 |
| 80 | 44.99 | 2.76 | 1.81 | 8.71 |
| 100 | 37.90 | 2.33 | 1.38 | 8.27 |
| 120 | 32.89 | 2.02 | 1.07 | 7.71 |
| 140 | 29.15 | 1.79 | 0.84 | 7.06 |
| 160 | 26.24 | 1.61 | 0.66 | 6.36 |
| 180 | 23.90 | 1.47 | 0.52 | 5.60 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #7**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 11.4 | m3 |

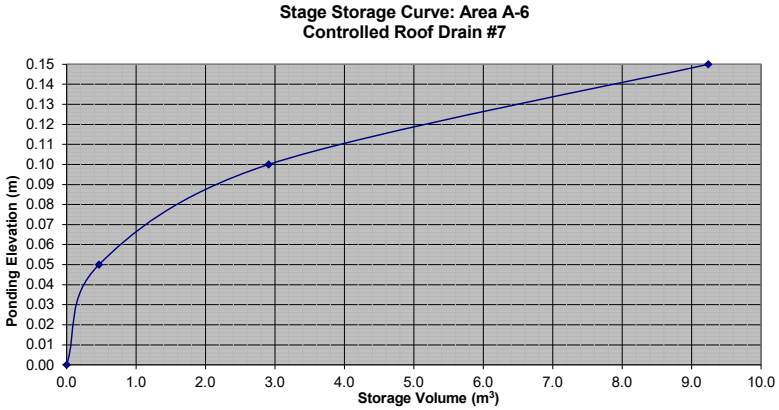
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 17.89 | 16.94 | 5.08 |
| 10 | 214.27 | 13.16 | 12.21 | 7.33 |
| 15 | 171.47 | 10.53 | 9.58 | 8.63 |
| 20 | 143.94 | 8.84 | 7.89 | 9.47 |
| 25 | 124.62 | 7.66 | 6.71 | 10.06 |
| 30 | 110.24 | 6.77 | 5.82 | 10.48 |
| 35 | 99.09 | 6.09 | 5.14 | 10.79 |
| 40 | 90.17 | 5.54 | 4.59 | 11.02 |
| 45 | 82.86 | 5.09 | 4.14 | 11.18 |
| 50 | 76.74 | 4.72 | 3.77 | 11.30 |
| 55 | 71.55 | 4.40 | 3.45 | 11.37 |
| 60 | 67.07 | 4.12 | 3.17 | 11.42 |
| 65 | 63.18 | 3.88 | 2.93 | 11.43 |
| 70 | 59.75 | 3.67 | 2.72 | 11.43 |
| 75 | 56.71 | 3.48 | 2.53 | 11.40 |
| 90 | 49.33 | 3.03 | 2.08 | 11.24 |
| 105 | 43.80 | 2.69 | 1.74 | 10.97 |
| 120 | 39.47 | 2.43 | 1.48 | 10.62 |

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

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 2.7 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 4.0 | 9.2 |
| 1:100 Year | 0.95 | 0.95 | 15 | 9.0 | |

**Roof Drain Storage Table for Area RD 7**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 18.6 | 0.5 |
| 0.10 | 79.1 | 2.9 |
| 0.15 | 174.2 | 9.2 |



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.71 | L/s |
| C = | 0.90 | | Vol(max) = | 2.7 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 5.70 | 4.99 | 1.50 |
| 10 | 76.81 | 4.23 | 3.52 | 2.11 |
| 15 | 61.77 | 3.40 | 2.69 | 2.42 |
| 20 | 52.03 | 2.86 | 2.15 | 2.58 |
| 25 | 45.17 | 2.49 | 1.78 | 2.66 |
| 30 | 40.04 | 2.20 | 1.49 | 2.69 |
| 35 | 36.06 | 1.98 | 1.27 | 2.68 |
| 40 | 32.86 | 1.81 | 1.10 | 2.64 |
| 45 | 30.24 | 1.66 | 0.95 | 2.58 |
| 50 | 28.04 | 1.54 | 0.83 | 2.50 |
| 55 | 26.17 | 1.44 | 0.73 | 2.41 |
| 60 | 24.56 | 1.35 | 0.64 | 2.31 |
| 65 | 23.15 | 1.27 | 0.56 | 2.20 |
| 70 | 21.91 | 1.21 | 0.50 | 2.08 |
| 75 | 20.81 | 1.15 | 0.44 | 1.96 |
| 90 | 18.14 | 1.00 | 0.29 | 1.56 |
| 105 | 16.13 | 0.89 | 0.18 | 1.12 |
| 120 | 14.56 | 0.80 | 0.09 | 0.66 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.79 | L/s |
| C = | 0.90 | | Vol(max) = | 3.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 7.77 | 6.98 | 2.09 |
| 10 | 104.19 | 5.74 | 4.95 | 2.97 |
| 15 | 83.56 | 4.60 | 3.81 | 3.43 |
| 20 | 70.25 | 3.87 | 3.08 | 3.69 |
| 25 | 60.90 | 3.35 | 2.56 | 3.84 |
| 30 | 53.93 | 2.97 | 2.18 | 3.92 |
| 35 | 48.52 | 2.67 | 1.88 | 3.95 |
| 40 | 44.18 | 2.43 | 1.64 | 3.94 |
| 45 | 40.63 | 2.24 | 1.45 | 3.91 |
| 50 | 37.65 | 2.07 | 1.28 | 3.85 |
| 55 | 35.12 | 1.93 | 1.14 | 3.77 |
| 60 | 32.94 | 1.81 | 1.02 | 3.68 |
| 65 | 31.04 | 1.71 | 0.92 | 3.58 |
| 70 | 29.37 | 1.62 | 0.83 | 3.47 |
| 75 | 27.89 | 1.54 | 0.75 | 3.35 |
| 90 | 24.29 | 1.34 | 0.55 | 2.95 |
| 105 | 21.58 | 1.19 | 0.40 | 2.51 |
| 120 | 19.47 | 1.07 | 0.28 | 2.03 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA A-6 Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 8.9 | m3 |

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 14.84 | 13.89 | 4.17 |
| 10 | 178.56 | 10.92 | 9.97 | 5.98 |
| 15 | 142.89 | 8.74 | 7.79 | 7.01 |
| 20 | 119.95 | 7.34 | 6.39 | 7.66 |
| 25 | 103.85 | 6.35 | 5.40 | 8.10 |
| 30 | 91.87 | 5.62 | 4.67 | 8.40 |
| 35 | 82.58 | 5.05 | 4.10 | 8.61 |
| 40 | 75.15 | 4.60 | 3.65 | 8.75 |
| 45 | 69.05 | 4.22 | 3.27 | 8.84 |
| 50 | 63.95 | 3.91 | 2.96 | 8.88 |
| 55 | 59.62 | 3.65 | 2.70 | 8.90 |
| 60 | 55.89 | 3.42 | 2.47 | 8.89 |
| 80 | 44.99 | 2.75 | 1.80 | 8.65 |
| 100 | 37.90 | 2.32 | 1.37 | 8.21 |
| 120 | 32.89 | 2.01 | 1.06 | 7.65 |
| 140 | 29.15 | 1.78 | 0.83 | 7.00 |
| 160 | 26.24 | 1.60 | 0.65 | 6.29 |
| 180 | 23.90 | 1.46 | 0.51 | 5.53 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**REQUIRED STORAGE - 1:100 YEAR + 20%**
**AREA A-6 Controlled Roof Drain #8**

OTTAWA IDF CURVE

| | | | | | |
|---|---|---|---|---|---|
| Area = | 0.022 | ha | Qallow = | 0.95 | L/s |
| C = | 1.00 | | Vol(max) = | 11.4 | m3 |

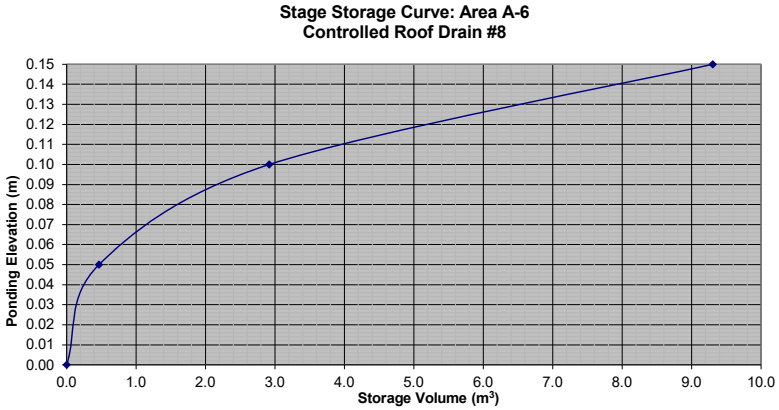
| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 17.81 | 16.86 | 5.06 |
| 10 | 214.27 | 13.10 | 12.15 | 7.29 |
| 15 | 171.47 | 10.49 | 9.54 | 8.58 |
| 20 | 143.94 | 8.80 | 7.85 | 9.42 |
| 25 | 124.62 | 7.62 | 6.67 | 10.01 |
| 30 | 110.24 | 6.74 | 5.79 | 10.43 |
| 35 | 99.09 | 6.06 | 5.11 | 10.73 |
| 40 | 90.17 | 5.52 | 4.57 | 10.96 |
| 45 | 82.86 | 5.07 | 4.12 | 11.12 |
| 50 | 76.74 | 4.69 | 3.74 | 11.23 |
| 55 | 71.55 | 4.38 | 3.43 | 11.31 |
| 60 | 67.07 | 4.10 | 3.15 | 11.35 |
| 65 | 63.18 | 3.86 | 2.91 | 11.36 |
| 70 | 59.75 | 3.65 | 2.70 | 11.36 |
| 75 | 56.71 | 3.47 | 2.52 | 11.33 |
| 90 | 49.33 | 3.02 | 2.07 | 11.16 |
| 105 | 43.80 | 2.68 | 1.73 | 10.89 |
| 120 | 39.47 | 2.41 | 1.46 | 10.54 |

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

| Design Event | Flow/Drain (L/s) | Total Flow (L/s) | Ponding (cm) | Storage ($m^3$) Required | Storage ($m^3$) Provided |
|---|---|---|---|---|---|
| 1:2 Year | 0.71 | 0.71 | 8 | 2.7 | |
| 1:5 Year | 0.79 | 0.79 | 10 | 3.9 | 9.3 |
| 1:100 Year | 0.95 | 0.95 | 15 | 8.9 | |

**Roof Drain Storage Table for Area RD 8**

| Elevation | Area RD 1 | Total Volume |
|---|---|---|
| m | $m^2$ | $m^3$ |
| 0.00 | 0 | 0 |
| 0.05 | 18.7 | 0.5 |
| 0.10 | 79.3 | 2.9 |
| 0.15 | 176.1 | 9.3 |



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:2 YEAR EVENT**
**AREA B-0a Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 2.0 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 2.72 | 0.70 | 0.21 |
| 10 | 76.81 | 2.02 | 0.00 | 0.00 |
| 15 | 61.77 | 1.62 | -0.39 | -0.36 |
| 20 | 52.03 | 1.37 | -0.65 | -0.78 |
| 25 | 45.17 | 1.19 | -0.83 | -1.25 |
| 30 | 40.04 | 1.05 | -0.96 | -1.74 |
| 35 | 36.06 | 0.95 | -1.07 | -2.25 |
| 40 | 32.86 | 0.86 | -1.15 | -2.77 |
| 45 | 30.24 | 0.79 | -1.22 | -3.30 |
| 50 | 28.04 | 0.74 | -1.28 | -3.84 |
| 55 | 26.17 | 0.69 | -1.33 | -4.39 |
| 60 | 24.56 | 0.64 | -1.37 | -4.94 |
| 65 | 23.15 | 0.61 | -1.41 | -5.49 |
| 70 | 21.91 | 0.58 | -1.44 | -6.05 |
| 75 | 20.81 | 0.55 | -1.47 | -6.61 |
| 90 | 18.14 | 0.48 | -1.54 | -8.31 |
| 105 | 16.13 | 0.42 | -1.59 | -10.03 |
| 120 | 14.56 | 0.38 | -1.63 | -11.76 |
| 135 | 13.30 | 0.35 | -1.67 | -13.50 |
| 150 | 12.25 | 0.32 | -1.69 | -15.25 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:5 YEAR EVENT**
**AREA B-0a Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 2.7 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 3.71 | 0.97 | 0.29 |
| 10 | 104.19 | 2.73 | 0.00 | 0.00 |
| 15 | 83.56 | 2.19 | -0.54 | -0.49 |
| 20 | 70.25 | 1.84 | -0.89 | -1.07 |
| 25 | 60.90 | 1.60 | -1.14 | -1.70 |
| 30 | 53.93 | 1.42 | -1.32 | -2.37 |
| 35 | 48.52 | 1.27 | -1.46 | -3.07 |
| 40 | 44.18 | 1.16 | -1.58 | -3.78 |
| 45 | 40.63 | 1.07 | -1.67 | -4.50 |
| 50 | 37.65 | 0.99 | -1.75 | -5.24 |
| 55 | 35.12 | 0.92 | -1.81 | -5.98 |
| 60 | 32.94 | 0.86 | -1.87 | -6.73 |
| 65 | 31.04 | 0.81 | -1.92 | -7.49 |
| 70 | 29.37 | 0.77 | -1.96 | -8.25 |
| 75 | 27.89 | 0.73 | -2.00 | -9.01 |
| 90 | 24.29 | 0.64 | -2.10 | -11.33 |
| 105 | 21.58 | 0.57 | -2.17 | -13.66 |
| 120 | 19.47 | 0.51 | -2.22 | -16.01 |
| 135 | 17.76 | 0.47 | -2.27 | -18.37 |
| 150 | 16.36 | 0.43 | -2.31 | -20.75 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YEAR EVENT**
**AREA B-0a Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 5.7 L/s
C = 0.30 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 7.75 | 2.05 | 0.61 |
| 10 | 178.56 | 5.70 | 0.00 | 0.00 |
| 15 | 142.89 | 4.56 | -1.14 | -1.03 |
| 20 | 119.95 | 3.83 | -1.87 | -2.25 |
| 25 | 103.85 | 3.32 | -2.39 | -3.58 |
| 30 | 91.87 | 2.93 | -2.77 | -4.98 |
| 35 | 82.58 | 2.64 | -3.07 | -6.44 |
| 40 | 75.15 | 2.40 | -3.30 | -7.93 |
| 45 | 69.05 | 2.21 | -3.50 | -9.44 |
| 50 | 63.95 | 2.04 | -3.66 | -10.98 |
| 55 | 59.62 | 1.90 | -3.80 | -12.54 |
| 60 | 55.89 | 1.79 | -3.92 | -14.10 |
| 65 | 52.65 | 1.68 | -4.02 | -15.68 |
| 70 | 49.79 | 1.59 | -4.11 | -17.27 |
| 75 | 47.26 | 1.51 | -4.19 | -18.87 |
| 90 | 41.11 | 1.31 | -4.39 | -23.71 |
| 105 | 36.50 | 1.17 | -4.54 | -28.59 |
| 120 | 32.89 | 1.05 | -4.65 | -33.50 |
| 135 | 30.00 | 0.96 | -4.75 | -38.43 |
| 150 | 27.61 | 0.88 | -4.82 | -43.39 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YR + 20% IDF Increase**
**AREA B-0a Un-Controlled Runoff - Legget Drive**

OTTAWA IDF CURVE

Area = 0.038 ha Qallow = 6.8 L/s
C = 0.30 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 9.30 | 2.46 | 0.74 |
| 10 | 214.27 | 6.84 | 0.00 | 0.00 |
| 15 | 171.47 | 5.48 | -1.37 | -1.23 |
| 20 | 143.94 | 4.60 | -2.25 | -2.70 |
| 25 | 124.62 | 3.98 | -2.86 | -4.30 |
| 30 | 110.24 | 3.52 | -3.32 | -5.98 |
| 35 | 99.09 | 3.17 | -3.68 | -7.73 |
| 40 | 90.17 | 2.88 | -3.96 | -9.51 |
| 45 | 82.86 | 2.65 | -4.20 | -11.33 |
| 50 | 76.74 | 2.45 | -4.39 | -13.18 |
| 55 | 71.55 | 2.29 | -4.56 | -15.04 |
| 60 | 67.07 | 2.14 | -4.70 | -16.93 |
| 65 | 63.18 | 2.02 | -4.83 | -18.82 |
| 70 | 59.75 | 1.91 | -4.94 | -20.73 |
| 75 | 56.71 | 1.81 | -5.03 | -22.65 |
| 90 | 49.33 | 1.58 | -5.27 | -28.45 |
| 105 | 43.80 | 1.40 | -5.44 | -34.30 |
| 120 | 39.47 | 1.26 | -5.58 | -40.20 |
| 135 | 36.00 | 1.15 | -5.69 | -46.12 |
| 150 | 33.13 | 1.06 | -5.79 | -52.07 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:2 YEAR EVENT**
**AREA B-0b Un-Controlled Runoff - Access Route**

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 3.0 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 4.09 | 1.06 | 0.32 |
| 10 | 76.81 | 3.03 | 0.00 | 0.00 |
| 15 | 61.77 | 2.44 | -0.59 | -0.53 |
| 20 | 52.03 | 2.05 | -0.98 | -1.17 |
| 25 | 45.17 | 1.78 | -1.25 | -1.87 |
| 30 | 40.04 | 1.58 | -1.45 | -2.61 |
| 35 | 36.06 | 1.42 | -1.61 | -3.38 |
| 40 | 32.86 | 1.30 | -1.73 | -4.16 |
| 45 | 30.24 | 1.19 | -1.84 | -4.96 |
| 50 | 28.04 | 1.11 | -1.93 | -5.78 |
| 55 | 26.17 | 1.03 | -2.00 | -6.60 |
| 60 | 24.56 | 0.97 | -2.06 | -7.43 |
| 65 | 23.15 | 0.91 | -2.12 | -8.26 |
| 70 | 21.91 | 0.87 | -2.17 | -9.10 |
| 75 | 20.81 | 0.82 | -2.21 | -9.95 |
| 90 | 18.14 | 0.72 | -2.32 | -12.51 |
| 105 | 16.13 | 0.64 | -2.40 | -15.09 |
| 120 | 14.56 | 0.57 | -2.46 | -17.69 |
| 135 | 13.30 | 0.52 | -2.51 | -20.31 |
| 150 | 12.25 | 0.48 | -2.55 | -22.93 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:5 YEAR EVENT**
**AREA B-0b Un-Controlled Runoff - Access Route**

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 4.1 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 5.57 | 1.46 | 0.44 |
| 10 | 104.19 | 4.11 | 0.00 | 0.00 |
| 15 | 83.56 | 3.30 | -0.81 | -0.73 |
| 20 | 70.25 | 2.77 | -1.34 | -1.61 |
| 25 | 60.90 | 2.40 | -1.71 | -2.56 |
| 30 | 53.93 | 2.13 | -1.98 | -3.57 |
| 35 | 48.52 | 1.92 | -2.20 | -4.62 |
| 40 | 44.18 | 1.74 | -2.37 | -5.69 |
| 45 | 40.63 | 1.60 | -2.51 | -6.78 |
| 50 | 37.65 | 1.49 | -2.63 | -7.88 |
| 55 | 35.12 | 1.39 | -2.73 | -9.00 |
| 60 | 32.94 | 1.30 | -2.81 | -10.13 |
| 65 | 31.04 | 1.23 | -2.89 | -11.26 |
| 70 | 29.37 | 1.16 | -2.95 | -12.41 |
| 75 | 27.89 | 1.10 | -3.01 | -13.55 |
| 90 | 24.29 | 0.96 | -3.15 | -17.03 |
| 105 | 21.58 | 0.85 | -3.26 | -20.55 |
| 120 | 19.47 | 0.77 | -3.34 | -24.08 |
| 135 | 17.76 | 0.70 | -3.41 | -27.64 |
| 150 | 16.36 | 0.65 | -3.47 | -31.20 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YEAR EVENT**
**AREA B-0b Un-Controlled Runoff - Access Route**

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 8.8 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 11.98 | 3.17 | 0.95 |
| 10 | 178.56 | 8.81 | 0.00 | 0.00 |
| 15 | 142.89 | 7.05 | -1.76 | -1.58 |
| 20 | 119.95 | 5.92 | -2.89 | -3.47 |
| 25 | 103.85 | 5.12 | -3.69 | -5.53 |
| 30 | 91.87 | 4.53 | -4.28 | -7.70 |
| 35 | 82.58 | 4.07 | -4.74 | -9.95 |
| 40 | 75.15 | 3.71 | -5.10 | -12.25 |
| 45 | 69.05 | 3.41 | -5.40 | -14.59 |
| 50 | 63.95 | 3.16 | -5.66 | -16.97 |
| 55 | 59.62 | 2.94 | -5.87 | -19.37 |
| 60 | 55.89 | 2.76 | -6.05 | -21.79 |
| 65 | 52.65 | 2.60 | -6.21 | -24.23 |
| 70 | 49.79 | 2.46 | -6.35 | -26.69 |
| 75 | 47.26 | 2.33 | -6.48 | -29.16 |
| 90 | 41.11 | 2.03 | -6.78 | -36.62 |
| 105 | 36.50 | 1.80 | -7.01 | -44.16 |
| 120 | 32.89 | 1.62 | -7.19 | -51.75 |
| 135 | 30.00 | 1.48 | -7.33 | -59.38 |
| 150 | 27.61 | 1.36 | -7.45 | -67.04 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YR + 20% IDF Increase**
**AREA B-0b Un-Controlled Runoff - Access Route**

OTTAWA IDF CURVE

Area = 0.071 ha Qallow = 10.6 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 14.37 | 3.80 | 1.14 |
| 10 | 214.27 | 10.57 | 0.00 | 0.00 |
| 15 | 171.47 | 8.46 | -2.11 | -1.90 |
| 20 | 143.94 | 7.10 | -3.47 | -4.16 |
| 25 | 124.62 | 6.15 | -4.42 | -6.64 |
| 30 | 110.24 | 5.44 | -5.13 | -9.24 |
| 35 | 99.09 | 4.89 | -5.68 | -11.94 |
| 40 | 90.17 | 4.45 | -6.12 | -14.70 |
| 45 | 82.86 | 4.09 | -6.48 | -17.51 |
| 50 | 76.74 | 3.79 | -6.79 | -20.36 |
| 55 | 71.55 | 3.53 | -7.04 | -23.24 |
| 60 | 67.07 | 3.31 | -7.26 | -26.15 |
| 65 | 63.18 | 3.12 | -7.46 | -29.08 |
| 70 | 59.75 | 2.95 | -7.62 | -32.02 |
| 75 | 56.71 | 2.80 | -7.78 | -34.99 |
| 90 | 49.33 | 2.43 | -8.14 | -43.95 |
| 105 | 43.80 | 2.16 | -8.41 | -53.00 |
| 120 | 39.47 | 1.95 | -8.63 | -62.10 |
| 135 | 36.00 | 1.78 | -8.80 | -71.26 |
| 150 | 33.13 | 1.63 | -8.94 | -80.44 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)**

OTTAWA IDF CURVE
Area = 0.795 ha
C = 0.90
Qpeak = 22.5 L/s
Qavg = 11.3 L/s
Vol(max) = 135.8 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 206.02 | 194.77 | 58.43 |
| 10 | 76.81 | 152.78 | 141.53 | 84.92 |
| 15 | 61.77 | 122.86 | 111.61 | 100.45 |
| 20 | 52.03 | 103.50 | 92.25 | 110.70 |
| 25 | 45.17 | 89.84 | 78.59 | 117.89 |
| 30 | 40.04 | 79.65 | 68.40 | 123.12 |
| 35 | 36.06 | 71.73 | 60.48 | 127.00 |
| 40 | 32.86 | 65.37 | 54.12 | 129.89 |
| 45 | 30.24 | 60.15 | 48.90 | 132.03 |
| 50 | 28.04 | 55.78 | 44.53 | 133.58 |
| 55 | 26.17 | 52.06 | 40.81 | 134.66 |
| 60 | 24.56 | 48.85 | 37.60 | 135.36 |
| 65 | 23.15 | 46.05 | 34.80 | 135.72 |
| 70 | 21.91 | 43.59 | 32.34 | 135.82 |
| 75 | 20.81 | 41.40 | 30.15 | 135.68 |
| 90 | 18.14 | 36.09 | 24.84 | 134.13 |
| 105 | 16.13 | 32.09 | 20.84 | 131.31 |
| 120 | 14.56 | 28.97 | 17.72 | 127.55 |
| 135 | 13.30 | 26.45 | 15.20 | 123.10 |
| 150 | 12.25 | 24.37 | 13.12 | 118.08 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)**

OTTAWA IDF CURVE
Area = 0.795 ha
C = 0.90
Qpeak = 27.2 L/s
Qavg = 13.6 L/s
Vol(max) = 188.4 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 280.83 | 267.23 | 80.17 |
| 10 | 104.19 | 207.26 | 193.66 | 116.19 |
| 15 | 83.56 | 166.21 | 152.61 | 137.35 |
| 20 | 70.25 | 139.74 | 126.14 | 151.37 |
| 25 | 60.90 | 121.13 | 107.53 | 161.30 |
| 30 | 53.93 | 107.27 | 93.67 | 168.61 |
| 35 | 48.52 | 96.51 | 82.91 | 174.11 |
| 40 | 44.18 | 87.89 | 74.29 | 178.29 |
| 45 | 40.63 | 80.82 | 67.22 | 181.48 |
| 50 | 37.65 | 74.90 | 61.30 | 183.89 |
| 55 | 35.12 | 69.87 | 56.27 | 185.68 |
| 60 | 32.94 | 65.53 | 51.93 | 186.95 |
| 65 | 31.04 | 61.75 | 48.15 | 187.79 |
| 70 | 29.37 | 58.43 | 44.83 | 188.27 |
| 75 | 27.89 | 55.47 | 41.87 | 188.43 |
| 90 | 24.29 | 48.31 | 34.71 | 187.45 |
| 105 | 21.58 | 42.93 | 29.33 | 184.78 |
| 120 | 19.47 | 38.72 | 25.12 | 180.89 |
| 135 | 17.76 | 35.34 | 21.74 | 176.07 |
| 150 | 16.36 | 32.55 | 18.95 | 170.52 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)**

OTTAWA IDF CURVE
Area = 0.795 ha
C = 1.00
Qpeak = 41.0 L/s
Qavg = 20.5 L/s
Vol(max) = 380.0 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 536.42 | 515.92 | 154.77 |
| 10 | 178.56 | 394.65 | 374.15 | 224.49 |
| 15 | 142.89 | 315.82 | 295.32 | 265.79 |
| 20 | 119.95 | 265.11 | 244.61 | 293.53 |
| 25 | 103.85 | 229.52 | 209.02 | 313.53 |
| 30 | 91.87 | 203.04 | 182.54 | 328.58 |
| 35 | 82.58 | 182.51 | 162.01 | 340.23 |
| 40 | 75.15 | 166.08 | 145.58 | 349.40 |
| 45 | 69.05 | 152.61 | 132.11 | 356.71 |
| 50 | 63.95 | 141.35 | 120.85 | 362.55 |
| 55 | 59.62 | 131.78 | 111.28 | 367.22 |
| 60 | 55.89 | 123.54 | 103.04 | 370.93 |
| 65 | 52.65 | 116.36 | 95.86 | 373.84 |
| 70 | 49.79 | 110.04 | 89.54 | 376.08 |
| 75 | 47.26 | 104.44 | 83.94 | 377.74 |
| 90 | 41.11 | 90.86 | 70.36 | 379.96 |
| 105 | 36.50 | 80.67 | 60.17 | 379.04 |
| 120 | 32.89 | 72.70 | 52.20 | 375.86 |
| 135 | 30.00 | 66.30 | 45.80 | 370.97 |
| 150 | 27.61 | 61.02 | 40.52 | 364.72 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA B-1 Controlled Site Flows (R&D Lab Internal SWM Tank)**

OTTAWA IDF CURVE
Area = 0.795 ha
C = 1.00
Qpeak = 41.0 L/s
Qavg = 20.5 L/s
Vol(max) = 480.7 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 643.70 | 623.20 | 186.96 |
| 10 | 214.27 | 473.57 | 453.07 | 271.84 |
| 15 | 171.47 | 378.98 | 358.48 | 322.64 |
| 20 | 143.94 | 318.13 | 297.63 | 357.16 |
| 25 | 124.62 | 275.42 | 254.92 | 382.38 |
| 30 | 110.24 | 243.65 | 223.15 | 401.68 |
| 35 | 99.09 | 219.01 | 198.51 | 416.88 |
| 40 | 90.17 | 199.30 | 178.80 | 429.12 |
| 45 | 82.86 | 183.14 | 162.64 | 439.12 |
| 50 | 76.74 | 169.62 | 149.12 | 447.36 |
| 55 | 71.55 | 158.13 | 137.63 | 454.19 |
| 60 | 67.07 | 148.24 | 127.74 | 459.88 |
| 65 | 63.18 | 139.63 | 119.13 | 464.60 |
| 70 | 59.75 | 132.05 | 111.55 | 468.52 |
| 75 | 56.71 | 125.33 | 104.83 | 471.74 |
| 90 | 49.33 | 109.03 | 88.53 | 478.09 |
| 105 | 43.80 | 96.80 | 76.30 | 480.68 |
| 120 | 39.47 | 87.24 | 66.74 | 480.56 |
| 135 | 36.00 | 79.56 | 59.06 | 478.37 |
| 150 | 33.13 | 73.23 | 52.73 | 474.56 |

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| SWM TANK | 1000 | 400.00 | 79.80 | | 77.95 |
| CBMH 266 | 1200 | 1.13 | 79.78 | 77.94 | 77.89 |
| - | - | - | - | - | - |

**PI =** 3.141592654
**PIPE I.D.=** 457.2 PVC
**U/G Storage Pipe Volume**
End Area 0.164 ($m^2$)
Total Length 1.0 (m)
Pipe Volume 0.2 ($m^3$)

**Area B-1: Storage Table**

| Elevation (m) | System Depth (m) | SWM TANK Volume ($m^3$) | CBMH 266 Volume ($m^3$) | - - - | Combined Volume ($m^3$) | Surface Storage: SWM TANK Area ($m^2$) | SWM TANK Volume ($m^3$) | CBMH 266 Area ($m^2$) | CBMH 266 Volume ($m^3$) | - Area ($m^2$) | - Volume ($m^3$) | Total Storage: Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77.89 | 0.00 | 0.00 | 0.00 | | 0.16 | - | - | - | - | - | - | - | **0** | - |
| 78.30 | 0.35 | 140.00 | 0.46 | | 140.63 | - | - | - | - | - | - | - | **140.6** | 0.26 |
| 78.42 | 0.47 | 188.00 | 0.60 | | 188.76 | - | - | - | - | - | - | - | **188.8** | 0.38 |
| 78.90 | 0.95 | 380.00 | 1.14 | | 381.31 | - | - | - | - | - | - | - | **381.3** | 0.86 |
| 78.95 | 1.00 | 400.00 | 1.20 | | 401.36 | - | - | - | - | - | - | - | **401.4** | 0.91 |
| 79.78 | 1.83 | 400.00 | 2.14 | | 402.30 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **402.3** | 1.74 |
| 79.83 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **402.3** | 1.79 |
| 79.88 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **402.3** | 1.84 |
| 79.93 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **402.3** | 1.89 |

**Tempest HF Type D ICD**

**1:100 Yr**
Flow (L/s) = 41.0
Head (m) = 0.86
Elevation (m) = **78.90**
Outlet Pipe Dia.(mm) = 301
Volume (m3) = 380.0

**1:5 Yr**
Flow (L/s) = 27.2
Head (m) = 0.38
Elevation (m) = **78.42**
Outlet Pipe Dia.(mm) = 301
Volume (m3) = 188.4

**1:2 Yr**
Flow (L/s) = 22.5
Head (m) = 0.26
Elevation (m) = **78.30**
Outlet Pipe Dia.(mm) = 301
Volume (m3) = 135.8

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

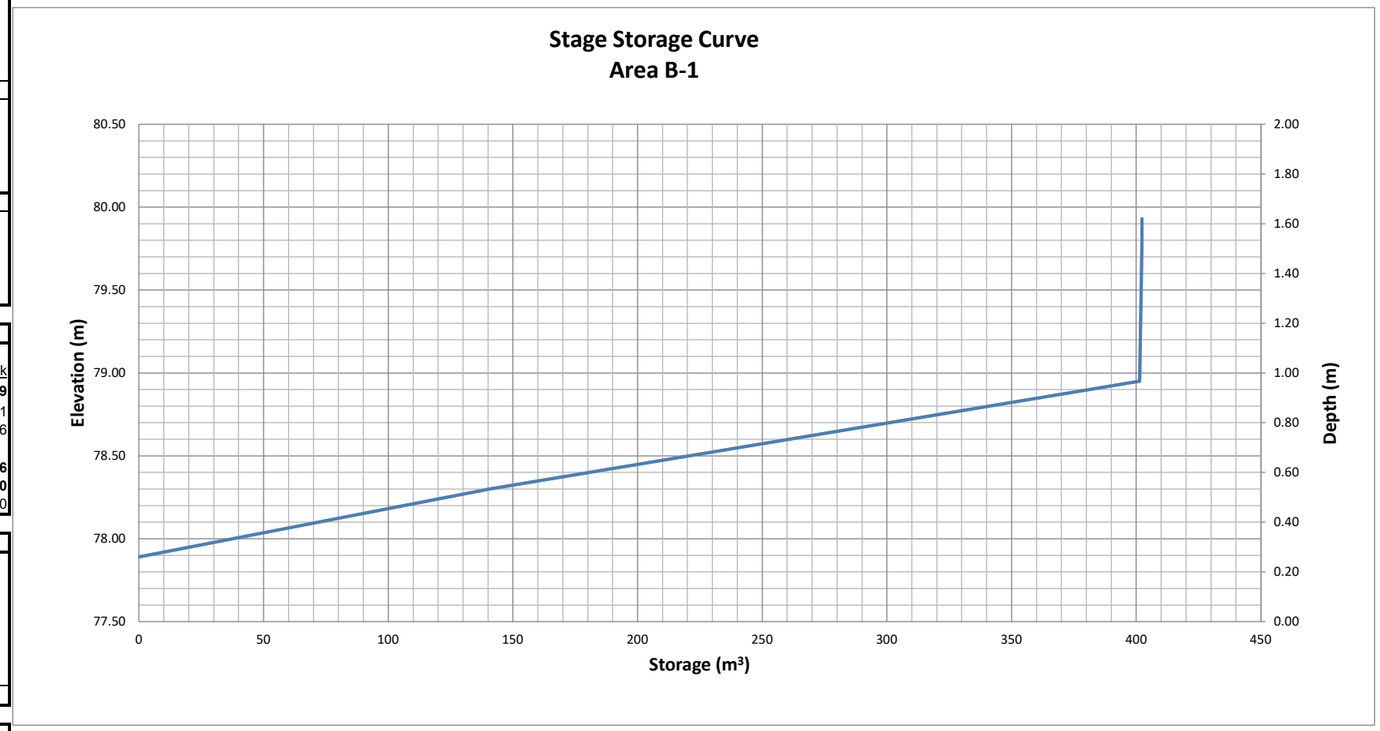
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0410 | **0.0409** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **0.86** | 0.86 |
| A ($m^2$) = | **0.01610348** | **0.01606** |
| D (m) = | **0.143190736** | **0.14300** |
| D (mm) = | **143** | 143.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0272 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.38** |
| A ($m^2$) = | **0.01606** |
| D (m) = | **0.143** |
| D (mm) = | **143** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0225 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.26** |
| A ($m^2$) = | **0.01606** |
| D (m) = | **0.143** |
| D (mm) = | **143** |



**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)**

OTTAWA IDF CURVE — Qpeak = 31.9 L/s
Area = 0.584 ha — Qavg = 16.0 L/s
C = 0.66 — Vol(max) = 48.3 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 110.36 | 94.41 | 28.32 |
| 10 | 76.81 | 81.84 | 65.89 | 39.53 |
| 15 | 61.77 | 65.82 | 49.87 | 44.88 |
| 20 | 52.03 | 55.44 | 39.49 | 47.39 |
| 25 | 45.17 | 48.13 | 32.18 | 48.27 |
| 30 | 40.04 | 42.67 | 26.72 | 48.09 |
| 35 | 36.06 | 38.42 | 22.47 | 47.19 |
| 40 | 32.86 | 35.02 | 19.07 | 45.77 |
| 45 | 30.24 | 32.22 | 16.27 | 43.93 |
| 50 | 28.04 | 29.88 | 13.93 | 41.79 |
| 55 | 26.17 | 27.89 | 11.94 | 39.39 |
| 60 | 24.56 | 26.17 | 10.22 | 36.78 |
| 65 | 23.15 | 24.67 | 8.72 | 34.00 |
| 70 | 21.91 | 23.35 | 7.40 | 31.08 |
| 75 | 20.81 | 22.18 | 6.23 | 28.02 |
| 90 | 18.14 | 19.33 | 3.38 | 18.26 |
| 105 | 16.13 | 17.19 | 1.24 | 7.82 |
| 120 | 14.56 | 15.52 | -0.43 | -3.12 |
| 135 | 13.30 | 14.17 | -1.78 | -14.44 |
| 150 | 12.25 | 13.05 | -2.90 | -26.06 |

**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)**

OTTAWA IDF CURVE — Qpeak = 35.8 L/s
Area = 0.584 ha — Qavg = 17.9 L/s
C = 0.66 — Vol(max) = 71.2 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 150.43 | 132.53 | 39.76 |
| 10 | 104.19 | 111.02 | 93.12 | 55.87 |
| 15 | 83.56 | 89.04 | 71.14 | 64.02 |
| 20 | 70.25 | 74.86 | 56.96 | 68.35 |
| 25 | 60.90 | 64.89 | 46.99 | 70.48 |
| 30 | 53.93 | 57.46 | 39.56 | 71.21 |
| 35 | 48.52 | 51.70 | 33.80 | 70.98 |
| 40 | 44.18 | 47.08 | 29.18 | 70.03 |
| 45 | 40.63 | 43.29 | 25.39 | 68.56 |
| 50 | 37.65 | 40.12 | 22.22 | 66.67 |
| 55 | 35.12 | 37.43 | 19.53 | 64.44 |
| 60 | 32.94 | 35.10 | 17.20 | 61.93 |
| 65 | 31.04 | 33.08 | 15.18 | 59.20 |
| 70 | 29.37 | 31.30 | 13.40 | 56.27 |
| 75 | 27.89 | 29.72 | 11.82 | 53.18 |
| 90 | 24.29 | 25.88 | 7.98 | 43.10 |
| 105 | 21.58 | 23.00 | 5.10 | 32.11 |
| 120 | 19.47 | 20.74 | 2.84 | 20.48 |
| 135 | 17.76 | 18.93 | 1.03 | 8.34 |
| 150 | 16.36 | 17.43 | -0.47 | -4.19 |

**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)**

OTTAWA IDF CURVE — Qpeak = 48.0 L/s
Area = 0.584 ha — Qavg = 24.0 L/s
C = 0.74 — Vol(max) = 159.1 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 291.51 | 267.51 | 80.25 |
| 10 | 178.56 | 214.47 | 190.47 | 114.28 |
| 15 | 142.89 | 171.63 | 147.63 | 132.87 |
| 20 | 119.95 | 144.07 | 120.07 | 144.09 |
| 25 | 103.85 | 124.73 | 100.73 | 151.10 |
| 30 | 91.87 | 110.34 | 86.34 | 155.42 |
| 35 | 82.58 | 99.19 | 75.19 | 157.89 |
| 40 | 75.15 | 90.26 | 66.26 | 159.02 |
| 45 | 69.05 | 82.94 | 58.94 | 159.13 |
| 50 | 63.95 | 76.82 | 52.82 | 158.45 |
| 55 | 59.62 | 71.61 | 47.61 | 157.13 |
| 60 | 55.89 | 67.14 | 43.14 | 155.29 |
| 65 | 52.65 | 63.23 | 39.23 | 153.01 |
| 70 | 49.79 | 59.80 | 35.80 | 150.37 |
| 75 | 47.26 | 56.76 | 32.76 | 147.41 |
| 90 | 41.11 | 49.38 | 25.38 | 137.04 |
| 105 | 36.50 | 43.84 | 19.84 | 124.97 |
| 120 | 32.89 | 39.51 | 15.51 | 111.67 |
| 135 | 30.00 | 36.03 | 12.03 | 97.44 |
| 150 | 27.61 | 33.16 | 9.16 | 82.47 |

**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA B-2 Controlled Site Flows (Plaza & Entrance Dropoff)**

OTTAWA IDF CURVE — Qpeak = 48.0 L/s
Area = 0.584 ha — Qavg = 24.0 L/s
C = 0.74 — Vol(max) = 204.5 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 349.82 | 325.82 | 97.74 |
| 10 | 214.27 | 257.36 | 233.36 | 140.02 |
| 15 | 171.47 | 205.96 | 181.96 | 163.76 |
| 20 | 143.94 | 172.89 | 148.89 | 178.67 |
| 25 | 124.62 | 149.68 | 125.68 | 188.52 |
| 30 | 110.24 | 132.41 | 108.41 | 195.14 |
| 35 | 99.09 | 119.02 | 95.02 | 199.55 |
| 40 | 90.17 | 108.31 | 84.31 | 202.34 |
| 45 | 82.86 | 99.52 | 75.52 | 203.92 |
| 50 | 76.74 | 92.18 | 68.18 | 204.54 |
| 55 | 71.55 | 85.94 | 61.94 | 204.39 |
| 60 | 67.07 | 80.56 | 56.56 | 203.62 |
| 65 | 63.18 | 75.88 | 51.88 | 202.34 |
| 70 | 59.75 | 71.76 | 47.76 | 200.60 |
| 75 | 56.71 | 68.11 | 44.11 | 198.50 |
| 90 | 49.33 | 59.25 | 35.25 | 190.37 |
| 105 | 43.80 | 52.60 | 28.60 | 180.21 |
| 120 | 39.47 | 47.41 | 23.41 | 168.57 |
| 135 | 36.00 | 43.24 | 19.24 | 155.81 |
| 150 | 33.13 | 39.80 | 15.80 | 142.16 |

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| UG STORAGE | 1144 | 112.10 | 82.10 | | 79.58 |
| CMBH 254-259 | 1200 | 7.92 | VARIES | 79.54 | 79.14 |
| CBMH 260 | 1200 | 1.13 | 81.15 | 78.93 | 78.90 |

**PI =** 3.141592654
**PIPE I.D.=** 304.2 PVC
**U/G Storage Pipe Volume**
End Area 0.073 ($m^2$)
Total Length 230.7 (m)
Pipe Volume 16.8 ($m^3$)

**Area B-2: Storage Table**

| Elevation (m) | System Depth (m) | UG STORAGE Volume ($m^3$) | CMBH 254-259 Volume ($m^3$) | CBMH 260 Volume ($m^3$) | Underground Storage Combined Volume ($m^3$) | Surface Storage: UG STORAGE Area ($m^2$) | UG STORAGE Volume ($m^3$) | CMBH 254-259 Area ($m^2$) | CMBH 254-259 Volume ($m^3$) | CBMH 260 Area ($m^2$) | CBMH 260 Volume ($m^3$) | Total Storage: Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78.90 | 0.00 | 0.00 | 0.00 | 0.00 | 16.77 | - | - | - | - | - | - | - | **0** | - |
| 79.81 | 0.23 | 25.78 | 5.30 | 1.03 | 48.88 | - | - | - | - | - | - | - | **48.9** | 0.72 |
| 80.00 | 0.42 | 47.08 | 6.81 | 1.24 | 71.90 | - | - | - | - | - | - | - | **71.9** | 0.91 |
| 80.72 | 1.14 | 127.80 | 12.51 | 2.06 | 159.13 | - | - | - | - | - | - | - | **159.1** | 1.63 |
| 80.73 | 1.15 | 127.80 | 12.59 | 2.07 | 159.22 | - | - | - | - | - | - | - | **159.2** | 1.64 |
| 81.15 | 1.57 | 127.80 | 15.91 | 2.54 | 163.02 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **163.0** | 2.06 |
| 81.20 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **163.0** | 2.11 |
| 81.25 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **163.0** | 2.16 |
| 81.30 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **163.0** | 2.21 |

**Tempest HF Type D ICD**

**1:100 Yr**
Flow (L/s) = 48.0
Head (m) = 1.64
Elevation (m) = **80.73**
Outlet Pipe Dia.(mm) = 382
Volume (m3) = 159.1

**1:5 Yr**
Flow (L/s) = 35.8
Head (m) = 0.91
Elevation (m) = **80.00**
Outlet Pipe Dia.(mm) = 382
Volume (m3) = 71.2

**1:2 Yr**
Flow (L/s) = 31.9
Head (m) = 0.72
Elevation (m) = **79.81**
Outlet Pipe Dia.(mm) = 382
Volume (m3) = 48.3

**Orifice Size - 1:100 yr Flow Check**

Q=0.62xAx(2gh)^0.5

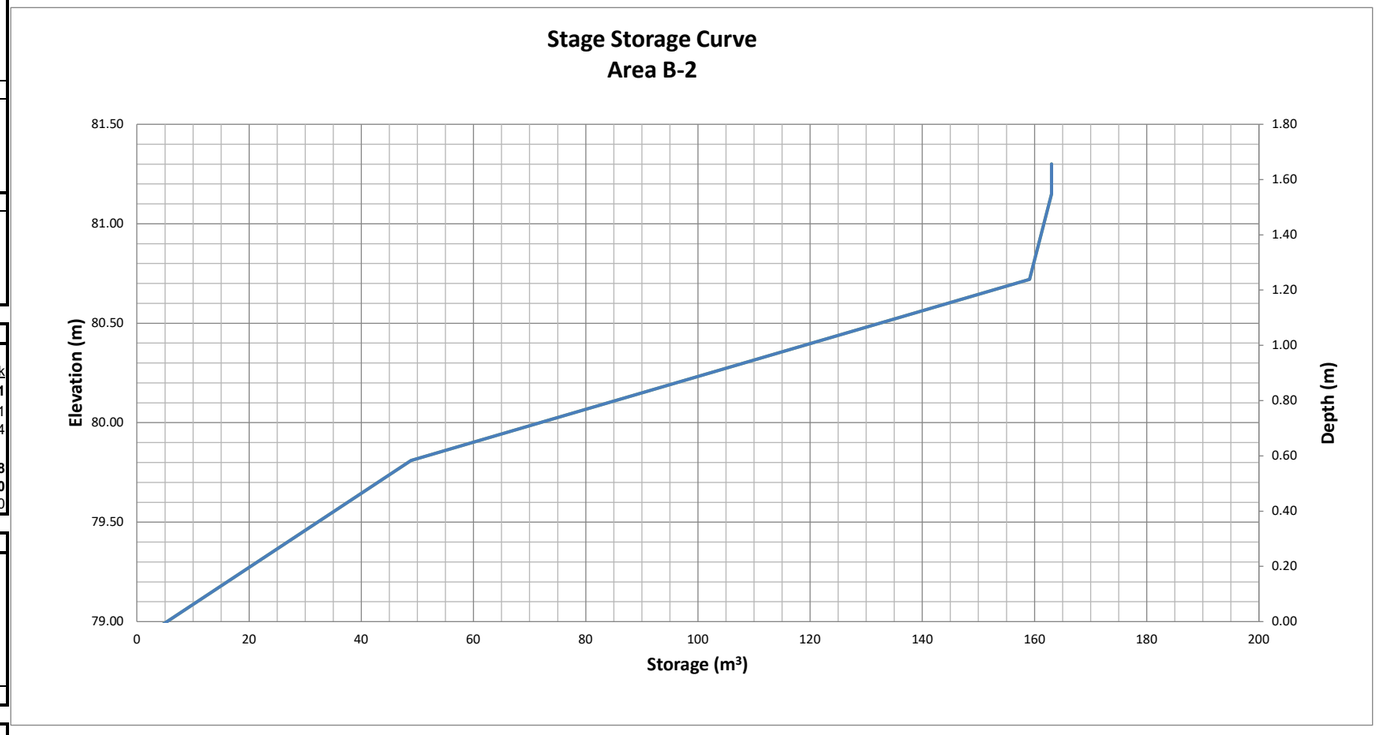
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0480 | **0.0481** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **1.64** | 1.64 |
| A ($m^2$) = | **0.013652449** | **0.01368** |
| D (m) = | **0.131843992** | **0.13200** |
| D (mm) = | **132** | 132.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0358 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.91** |
| A ($m^2$) = | **0.01368** |
| D (m) = | **0.132** |
| D (mm) = | **132** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0319 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.72** |
| A ($m^2$) = | **0.01368** |
| D (m) = | **0.132** |
| D (mm) = | **132** |



**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA B-3 Controlled Site Flows (Parking Structure)**

OTTAWA IDF CURVE — Qpeak = 23.7 L/s
Area = 1.187 ha — Qavg = 11.9 L/s
C = 0.89 — Vol(max) = 222.2 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 302.53 | 290.68 | 87.21 |
| 10 | 76.81 | 224.35 | 212.50 | 127.50 |
| 15 | 61.77 | 180.42 | 168.57 | 151.72 |
| 20 | 52.03 | 151.98 | 140.13 | 168.16 |
| 25 | 45.17 | 131.93 | 120.08 | 180.13 |
| 30 | 40.04 | 116.97 | 105.12 | 189.21 |
| 35 | 36.06 | 105.33 | 93.48 | 196.31 |
| 40 | 32.86 | 96.00 | 84.15 | 201.95 |
| 45 | 30.24 | 88.33 | 76.48 | 206.50 |
| 50 | 28.04 | 81.91 | 70.06 | 210.18 |
| 55 | 26.17 | 76.44 | 64.59 | 213.16 |
| 60 | 24.56 | 71.73 | 59.88 | 215.58 |
| 65 | 23.15 | 67.62 | 55.77 | 217.52 |
| 70 | 21.91 | 64.01 | 52.16 | 219.06 |
| 75 | 20.81 | 60.80 | 48.95 | 220.26 |
| 90 | 18.14 | 53.00 | 41.15 | 222.19 |
| 105 | 16.13 | 47.13 | 35.28 | 222.24 |
| 120 | 14.56 | 42.54 | 30.69 | 220.94 |
| 135 | 13.30 | 38.84 | 26.99 | 218.60 |
| 150 | 12.25 | 35.79 | 23.94 | 215.44 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA B-3 Controlled Site Flows (Parking Structure)**

OTTAWA IDF CURVE — Qpeak = 29.8 L/s
Area = 1.187 ha — Qavg = 14.9 L/s
C = 0.89 — Vol(max) = 303.3 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 412.39 | 397.49 | 119.25 |
| 10 | 104.19 | 304.35 | 289.45 | 173.67 |
| 15 | 83.56 | 244.07 | 229.17 | 206.26 |
| 20 | 70.25 | 205.21 | 190.31 | 228.37 |
| 25 | 60.90 | 177.88 | 162.98 | 244.47 |
| 30 | 53.93 | 157.52 | 142.62 | 256.72 |
| 35 | 48.52 | 141.72 | 126.82 | 266.32 |
| 40 | 44.18 | 129.06 | 114.16 | 273.99 |
| 45 | 40.63 | 118.68 | 103.78 | 280.20 |
| 50 | 37.65 | 109.99 | 95.09 | 285.26 |
| 55 | 35.12 | 102.60 | 87.70 | 289.40 |
| 60 | 32.94 | 96.23 | 81.33 | 292.78 |
| 65 | 31.04 | 90.68 | 75.78 | 295.54 |
| 70 | 29.37 | 85.80 | 70.90 | 297.76 |
| 75 | 27.89 | 81.46 | 66.56 | 299.53 |
| 90 | 24.29 | 70.95 | 56.05 | 302.65 |
| 105 | 21.58 | 63.04 | 48.14 | 303.30 |
| 120 | 19.47 | 56.87 | 41.97 | 302.15 |
| 135 | 17.76 | 51.89 | 36.99 | 299.63 |
| 150 | 16.36 | 47.79 | 32.89 | 296.05 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA B-3 Controlled Site Flows (Parking Structure)**

OTTAWA IDF CURVE — Qpeak = 46.0 L/s
Area = 1.187 ha — Qavg = 23.0 L/s
C = 0.98 — Vol(max) = 603.6 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 788.18 | 765.18 | 229.56 |
| 10 | 178.56 | 579.87 | 556.87 | 334.12 |
| 15 | 142.89 | 464.05 | 441.05 | 396.95 |
| 20 | 119.95 | 389.54 | 366.54 | 439.85 |
| 25 | 103.85 | 337.24 | 314.24 | 471.37 |
| 30 | 91.87 | 298.34 | 275.34 | 495.62 |
| 35 | 82.58 | 268.17 | 245.17 | 514.87 |
| 40 | 75.15 | 244.04 | 221.04 | 530.48 |
| 45 | 69.05 | 224.24 | 201.24 | 543.35 |
| 50 | 63.95 | 207.69 | 184.69 | 554.08 |
| 55 | 59.62 | 193.63 | 170.63 | 563.08 |
| 60 | 55.89 | 181.52 | 158.52 | 570.67 |
| 65 | 52.65 | 170.97 | 147.97 | 577.08 |
| 70 | 49.79 | 161.69 | 138.69 | 582.51 |
| 75 | 47.26 | 153.46 | 130.46 | 587.08 |
| 90 | 41.11 | 133.51 | 110.51 | 596.74 |
| 105 | 36.50 | 118.53 | 95.53 | 601.81 |
| 120 | 32.89 | 106.83 | 83.83 | 603.55 |
| 135 | 30.00 | 97.42 | 74.42 | 602.76 |
| 150 | 27.61 | 89.67 | 66.67 | 599.99 |
| 165 | 25.61 | 83.16 | 60.16 | 595.63 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA B-3 Controlled Site Flows (Parking Structure)**

OTTAWA IDF CURVE — Qpeak = 46.0 L/s
Area = 1.187 ha — Qavg = 23.0 L/s
C = 0.98 — Vol(max) = 761.4 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 945.82 | 922.82 | 276.85 |
| 10 | 214.27 | 695.85 | 672.85 | 403.71 |
| 15 | 171.47 | 556.86 | 533.86 | 480.47 |
| 20 | 143.94 | 467.45 | 444.45 | 533.34 |
| 25 | 124.62 | 404.69 | 381.69 | 572.54 |
| 30 | 110.24 | 358.01 | 335.01 | 603.02 |
| 35 | 99.09 | 321.81 | 298.81 | 627.50 |
| 40 | 90.17 | 292.84 | 269.84 | 647.62 |
| 45 | 82.86 | 269.09 | 246.09 | 664.44 |
| 50 | 76.74 | 249.23 | 226.23 | 678.69 |
| 55 | 71.55 | 232.35 | 209.35 | 690.87 |
| 60 | 67.07 | 217.82 | 194.82 | 701.36 |
| 65 | 63.18 | 205.16 | 182.16 | 710.44 |
| 70 | 59.75 | 194.03 | 171.03 | 718.33 |
| 75 | 56.71 | 184.16 | 161.16 | 725.20 |
| 90 | 49.33 | 160.21 | 137.21 | 740.93 |
| 105 | 43.80 | 142.23 | 119.23 | 751.15 |
| 120 | 39.47 | 128.19 | 105.19 | 757.38 |
| 135 | 36.00 | 116.90 | 93.90 | 760.58 |
| 150 | 33.13 | 107.60 | 84.60 | 761.39 |

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| UG STORAGE | 1144 | 526.11 | 80.37 | | 78.22 |
| CB 209-210 | 1200 | 2.26 | 80.10 | | 78.33 |
| STMMH 110 | 1200 | 1.13 | 80.22 | 78.21 | 78.19 |

**PI =** 3.141592654
**PIPE I.D.=** 381 PVC
**U/G Storage Pipe Volume**
End Area 0.114 ($m^2$)
Total Length 18.8 (m)
Pipe Volume 2.1 ($m^3$)

**Area B-3: Storage Table**

| Elevation (m) | System Depth (m) | UG STORAGE Volume ($m^3$) | CB 209-210 Volume ($m^3$) | STMMH 110 Volume ($m^3$) | Underground Storage Combined Volume ($m^3$) | Surface Storage UG STORAGE Area ($m^2$) | UG STORAGE Volume ($m^3$) | CB 209-210 Area ($m^2$) | CB 209-210 Volume ($m^3$) | STMMH 110 Area ($m^2$) | STMMH 110 Volume ($m^3$) | Total Storage Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78.19 | 0.00 | 0.00 | 0.00 | 0.00 | 2.14 | - | - | - | - | - | - | - | **0** | - |
| 78.64 | 0.42 | 220.97 | 0.70 | 0.51 | 224.32 | - | - | - | - | - | - | - | **224.3** | 0.26 |
| 78.79 | 0.57 | 299.88 | 1.04 | 0.68 | 303.75 | - | - | - | - | - | - | - | **303.7** | 0.41 |
| 79.36 | 1.14 | 599.77 | 2.33 | 1.32 | 605.56 | - | - | - | - | - | - | - | **605.6** | 0.98 |
| 79.73 | 1.51 | 599.77 | 3.17 | 1.74 | 606.82 | - | - | - | - | - | - | - | **606.8** | 1.35 |
| 80.00 | 1.78 | 599.77 | 3.78 | 2.05 | 607.73 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **607.7** | 1.62 |
| 80.05 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **607.7** | 1.67 |
| 80.10 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **607.7** | 1.72 |
| 80.15 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **607.7** | 1.77 |

**Tempest HF Type D ICD**

**1:100 Yr**
Flow (L/s) = 46.0
Head (m) = 0.98
Elevation (m) = **79.36**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 603.6

**1:5 Yr**
Flow (L/s) = 29.8
Head (m) = 0.41
Elevation (m) = **78.79**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 303.3

**1:2 Yr**
Flow (L/s) = 23.7
Head (m) = 0.26
Elevation (m) = **78.64**
Outlet Pipe Dia.(mm) = 381
Volume (m3) = 222.2

**Orifice Size - 1:100 yr Flow Check**

Q=0.62xAx(2gh)^0.5

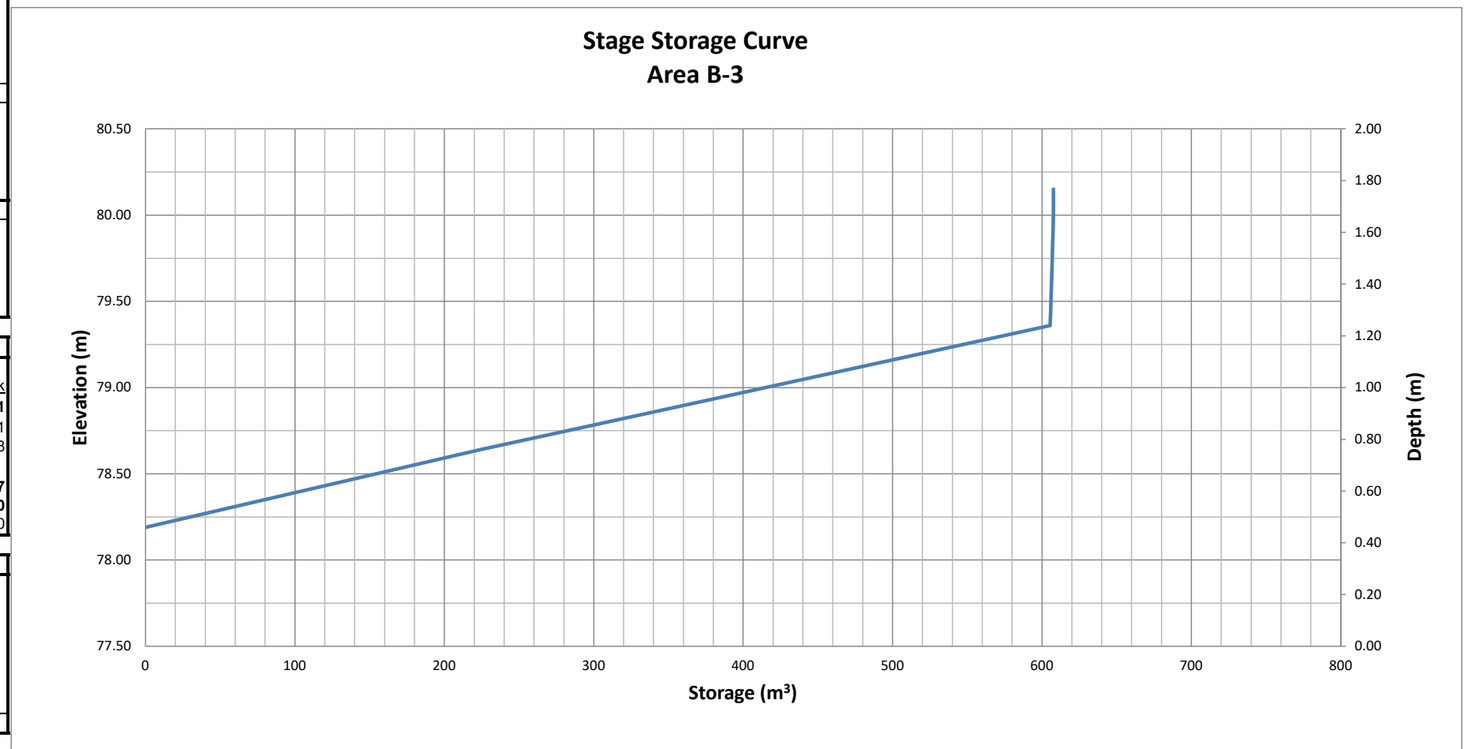
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0460 | **0.0461** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **0.98** | 0.98 |
| A ($m^2$) = | **0.016924444** | **0.01697** |
| D (m) = | **0.14679534** | **0.14700** |
| D (mm) = | **147** | 147.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0298 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.41** |
| A ($m^2$) = | **0.01697** |
| D (m) = | **0.147** |
| D (mm) = | **147** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0237 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.26** |
| A ($m^2$) = | **0.01697** |
| D (m) = | **0.147** |
| D (mm) = | **147** |



**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA B-4 Controlled Site Flows (Access Route)**

OTTAWA IDF CURVE — Qpeak = 19.6 L/s
Area = 0.752 ha — Qavg = 9.8 L/s
C = 0.88 — Vol(max) = 127.4 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 189.66 | 179.86 | 53.96 |
| 10 | 76.81 | 140.64 | 130.84 | 78.51 |
| 15 | 61.77 | 113.11 | 103.31 | 92.98 |
| 20 | 52.03 | 95.28 | 85.48 | 102.58 |
| 25 | 45.17 | 82.71 | 72.91 | 109.36 |
| 30 | 40.04 | 73.33 | 63.53 | 114.35 |
| 35 | 36.06 | 66.03 | 56.23 | 118.09 |
| 40 | 32.86 | 60.18 | 50.38 | 120.91 |
| 45 | 30.24 | 55.37 | 45.57 | 123.05 |
| 50 | 28.04 | 51.35 | 41.55 | 124.65 |
| 55 | 26.17 | 47.92 | 38.12 | 125.81 |
| 60 | 24.56 | 44.97 | 35.17 | 126.61 |
| 65 | 23.15 | 42.39 | 32.59 | 127.12 |
| 70 | 21.91 | 40.13 | 30.33 | 127.37 |
| 75 | 20.81 | 38.11 | 28.31 | 127.41 |
| 90 | 18.14 | 33.22 | 23.42 | 126.48 |
| 105 | 16.13 | 29.54 | 19.74 | 124.39 |
| 120 | 14.56 | 26.67 | 16.87 | 121.43 |
| 135 | 13.30 | 24.35 | 14.55 | 117.83 |
| 150 | 12.25 | 22.44 | 12.64 | 113.72 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA B-4 Controlled Site Flows (Access Route)**

OTTAWA IDF CURVE — Qpeak = 23.7 L/s
Area = 0.752 ha — Qavg = 11.9 L/s
C = 0.88 — Vol(max) = 176.5 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 258.52 | 246.67 | 74.00 |
| 10 | 104.19 | 190.80 | 178.95 | 107.37 |
| 15 | 83.56 | 153.01 | 141.16 | 127.04 |
| 20 | 70.25 | 128.64 | 116.79 | 140.15 |
| 25 | 60.90 | 111.51 | 99.66 | 149.49 |
| 30 | 53.93 | 98.75 | 86.90 | 156.42 |
| 35 | 48.52 | 88.84 | 76.99 | 161.69 |
| 40 | 44.18 | 80.91 | 69.06 | 165.74 |
| 45 | 40.63 | 74.40 | 62.55 | 168.88 |
| 50 | 37.65 | 68.95 | 57.10 | 171.30 |
| 55 | 35.12 | 64.32 | 52.47 | 173.14 |
| 60 | 32.94 | 60.33 | 48.48 | 174.51 |
| 65 | 31.04 | 56.85 | 45.00 | 175.49 |
| 70 | 29.37 | 53.79 | 41.94 | 176.13 |
| 75 | 27.89 | 51.07 | 39.22 | 176.49 |
| 90 | 24.29 | 44.48 | 32.63 | 176.18 |
| 105 | 21.58 | 39.52 | 27.67 | 174.33 |
| 120 | 19.47 | 35.65 | 23.80 | 171.35 |
| 135 | 17.76 | 32.53 | 20.68 | 167.52 |
| 150 | 16.36 | 29.96 | 18.11 | 163.01 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA B-4 Controlled Site Flows (Access Route)**

OTTAWA IDF CURVE — Qpeak = 35.0 L/s
Area = 0.752 ha — Qavg = 17.5 L/s
C = 0.97 — Vol(max) = 358.0 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 494.30 | 476.80 | 143.04 |
| 10 | 178.56 | 363.66 | 346.16 | 207.69 |
| 15 | 142.89 | 291.02 | 273.52 | 246.17 |
| 20 | 119.95 | 244.29 | 226.79 | 272.15 |
| 25 | 103.85 | 211.50 | 194.00 | 291.00 |
| 30 | 91.87 | 187.10 | 169.60 | 305.28 |
| 35 | 82.58 | 168.18 | 150.68 | 316.43 |
| 40 | 75.15 | 153.04 | 135.54 | 325.30 |
| 45 | 69.05 | 140.63 | 123.13 | 332.45 |
| 50 | 63.95 | 130.25 | 112.75 | 338.25 |
| 55 | 59.62 | 121.43 | 103.93 | 342.97 |
| 60 | 55.89 | 113.84 | 96.34 | 346.81 |
| 65 | 52.65 | 107.22 | 89.72 | 349.91 |
| 70 | 49.79 | 101.40 | 83.90 | 352.39 |
| 75 | 47.26 | 96.24 | 78.74 | 354.34 |
| 90 | 41.11 | 83.73 | 66.23 | 357.63 |
| 105 | 36.50 | 74.33 | 56.83 | 358.04 |
| 120 | 32.89 | 66.99 | 49.49 | 356.36 |
| 135 | 30.00 | 61.09 | 43.59 | 353.10 |
| 150 | 27.61 | 56.23 | 38.73 | 348.59 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA B-4 Controlled Site Flows (Access Route)**

OTTAWA IDF CURVE — Qpeak = 35.0 L/s
Area = 0.752 ha — Qavg = 17.5 L/s
C = 0.97 — Vol(max) = 452.8 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 593.16 | 575.66 | 172.70 |
| 10 | 214.27 | 436.39 | 418.89 | 251.33 |
| 15 | 171.47 | 349.23 | 331.73 | 298.55 |
| 20 | 143.94 | 293.15 | 275.65 | 330.78 |
| 25 | 124.62 | 253.80 | 236.30 | 354.45 |
| 30 | 110.24 | 224.52 | 207.02 | 372.64 |
| 35 | 99.09 | 201.82 | 184.32 | 387.07 |
| 40 | 90.17 | 183.65 | 166.15 | 398.76 |
| 45 | 82.86 | 168.76 | 151.26 | 408.39 |
| 50 | 76.74 | 156.30 | 138.80 | 416.40 |
| 55 | 71.55 | 145.72 | 128.22 | 423.12 |
| 60 | 67.07 | 136.60 | 119.10 | 428.77 |
| 65 | 63.18 | 128.67 | 111.17 | 433.55 |
| 70 | 59.75 | 121.68 | 104.18 | 437.57 |
| 75 | 56.71 | 115.49 | 97.99 | 440.96 |
| 90 | 49.33 | 100.47 | 82.97 | 448.05 |
| 105 | 43.80 | 89.20 | 71.70 | 451.70 |
| 120 | 39.47 | 80.39 | 62.89 | 452.83 |
| 135 | 36.00 | 73.31 | 55.81 | 452.07 |
| 150 | 33.13 | 67.48 | 49.98 | 449.81 |

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| UG STORAGE | 1144 | 313.61 | 80.07 | | 77.71 |
| STMMH 115 | 1200 | 1.13 | 79.95 | 77.70 | 77.67 |
| STMMH 116 | 1200 | 1.13 | 79.66 | 77.64 | 77.59 |

**PI =** 3.141592654
**PIPE I.D.=** 381 Concrete Pipe)
**U/G Storage Pipe Volume**
End Area 0.114 ($m^2$)
Total Length 37.6 (m)
Pipe Volume 4.3 ($m^3$)

**Area B-4: Storage Table**

| Elevation (m) | System Depth (m) | UG STORAGE Volume ($m^3$) | STMMH 115 Volume ($m^3$) | STMMH 116 Volume ($m^3$) | Underground Storage: Combined Volume ($m^3$) | Surface Storage: UG STORAGE Area ($m^2$) | UG STORAGE Volume ($m^3$) | STMMH 115 Area ($m^2$) | STMMH 115 Volume ($m^3$) | STMMH 116 Area ($m^2$) | STMMH 116 Volume ($m^3$) | Total Storage: Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 77.59 | 0.00 | 0.00 | 0.00 | 0.00 | 4.29 | - | - | - | - | - | - | - | **0** | - |
| 78.11 | 0.40 | 125.44 | 0.50 | 0.59 | 130.82 | - | - | - | - | - | - | - | **130.8** | 0.33 |
| 78.26 | 0.55 | 172.48 | 0.67 | 0.76 | 178.20 | - | - | - | - | - | - | - | **178.2** | 0.48 |
| 78.83 | 1.12 | 351.24 | 1.31 | 1.40 | 358.24 | - | - | - | - | - | - | - | **358.2** | 1.05 |
| 78.85 | 1.14 | 357.51 | 1.33 | 1.43 | 364.56 | - | - | - | - | - | - | - | **364.6** | 1.07 |
| 79.10 | 1.39 | 357.51 | 1.62 | 1.71 | 365.12 | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **365.1** | 1.32 |
| 79.15 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **365.1** | 1.37 |
| 79.20 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **365.1** | 1.42 |
| 79.25 | | | | | | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0 | **365.1** | 1.47 |

**Tempest HF Type C ICD**

**1:100 Yr**
Flow (L/s) = 35.0
Head (m) = 1.05
Elevation (m) = **78.83**
Outlet Pipe Dia.(mm) = 382
Volume (m3) = 358.0

**1:5 Yr**
Flow (L/s) = 23.7
Head (m) = 0.48
Elevation (m) = **78.26**
Outlet Pipe Dia.(mm) = 382
Volume (m3) = 176.5

**1:2 Yr**
Flow (L/s) = 19.6
Head (m) = 0.33
Elevation (m) = **78.11**
Outlet Pipe Dia.(mm) = 382
Volume (m3) = 127.4

**Orifice Size - 1:100 yr Flow Check**

Q=0.62xAx(2gh)^0.5

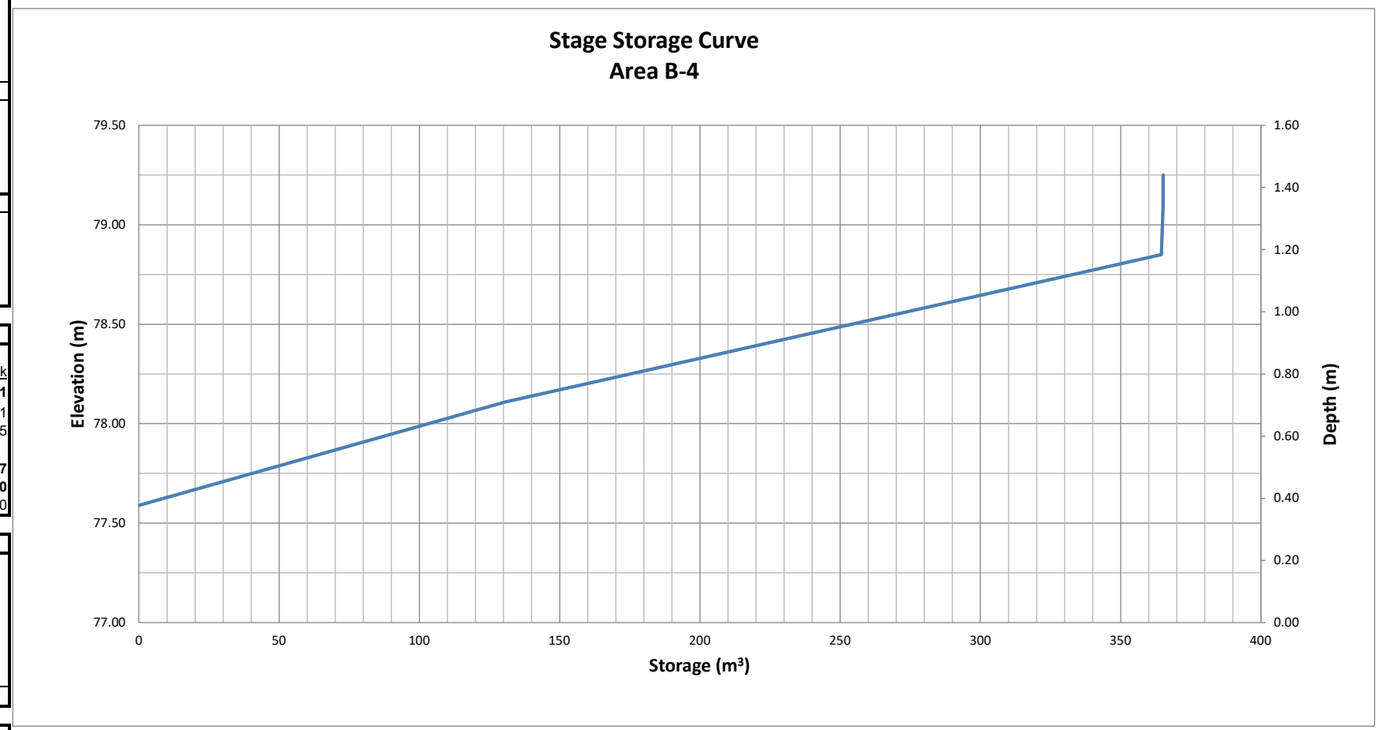
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0350 | **0.0351** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **1.05** | 1.05 |
| A ($m^2$) = | **0.012443401** | **0.01247** |
| D (m) = | **0.12587069** | **0.12600** |
| D (mm) = | **126** | 126.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0237 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.48** |
| A ($m^2$) = | **0.01247** |
| D (m) = | **0.126** |
| D (mm) = | **126** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0196 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.33** |
| A ($m^2$) = | **0.01247** |
| D (m) = | **0.126** |
| D (mm) = | **126** |



**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:2 YEAR EVENT**
**AREA C-0 Un-Controlled Runoff - Retained Lands**

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 2.7 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 3.68 | 0.95 | 0.28 |
| 10 | 76.81 | 2.73 | 0.00 | 0.00 |
| 15 | 61.77 | 2.19 | -0.53 | -0.48 |
| 20 | 52.03 | 1.85 | -0.88 | -1.06 |
| 25 | 45.17 | 1.60 | -1.12 | -1.68 |
| 30 | 40.04 | 1.42 | -1.30 | -2.35 |
| 35 | 36.06 | 1.28 | -1.45 | -3.04 |
| 40 | 32.86 | 1.17 | -1.56 | -3.74 |
| 45 | 30.24 | 1.07 | -1.65 | -4.46 |
| 50 | 28.04 | 1.00 | -1.73 | -5.19 |
| 55 | 26.17 | 0.93 | -1.80 | -5.93 |
| 60 | 24.56 | 0.87 | -1.85 | -6.68 |
| 65 | 23.15 | 0.82 | -1.90 | -7.43 |
| 70 | 21.91 | 0.78 | -1.95 | -8.18 |
| 75 | 20.81 | 0.74 | -1.99 | -8.94 |
| 90 | 18.14 | 0.64 | -2.08 | -11.24 |
| 105 | 16.13 | 0.57 | -2.15 | -13.57 |
| 120 | 14.56 | 0.52 | -2.21 | -15.91 |
| 135 | 13.30 | 0.47 | -2.25 | -18.26 |
| 150 | 12.25 | 0.43 | -2.29 | -20.62 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:5 YEAR EVENT**
**AREA C-0 Un-Controlled Runoff - Retained Lands**

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 3.7 L/s
C = 0.20 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 5.01 | 1.31 | 0.39 |
| 10 | 104.19 | 3.70 | 0.00 | 0.00 |
| 15 | 83.56 | 2.97 | -0.73 | -0.66 |
| 20 | 70.25 | 2.49 | -1.20 | -1.45 |
| 25 | 60.90 | 2.16 | -1.54 | -2.30 |
| 30 | 53.93 | 1.91 | -1.78 | -3.21 |
| 35 | 48.52 | 1.72 | -1.98 | -4.15 |
| 40 | 44.18 | 1.57 | -2.13 | -5.11 |
| 45 | 40.63 | 1.44 | -2.26 | -6.09 |
| 50 | 37.65 | 1.34 | -2.36 | -7.08 |
| 55 | 35.12 | 1.25 | -2.45 | -8.09 |
| 60 | 32.94 | 1.17 | -2.53 | -9.10 |
| 65 | 31.04 | 1.10 | -2.60 | -10.12 |
| 70 | 29.37 | 1.04 | -2.66 | -11.15 |
| 75 | 27.89 | 0.99 | -2.71 | -12.19 |
| 90 | 24.29 | 0.86 | -2.84 | -15.31 |
| 105 | 21.58 | 0.77 | -2.93 | -18.47 |
| 120 | 19.47 | 0.69 | -3.01 | -21.65 |
| 135 | 17.76 | 0.63 | -3.07 | -24.85 |
| 150 | 16.36 | 0.58 | -3.12 | -28.05 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YEAR EVENT**
**AREA C-0 Un-Controlled Runoff - Retained Lands**

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 7.9 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 10.77 | 2.85 | 0.85 |
| 10 | 178.56 | 7.92 | 0.00 | 0.00 |
| 15 | 142.89 | 6.34 | -1.58 | -1.42 |
| 20 | 119.95 | 5.32 | -2.60 | -3.12 |
| 25 | 103.85 | 4.61 | -3.32 | -4.97 |
| 30 | 91.87 | 4.08 | -3.85 | -6.92 |
| 35 | 82.58 | 3.66 | -4.26 | -8.94 |
| 40 | 75.15 | 3.33 | -4.59 | -11.01 |
| 45 | 69.05 | 3.06 | -4.86 | -13.12 |
| 50 | 63.95 | 2.84 | -5.09 | -15.26 |
| 55 | 59.62 | 2.65 | -5.28 | -17.42 |
| 60 | 55.89 | 2.48 | -5.44 | -19.60 |
| 65 | 52.65 | 2.34 | -5.59 | -21.79 |
| 70 | 49.79 | 2.21 | -5.71 | -24.00 |
| 75 | 47.26 | 2.10 | -5.83 | -26.22 |
| 90 | 41.11 | 1.82 | -6.10 | -32.94 |
| 105 | 36.50 | 1.62 | -6.30 | -39.72 |
| 120 | 32.89 | 1.46 | -6.46 | -46.54 |
| 135 | 30.00 | 1.33 | -6.59 | -53.40 |
| 150 | 27.61 | 1.23 | -6.70 | -60.29 |

**Proposed Nokia Ottawa Innovation Campus**
**Novatech Project No. 123043**
**Uncontrolled Runoff - 1:100 YR + 20% IDF Increase**
**AREA C-0 Un-Controlled Runoff - Retained Lands**

OTTAWA IDF CURVE

Area = 0.064 ha Qallow = 9.5 L/s
C = 0.25 Vol(max) = 0.0 m3

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 12.92 | 3.42 | 1.02 |
| 10 | 214.27 | 9.51 | 0.00 | 0.00 |
| 15 | 171.47 | 7.61 | -1.90 | -1.71 |
| 20 | 143.94 | 6.39 | -3.12 | -3.75 |
| 25 | 124.62 | 5.53 | -3.98 | -5.97 |
| 30 | 110.24 | 4.89 | -4.62 | -8.31 |
| 35 | 99.09 | 4.40 | -5.11 | -10.73 |
| 40 | 90.17 | 4.00 | -5.51 | -13.22 |
| 45 | 82.86 | 3.68 | -5.83 | -15.74 |
| 50 | 76.74 | 3.41 | -6.10 | -18.31 |
| 55 | 71.55 | 3.18 | -6.33 | -20.90 |
| 60 | 67.07 | 2.98 | -6.53 | -23.52 |
| 65 | 63.18 | 2.80 | -6.70 | -26.15 |
| 70 | 59.75 | 2.65 | -6.86 | -28.80 |
| 75 | 56.71 | 2.52 | -6.99 | -31.46 |
| 90 | 49.33 | 2.19 | -7.32 | -39.52 |
| 105 | 43.80 | 1.94 | -7.56 | -47.66 |
| 120 | 39.47 | 1.75 | -7.76 | -55.85 |
| 135 | 36.00 | 1.60 | -7.91 | -64.08 |
| 150 | 33.13 | 1.47 | -8.04 | -72.34 |

**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA C-1 Controlled Site Flows (Retained Lands)**

OTTAWA IDF CURVE — Qpeak = 26.1 L/s
Area = 0.642 ha — Qavg = 13.1 L/s
C = 0.20 — Vol(max) = 8.6 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 37.03 | 23.98 | 7.19 |
| 10 | 76.81 | 27.46 | 14.41 | 8.65 |
| 15 | 61.77 | 22.08 | 9.03 | 8.13 |
| 20 | 52.03 | 18.60 | 5.55 | 6.66 |
| 25 | 45.17 | 16.15 | 3.10 | 4.65 |
| 30 | 40.04 | 14.32 | 1.27 | 2.28 |
| 35 | 36.06 | 12.89 | -0.16 | -0.33 |
| 40 | 32.86 | 11.75 | -1.30 | -3.12 |
| 45 | 30.24 | 10.81 | -2.24 | -6.05 |
| 50 | 28.04 | 10.03 | -3.02 | -9.07 |
| 55 | 26.17 | 9.36 | -3.69 | -12.19 |
| 60 | 24.56 | 8.78 | -4.27 | -15.37 |
| 65 | 23.15 | 8.28 | -4.77 | -18.62 |
| 70 | 21.91 | 7.83 | -5.22 | -21.91 |
| 75 | 20.81 | 7.44 | -5.61 | -25.24 |
| 90 | 18.14 | 6.49 | -6.56 | -35.44 |
| 105 | 16.13 | 5.77 | -7.28 | -45.88 |
| 120 | 14.56 | 5.21 | -7.84 | -56.48 |
| 135 | 13.30 | 4.75 | -8.30 | -67.20 |
| 150 | 12.25 | 4.38 | -8.67 | -78.03 |

**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA C-1 Controlled Site Flows (Retained Lands)**

OTTAWA IDF CURVE — Qpeak = 26.5 L/s
Area = 0.642 ha — Qavg = 13.3 L/s
C = 0.20 — Vol(max) = 15.0 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 50.47 | 37.22 | 11.17 |
| 10 | 104.19 | 37.25 | 24.00 | 14.40 |
| 15 | 83.56 | 29.87 | 16.62 | 14.96 |
| 20 | 70.25 | 25.12 | 11.87 | 14.24 |
| 25 | 60.90 | 21.77 | 8.52 | 12.78 |
| 30 | 53.93 | 19.28 | 6.03 | 10.85 |
| 35 | 48.52 | 17.35 | 4.10 | 8.60 |
| 40 | 44.18 | 15.80 | 2.55 | 6.11 |
| 45 | 40.63 | 14.53 | 1.28 | 3.44 |
| 50 | 37.65 | 13.46 | 0.21 | 0.63 |
| 55 | 35.12 | 12.56 | -0.69 | -2.29 |
| 60 | 32.94 | 11.78 | -1.47 | -5.30 |
| 65 | 31.04 | 11.10 | -2.15 | -8.39 |
| 70 | 29.37 | 10.50 | -2.75 | -11.55 |
| 75 | 27.89 | 9.97 | -3.28 | -14.76 |
| 90 | 24.29 | 8.68 | -4.57 | -24.66 |
| 105 | 21.58 | 7.72 | -5.53 | -34.86 |
| 120 | 19.47 | 6.96 | -6.29 | -45.29 |
| 135 | 17.76 | 6.35 | -6.90 | -55.88 |
| 150 | 16.36 | 5.85 | -7.40 | -66.60 |

**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA C-1 Controlled Site Flows (Retained Lands)**

OTTAWA IDF CURVE — Qpeak = 27.0 L/s
Area = 0.642 ha — Qavg = 13.5 L/s
C = 0.25 — Vol(max) = 49.6 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 108.44 | 94.94 | 28.48 |
| 10 | 178.56 | 79.78 | 66.28 | 39.77 |
| 15 | 142.89 | 63.85 | 50.35 | 45.31 |
| 20 | 119.95 | 53.60 | 40.10 | 48.11 |
| 25 | 103.85 | 46.40 | 32.90 | 49.35 |
| 30 | 91.87 | 41.05 | 27.55 | 49.59 |
| 35 | 82.58 | 36.90 | 23.40 | 49.13 |
| 40 | 75.15 | 33.58 | 20.08 | 48.18 |
| 45 | 69.05 | 30.85 | 17.35 | 46.85 |
| 50 | 63.95 | 28.58 | 15.08 | 45.23 |
| 55 | 59.62 | 26.64 | 13.14 | 43.36 |
| 60 | 55.89 | 24.97 | 11.47 | 41.31 |
| 65 | 52.65 | 23.52 | 10.02 | 39.09 |
| 70 | 49.79 | 22.25 | 8.75 | 36.74 |
| 75 | 47.26 | 21.11 | 7.61 | 34.27 |
| 90 | 41.11 | 18.37 | 4.87 | 26.29 |
| 105 | 36.50 | 16.31 | 2.81 | 17.69 |
| 120 | 32.89 | 14.70 | 1.20 | 8.63 |
| 135 | 30.00 | 13.40 | -0.10 | -0.79 |
| 150 | 27.61 | 12.34 | -1.16 | -10.47 |

**Proposed Nokia Development** — Storage Calculations Using Average
**Novatech Project No. 123043** — Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA C-1 Controlled Site Flows (Retained Lands)**

OTTAWA IDF CURVE — Qpeak = 27.0 L/s
Area = 0.642 ha — Qavg = 13.5 L/s
C = 0.25 — Vol(max) = 64.6 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 130.13 | 116.63 | 34.99 |
| 10 | 214.27 | 95.74 | 82.24 | 49.34 |
| 15 | 171.47 | 76.62 | 63.12 | 56.81 |
| 20 | 143.94 | 64.31 | 50.81 | 60.98 |
| 25 | 124.62 | 55.68 | 42.18 | 63.27 |
| 30 | 110.24 | 49.26 | 35.76 | 64.36 |
| 35 | 99.09 | 44.28 | 30.78 | 64.63 |
| 40 | 90.17 | 40.29 | 26.79 | 64.30 |
| 45 | 82.86 | 37.02 | 23.52 | 63.51 |
| 50 | 76.74 | 34.29 | 20.79 | 62.37 |
| 55 | 71.55 | 31.97 | 18.47 | 60.95 |
| 60 | 67.07 | 29.97 | 16.47 | 59.29 |
| 65 | 63.18 | 28.23 | 14.73 | 57.44 |
| 70 | 59.75 | 26.70 | 13.20 | 55.42 |
| 75 | 56.71 | 25.34 | 11.84 | 53.27 |
| 90 | 49.33 | 22.04 | 8.54 | 46.13 |
| 105 | 43.80 | 19.57 | 6.07 | 38.24 |
| 120 | 39.47 | 17.64 | 4.14 | 29.79 |
| 135 | 36.00 | 16.08 | 2.58 | 20.93 |
| 150 | 33.13 | 14.80 | 1.30 | 11.74 |

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| CB 208 | 1200 | 1.13 | 80.00 | | 78.37 |
| - | - | - | - | - | - |
| - | - | - | - | - | - |

**PI =** 3.141592654
**PIPE I.D.=** 301 PVC
**U/G Storage Pipe Volume**
End Area 0.071 ($m^2$)
Total Length 0.0 (m)
Pipe Volume 0.0 ($m^3$)

**Area C-1: Storage Table**

| Elevation (m) | System Depth (m) | CB 208 Volume ($m^3$) | - Volume ($m^3$) | - Volume ($m^3$) | Underground Storage: Combined Volume ($m^3$) | Surface Storage: CB 208 Area ($m^2$) | CB 208 Volume ($m^3$) | - Area ($m^2$) | - Volume ($m^3$) | - Area ($m^2$) | - Volume ($m^3$) | Total Storage: Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78.37 | 0.00 | 0.00 | - | - | 0.00 | - | - | - | - | - | - | - | **0** | - |
| 78.67 | 0.30 | 0.34 | - | - | 0.34 | - | - | - | - | - | - | - | **0.3** | 0.15 |
| 78.97 | 0.60 | 0.68 | - | - | 0.68 | - | - | - | - | - | - | - | **0.7** | 0.45 |
| 79.27 | 0.90 | 1.02 | - | - | 1.02 | - | - | - | - | - | - | - | **1.0** | 0.75 |
| 79.57 | 1.20 | 1.36 | - | - | 1.36 | - | - | - | - | - | - | - | **1.4** | 1.05 |
| 80.00 | 1.63 | 1.84 | - | - | 1.84 | 0.0 | 0.00 | - | - | - | - | 0.0 | **1.8** | 1.48 |
| 80.17 | | | | | | 103.80 | 8.82 | - | - | - | - | 8.8 | **10.7** | 1.65 |
| 80.22 | | | | | | 198.60 | 16.38 | - | - | - | - | 16.4 | **18.2** | 1.70 |
| 80.30 | | | | | | 640.32 | 49.94 | - | - | - | - | 49.9 | **51.8** | 1.78 |
| 80.32 | | | | | | 731.67 | 63.66 | - | - | - | - | 63.7 | **65.5** | 1.80 |

**Tempest HF Type B ICD**

**1:100 Yr**
Flow (L/s) = 27.0
Head (m) = 1.78
Elevation (m) = **80.30**
Outlet Pipe Dia.(mm) = 301
Volume (m3) = 49.6

**1:5 Yr**
Flow (L/s) = 26.5
Head (m) = 1.70
Elevation (m) = **80.22**
Outlet Pipe Dia.(mm) = 301
Volume (m3) = 15.0

**1:2 Yr**
Flow (L/s) = 26.1
Head (m) = 1.65
Elevation (m) = **80.17**
Outlet Pipe Dia.(mm) = 301
Volume (m3) = 8.6

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

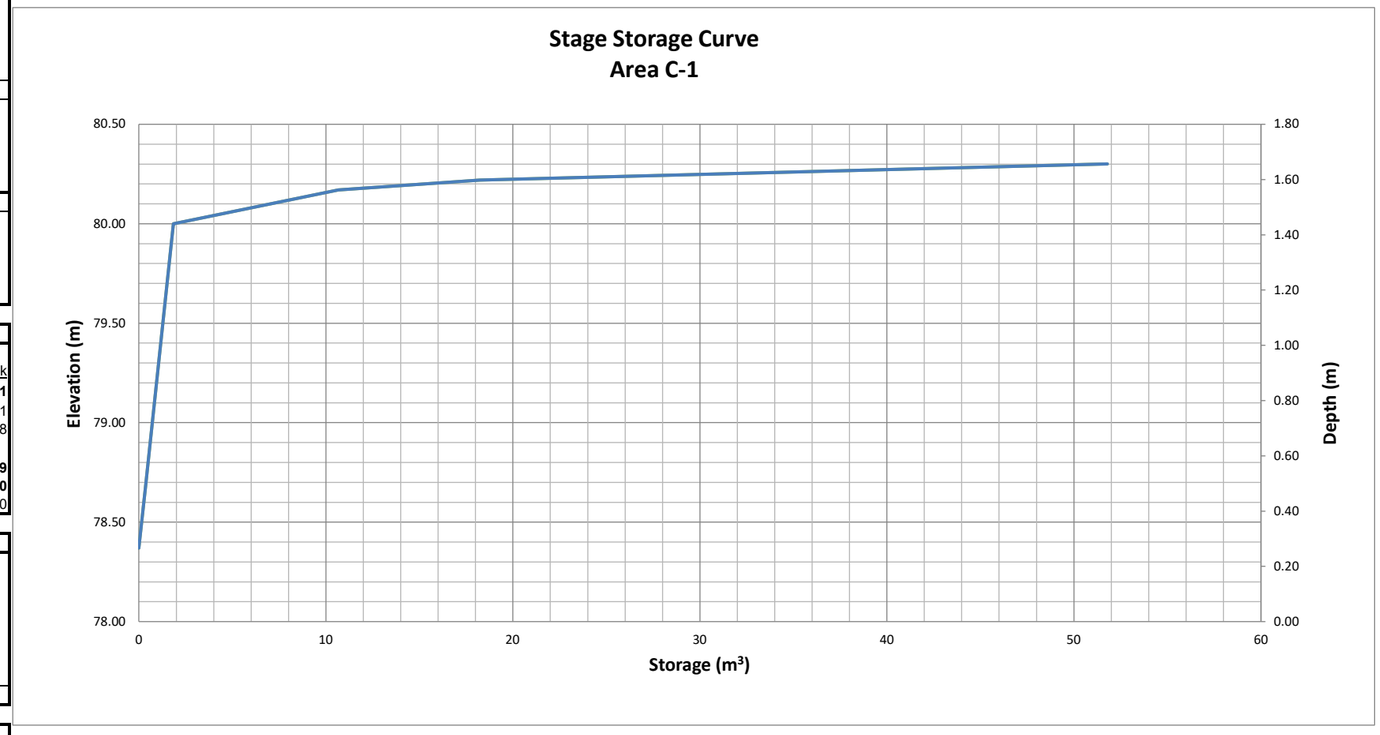
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0270 | **0.0271** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **1.78** | 1.78 |
| A ($m^2$) = | **0.007370103** | **0.00739** |
| D (m) = | **0.096870568** | **0.09700** |
| D (mm) = | **97** | 97.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0265 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **1.70** |
| A ($m^2$) = | **0.00739** |
| D (m) = | **0.097** |
| D (mm) = | **97** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0261 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **1.65** |
| A ($m^2$) = | **0.00739** |
| D (m) = | **0.097** |
| D (mm) = | **97** |



**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:2 YEAR EVENT**
**AREA C-2 Controlled Site Flows (Retained Lands - ROW)**

OTTAWA IDF CURVE — Qpeak = 8.3 L/s
Area = 0.075 ha — Qavg = 4.2 L/s
C = 0.90 — Vol(max) = 6.7 m3
(Vol calculated for Qallow-avg)

| Time (min) | Tributary Ar (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 103.57 | 19.35 | 15.20 | 4.56 |
| 10 | 76.81 | 14.35 | 10.20 | 6.12 |
| 15 | 61.77 | 11.54 | 7.39 | 6.65 |
| 20 | 52.03 | 9.72 | 5.57 | 6.69 |
| 25 | 45.17 | 8.44 | 4.29 | 6.44 |
| 30 | 40.04 | 7.48 | 3.33 | 6.00 |
| 35 | 36.06 | 6.74 | 2.59 | 5.44 |
| 40 | 32.86 | 6.14 | 1.99 | 4.78 |
| 45 | 30.24 | 5.65 | 1.50 | 4.05 |
| 50 | 28.04 | 5.24 | 1.09 | 3.27 |
| 55 | 26.17 | 4.89 | 0.74 | 2.44 |
| 60 | 24.56 | 4.59 | 0.44 | 1.58 |
| 65 | 23.15 | 4.33 | 0.18 | 0.69 |
| 70 | 21.91 | 4.09 | -0.06 | -0.23 |
| 75 | 20.81 | 3.89 | -0.26 | -1.17 |
| 90 | 18.14 | 3.39 | -0.76 | -4.10 |
| 105 | 16.13 | 3.01 | -1.14 | -7.15 |
| 120 | 14.56 | 2.72 | -1.43 | -10.29 |
| 135 | 13.30 | 2.48 | -1.67 | -13.49 |
| 150 | 12.25 | 2.29 | -1.86 | -16.74 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:5 YEAR EVENT**
**AREA C-2 Controlled Site Flows (Retained Lands - ROW)**

OTTAWA IDF CURVE — Qpeak = 10.5 L/s
Area = 0.075 ha — Qavg = 5.3 L/s
C = 0.90 — Vol(max) = 9.5 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 141.18 | 26.38 | 21.13 | 6.34 |
| 10 | 104.19 | 19.47 | 14.22 | 8.53 |
| 15 | 83.56 | 15.61 | 10.36 | 9.33 |
| 20 | 70.25 | 13.13 | 7.88 | 9.45 |
| 25 | 60.90 | 11.38 | 6.13 | 9.19 |
| 30 | 53.93 | 10.08 | 4.83 | 8.69 |
| 35 | 48.52 | 9.07 | 3.82 | 8.01 |
| 40 | 44.18 | 8.26 | 3.01 | 7.22 |
| 45 | 40.63 | 7.59 | 2.34 | 6.32 |
| 50 | 37.65 | 7.04 | 1.79 | 5.36 |
| 55 | 35.12 | 6.56 | 1.31 | 4.33 |
| 60 | 32.94 | 6.16 | 0.91 | 3.26 |
| 65 | 31.04 | 5.80 | 0.55 | 2.15 |
| 70 | 29.37 | 5.49 | 0.24 | 1.00 |
| 75 | 27.89 | 5.21 | -0.04 | -0.17 |
| 90 | 24.29 | 4.54 | -0.71 | -3.84 |
| 105 | 21.58 | 4.03 | -1.22 | -7.67 |
| 120 | 19.47 | 3.64 | -1.61 | -11.61 |
| 135 | 17.76 | 3.32 | -1.93 | -15.64 |
| 150 | 16.36 | 3.06 | -2.19 | -19.73 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YEAR EVENT**
**AREA C-2 Controlled Site Flows (Retained Lands - ROW)**

OTTAWA IDF CURVE — Qpeak = 15.0 L/s
Area = 0.075 ha — Qavg = 7.5 L/s
C = 1.00 — Vol(max) = 21.1 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 242.70 | 50.39 | 42.89 | 12.87 |
| 10 | 178.56 | 37.07 | 29.57 | 17.74 |
| 15 | 142.89 | 29.67 | 22.17 | 19.95 |
| 20 | 119.95 | 24.91 | 17.41 | 20.89 |
| 25 | 103.85 | 21.56 | 14.06 | 21.09 |
| 30 | 91.87 | 19.07 | 11.57 | 20.83 |
| 35 | 82.58 | 17.15 | 9.65 | 20.26 |
| 40 | 75.15 | 15.60 | 8.10 | 19.45 |
| 45 | 69.05 | 14.34 | 6.84 | 18.46 |
| 50 | 63.95 | 13.28 | 5.78 | 17.34 |
| 55 | 59.62 | 12.38 | 4.88 | 16.10 |
| 60 | 55.89 | 11.61 | 4.11 | 14.78 |
| 65 | 52.65 | 10.93 | 3.43 | 13.38 |
| 70 | 49.79 | 10.34 | 2.84 | 11.92 |
| 75 | 47.26 | 9.81 | 2.31 | 10.40 |
| 90 | 41.11 | 8.54 | 1.04 | 5.59 |
| 105 | 36.50 | 7.58 | 0.08 | 0.49 |
| 120 | 32.89 | 6.83 | -0.67 | -4.82 |
| 135 | 30.00 | 6.23 | -1.27 | -10.30 |
| 150 | 27.61 | 5.73 | -1.77 | -15.90 |

**Proposed Nokia Development** Storage Calculations Using Average
**Novatech Project No. 123043** Release Rate Equal to 50% of the Qpeak
**REQUIRED STORAGE - 1:100 YR + 20% IDF Increase**
**AREA C-2 Controlled Site Flows (Retained Lands - ROW)**

OTTAWA IDF CURVE — Qpeak = 15.0 L/s
Area = 0.075 ha — Qavg = 7.5 L/s
C = 1.00 — Vol(max) = 27.7 m3
(Vol calculated for Qallow-avg)

| Time (min) | Intensity (mm/hr) | Q (L/s) | Qnet (L/s) | Vol (m3) |
|---|---|---|---|---|
| 5 | 291.24 | 60.47 | 52.97 | 15.89 |
| 10 | 214.27 | 44.49 | 36.99 | 22.19 |
| 15 | 171.47 | 35.60 | 28.10 | 25.29 |
| 20 | 143.94 | 29.89 | 22.39 | 26.86 |
| 25 | 124.62 | 25.87 | 18.37 | 27.56 |
| 30 | 110.24 | 22.89 | 15.39 | 27.70 |
| 35 | 99.09 | 20.58 | 13.08 | 27.46 |
| 40 | 90.17 | 18.72 | 11.22 | 26.94 |
| 45 | 82.86 | 17.20 | 9.70 | 26.20 |
| 50 | 76.74 | 15.93 | 8.43 | 25.30 |
| 55 | 71.55 | 14.86 | 7.36 | 24.27 |
| 60 | 67.07 | 13.93 | 6.43 | 23.14 |
| 65 | 63.18 | 13.12 | 5.62 | 21.91 |
| 70 | 59.75 | 12.41 | 4.91 | 20.60 |
| 75 | 56.71 | 11.77 | 4.27 | 19.23 |
| 90 | 49.33 | 10.24 | 2.74 | 14.81 |
| 105 | 43.80 | 9.09 | 1.59 | 10.04 |
| 120 | 39.47 | 8.20 | 0.70 | 5.01 |
| 135 | 36.00 | 7.47 | -0.03 | -0.21 |
| 150 | 33.13 | 6.88 | -0.62 | -5.59 |

Project #: 123043
Project Name: Nokia Ottawa Innovation Campus
Location: Ottawa

NOVATECH
Engineers, Planners & Landscape Architects

Date Prepared: 2/7/2025

| Structures | Size (mm) | Area ($m^2$) | T/G | Inv IN | Inv OUT |
|---|---|---|---|---|---|
| UG STORAGE | 1144 | 15.82 | 80.20 | | 78.24 |
| CBMH 261 | 1200 | 1.13 | 80.13 | 78.22 | 78.19 |
| - | - | - | - | - | - |

**PI =** 3.141592654
**PIPE I.D.=** 304.8 PVC
**U/G Storage Pipe Volume**
End Area 0.073 ($m^2$)
Total Length 5.0 (m)
Pipe Volume 0.4 ($m^3$)

**Area C-2: Storage Table**

| Elevation (m) | System Depth (m) | UG STORAGE Volume ($m^3$) | CBMH 261 Volume ($m^3$) | - Volume ($m^3$) | Underground Storage: Combined Volume ($m^3$) | Surface Storage: UG STORAGE Area ($m^2$) | UG STORAGE Volume ($m^3$) | CBMH 261 Area ($m^2$) | CBMH 261 Volume ($m^3$) | - Area ($m^2$) | - Volume ($m^3$) | Total Storage: Ponding Volume ($m^3$) | **Total Volume ($m^3$)** | Design Head |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78.19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | - | - | - | - | - | - | - | **0** | - |
| 78.59 | 0.35 | 5.54 | 0.45 | 0.45 | 6.81 | - | - | - | - | - | - | - | **6.8** | 0.25 |
| 78.74 | 0.50 | 7.91 | 0.62 | 0.62 | 9.52 | - | - | - | - | - | - | - | **9.5** | 0.40 |
| 79.38 | 1.14 | 18.04 | 1.35 | 1.35 | 21.09 | - | - | - | - | - | - | - | **21.1** | 1.04 |
| 79.39 | 1.15 | 18.20 | 1.36 | 1.36 | 21.27 | - | - | - | - | - | - | - | **21.3** | 1.05 |
| 80.13 | 1.89 | 18.20 | 2.19 | 2.19 | 22.95 | 0.0 | 0.00 | 0.00 | 0.00 | - | - | 0.0 | **22.9** | 1.79 |
| 80.16 | | | | | | 0.00 | 0.00 | 3.61 | 0.05 | - | - | 0.1 | **23.0** | 1.82 |
| 80.19 | | | | | | 0.00 | 0.00 | 10.31 | 0.26 | - | - | 0.3 | **23.2** | 1.85 |
| 80.23 | | | | | | 0.00 | 0.00 | 19.55 | 0.86 | - | - | 0.9 | **23.8** | 1.89 |

**Tempest HF Type A ICD**

**1:100 Yr**
Flow (L/s) = 15.0
Head (m) = 1.04
Elevation (m) = **79.38**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 21.1

**1:5 Yr**
Flow (L/s) = 10.5
Head (m) = 0.40
Elevation (m) = **78.74**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 9.5

**1:2 Yr**
Flow (L/s) = 8.3
Head (m) = 0.25
Elevation (m) = **78.59**
Outlet Pipe Dia.(mm) = 304.8
Volume (m3) = 6.7

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

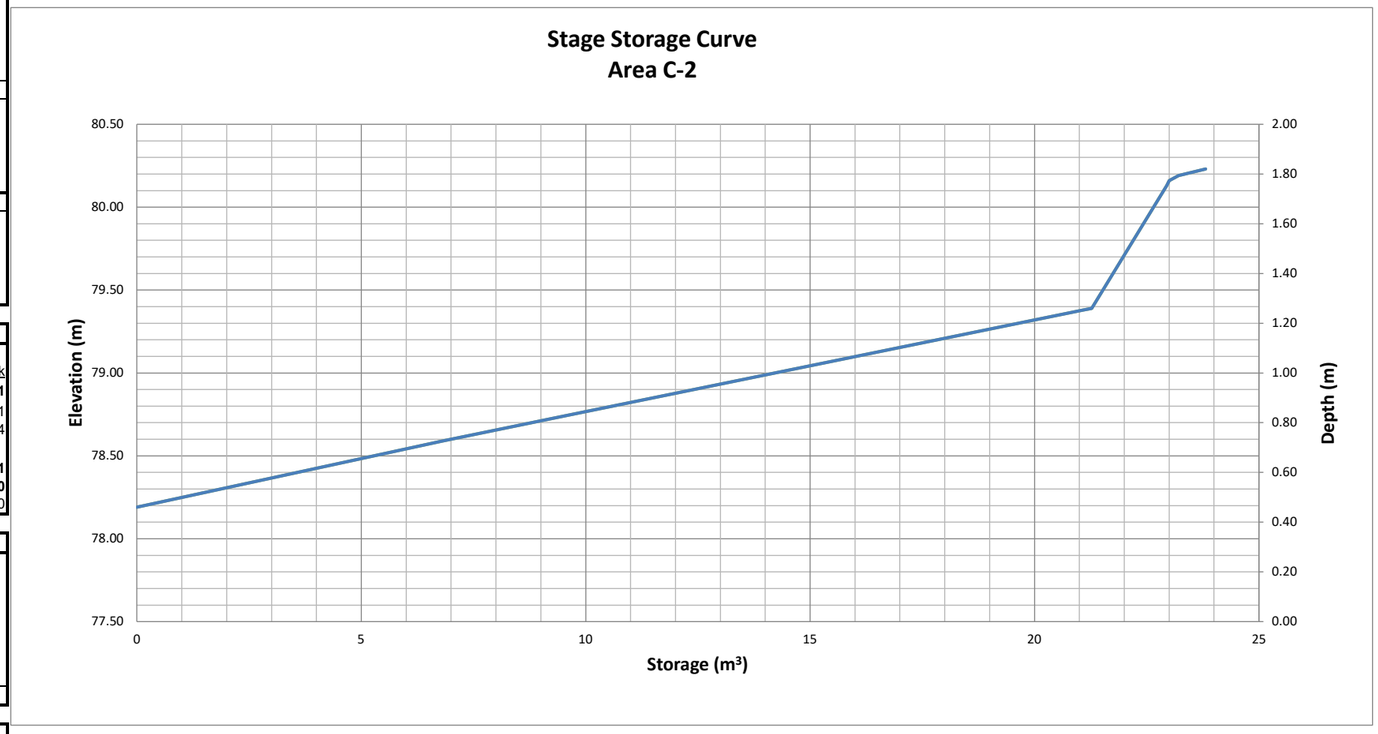
| | 1:100 yr | Flow Check |
|---|---|---|
| Q ($m^3/s$) = | 0.0150 | **0.0151** |
| g ($m/s^2$) = | 9.81 | 9.81 |
| h (m) = | **1.04** | 1.04 |
| A ($m^2$) = | **0.005362102** | **0.00541** |
| D (m) = | **0.082627118** | **0.08300** |
| D (mm) = | **83** | 83.0 |

**1:5 yr Flow Check**

| | 1:5 yr |
|---|---|
| Q ($m^3/s$) = | 0.0094 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.40** |
| A ($m^2$) = | **0.00541** |
| D (m) = | **0.083** |
| D (mm) = | **83** |

**1:2 yr Flow Check**

| | 1:2 yr |
|---|---|
| Q ($m^3/s$) = | 0.0074 |
| g ($m/s^2$) = | 9.81 |
| h (m) = | **0.25** |
| A ($m^2$) = | **0.00541** |
| D (m) = | **0.083** |
| D (mm) = | **83** |



# Manning Formula Uniform Pipe Flow at Given Slope and Depth

## 570 March Road

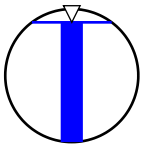
### Proposed 500mm dia. CSP Culvert Capacity Calculation

Inputs

| | | |
|---|---|---|
| Pipe diameter, $d_0$ | 500 | mm |
| Manning roughness, n | 0.02 | |
| Pressure slope (possibly ? equal to pipe slope), $S_0$ | 1 | % rise/run |
| Relative flow depth, $y/d_0$ | 90 | % |

Results

| | | |
|---|---|---|
| Flow depth, y | 0.4500 | m |
| Flow area, a | 0.1861 | m^2 |
| Pipe area, a0 | 0.1963 | m^2 |
| Relative area, a/a0 | 0.9480 | fraction |
| Wetted perimeter, $P_w$ | 1.2490 | m |
| Hydraulic radius, $R_h$ | 0.1490 | m |
| Top width, T | 0.3000 | m |
| Velocity, v | 1.4054 | m/s |
| Velocity head, $h_v$ | 0.1007 | m H2O |
| Froude number, F | 0.57 | |
| Average shear stress (tractive force), tau | 14.6127 | N/m^2 |
| **Flow, Q** (See notes) | 261.5860 | l/s |
| Full flow, Q0 | 0.2454 | m^3/s |
| Ratio to full flow, Q/Q0 | 106.5797 | % |



Notes:

**This is the flow and depth inside an *infinitely long* pipe.**
Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or see my 2-minute tutorial for standard culvert headwater calculations using HY-8.

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** Nokia Ottawa Innovation Campus
**Date:** 2/7/2025
**Input By:** KD
**Reviewed By:** FST
**Drawing Reference:** C500

**Storm Design Event =** 5 Year

# 520 & 570 March Road - Nokia Ottawa Innovation Campus
## Northern Outlet through KRP Lands
## 1:5 Year Storm Event

**Legend:**
- Design Input by User
- As-Built Input by User
- Cumulative Cell
- Calculated Design Cell Output
- Calculated Uncontrolled Peak Flow Cell Output
- Design Input Restricted Peak Flow Cell

**Reference:** City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

| Location | | | | Flow | | | | | | | | Design Capacity / Proposed Sewer Pipe Sizing / Design | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area ID | From MH | To MH | Area A (ha.) | Runoff Coefficient C | Indivi. 2.78 AC | Accum. 2.78 AC | Time of Conc. Tc (min.) | Rain Intensity I (mm/hr) | Total Uncontrolled Peak Flow Q (L/s) | Total Restricted Peak Flow (L/s) | Pipe Length (m) | Pipe Size (mm) and Material | Pipe ID Actual (m) | Roughness n | Design Grade So (%) | Capacity Qfull (L/s) | Full Flow Velocity (m/s) | Time of Flow (min.) | Q / Qfull |
| Lifestyle Street | A-1 | STMMH 101 | STMMH 102 | 0.14 | 0.89 | 0.35 | 0.35 | 10.00 | 104.19 | 36.3 | | 58.0 | 300 PVC | 0.3048 | 0.013 | 1.00 | 100.9 | 1.38 | 0.70 | 36.0% |
| Lifestyle Street | A-1 | STMMH 102 | STMMH 103 | 0.00 | - | 0.00 | 0.00 | 10.70 | 100.64 | Flows controlled by ICD | **17.5** | 37.4 | 300 PVC | 0.3048 | 0.013 | 2.00 | 142.7 | 1.96 | 0.32 | 12.3% |
| 570 March Road | A-3, A-5 | Retail West/Office | STMMH 103 | 0.39 | 0.90 | 0.97 | 0.97 | 10.00 | 104.19 | Controlled by 20 RDs | **14.9** | 25.8 | 375 PVC | 0.381 | 0.013 | 2.00 | 258.7 | 2.27 | 0.19 | 5.8% |
| Lifestyle Street | A-1, A-3, A-5 | STMMH 103 | STMMH 104 | 0.00 | - | 0.00 | 0.00 | 11.02 | 99.11 | | **32.4** | 20.0 | 375 PVC | 0.381 | 0.013 | 2.00 | 258.7 | 2.27 | 0.15 | 12.5% |
| 570 March Road | A-4, A-6 | Retail East/Link | STMMH 104 | 0.19 | 0.90 | 0.48 | 0.48 | 10.00 | 104.19 | Controlled by 10 RDs | **8.3** | 14.3 | 300 PVC | 0.3048 | 0.013 | 1.00 | 100.9 | 1.38 | 0.17 | 8.2% |
| Lifestyle Street | A-1, A3-A6 | STMMH 104 | STMMH 105 | 0.00 | - | 0.00 | 0.00 | 11.16 | 98.42 | | **40.7** | 27.3 | 375 PVC | 0.381 | 0.013 | 2.00 | 258.7 | 2.27 | 0.20 | 15.7% |
| Lifestyle Street | A-2 | CBMH 249 | CBMH 250 | 0.05 | 0.86 | 0.12 | 0.12 | 10.00 | 104.19 | 12.1 | | 13.2 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.27 | 20.3% |
| Lifestyle Street | A-2 | CBMH 250 | CBMH 251 | 0.17 | 0.86 | 0.40 | 0.52 | 10.27 | 102.79 | 53.4 | | 6.3 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.13 | 89.4% |
| Lifestyle Street | A-2 | CBMH 251 | STMMH 105 | 0.08 | 0.86 | 0.18 | 0.70 | 10.40 | 102.14 | Flows controlled by ICD | **17.0** | 3.2 | 300 PVC | 0.3048 | 0.013 | 2.00 | 142.7 | 1.96 | 0.03 | 11.9% |
| Lifestyle Street | A1-A6 | STMMH 105 | OGS UNIT 1 | 0.00 | - | 0.00 | 0.00 | 11.37 | 97.49 | | **57.7** | 8.1 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.14 | 53.3% |
| Legget Drive | A1-A6 | OGS UNIT 1 | EX CBMH "A" | 0.00 | - | 0.00 | 0.00 | 11.51 | 96.85 | | **57.7** | 70.1 | 375 PVC | 0.381 | 0.013 | 0.40 | 115.7 | 1.01 | 1.15 | 49.9% |
| 555 Legget Drive (KRP) | A1-A6, E-09 | EX CBMH "A" | EX CBMH "B" | 0.22 | 0.74 | 0.45 | 0.45 | 12.66 | 91.97 | 41.6 | **57.7** | 46.0 | 375 PVC | 0.381 | 0.013 | 1.62 | 232.8 | 2.04 | 0.38 | 42.7% |
| 555 Legget Drive (KRP) | E-07, E-08 | EX CBMH | EX CBMH "B" | 0.63 | 0.85 | 1.49 | 1.49 | 10.00 | 104.19 | 155.1 | | 59.7 | 375 PVC | 0.381 | 0.013 | 0.60 | 141.7 | 1.24 | 0.80 | 109.5% |
| 535 Legget Drive (KRP) | A1-A6, E07-E10 | EX CBMH "B" | EX CBMH "C" | 0.22 | 0.76 | 0.46 | 2.41 | 13.03 | 90.50 | 217.7 | **57.7** | 34.9 | 450 PVC | 0.4572 | 0.013 | 0.67 | 243.5 | 1.48 | 0.39 | 113.1% |
| 535 Legget Drive (KRP) | E-11 | Building | EX CBMH "C" | 0.11 | 0.90 | 0.28 | 0.28 | 10.00 | 104.19 | 28.7 | | 28.0 | 300 PVC | 0.3048 | 0.013 | 0.50 | 71.3 | 0.98 | 0.48 | 40.2% |
| 535 Legget Drive (KRP) | A1-A6, E07-E12 | EX CBMH "C" | EX STMMH "D" | 0.09 | 0.90 | 0.23 | 2.91 | 13.43 | 89.01 | 258.7 | **57.7** | 37.2 | 450 PVC | 0.4572 | 0.013 | 2.40 | 460.8 | 2.81 | 0.22 | 68.7% |
| 359 Terry Fox Drive (KRP) | E-13, E-15 | EX CBMH | EX STMMH "D" | 0.31 | 0.74 | 0.64 | 0.64 | 10.00 | 104.19 | 66.6 | | 52.5 | 250 PVC | 0.254 | 0.013 | 0.43 | 40.7 | 0.80 | 1.09 | 163.6% |
| 535 Legget Drive (KRP) | A1-A6, E07-E15 | EX STMMH "D" | EX CBMH "E" | 0.35 | 0.75 | 0.73 | 4.28 | 13.65 | 88.20 | 377.0 | **57.7** | 24.0 | 450 PVC | 0.4572 | 0.013 | 2.66 | 485.1 | 2.95 | 0.14 | 89.6% |
| 525 Legget Drive (KRP) | A1-A6, E07-E17 | EX CBMH "E" | EX CBMH "F" | 0.19 | 0.90 | 0.48 | 4.75 | 13.78 | 87.71 | 416.6 | **57.7** | 65.0 | 900 CONC | 0.9144 | 0.013 | 0.46 | 1280.9 | 1.95 | 0.56 | 37.0% |
| 359 Terry Fox Drive (KRP) | E-18, E-19 | EX CBMH | EX CBMH "F" | 0.27 | 0.90 | 0.68 | 0.68 | 10.00 | 104.19 | 70.4 | | 16.6 | 250 PVC | 0.254 | 0.013 | 1.00 | 62.0 | 1.22 | 0.23 | 113.5% |
| 525 Legget Drive (KRP) | A1-A6, E07-E20 | EX CBMH "F" | EX CBMH "G" | 0.10 | 0.90 | 0.25 | 5.68 | 14.34 | 85.76 | 486.8 | **57.7** | 24.4 | 900 CONC | 0.9144 | 0.013 | 0.57 | 1425.9 | 2.17 | 0.19 | 38.2% |
| 525 Legget Drive (KRP) | A1-A6, E07-E21 | EX CBMH "G" | FUT STMMH "H" | 0.03 | 0.68 | 0.06 | 5.73 | 14.53 | 85.12 | 488.0 | **57.7** | 7.4 | 900 CONC | 0.9144 | 0.013 | 0.36 | 1133.2 | 1.73 | 0.07 | 48.2% |

# STORM SEWER DESIGN SHEET

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Engineers, Planners & Landscape Architects

| Location | | | | Flow | | | | | | | | Design Capacity: Proposed Sewer Pipe Sizing / Design | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area ID | From MH | To MH | Area A (ha.) | Runoff Coefficient C | Indivi. 2.78 AC | Accum. 2.78 AC | Time of Conc. Tc (min.) | Rain Intensity I (mm/hr) | Total Uncontrolled Peak Flow Q (L/s) | Total Restricted Peak Flow (L/s) | Pipe Length (m) | Pipe Size (mm) and Material | Pipe ID Actual (m) | Roughness n | Design Grade So (%) | Capacity Qfull (L/s) | Full Flow Velocity (m/s) | Time of Flow (min.) | Q / Qfull |
| 525 Legget Drive (KRP) | E-23 | Building | EX CBMH | 0.17 | 0.90 | 0.43 | 0.43 | 10.00 | 104.19 | 44.3 | | 3.3 | 250 PVC | 0.254 | 0.013 | 1.00 | 62.0 | 1.22 | 0.04 | 71.4% |
| 525 Legget Drive (KRP) | E-23, E-24 | EX CBMH | FUT STMMH 1 | 0.13 | 0.90 | 0.33 | 0.75 | 10.04 | 103.96 | 78.0 | | 32.7 | 375 PVC | 0.381 | 0.013 | 2.23 | 273.1 | 2.40 | 0.23 | 28.6% |
| 525 Legget Drive (KRP) | E-23, E-24 | FUT STMMH 1 | FUT CBMH 1 | 0.00 | - | 0.00 | 0.75 | 10.27 | 102.78 | 77.1 | | 7.9 | 375 PVC | 0.381 | 0.013 | 0.50 | 129.3 | 1.13 | 0.12 | 59.6% |
| 525 Legget Drive (KRP) | E-23, E-24, F-4 | FUT CBMH 1 | FUT STMMH 2 | 0.02 | 0.90 | 0.05 | 0.80 | 10.39 | 102.18 | 81.8 | | 28.9 | 375 PVC | 0.381 | 0.013 | 0.50 | 129.3 | 1.13 | 0.42 | 63.3% |
| 525 Legget Drive (KRP) | E-23, E-24, F-4 | FUT STMMH 2 | FUT CBMH 2 | 0.00 | - | 0.00 | 0.80 | 10.81 | 100.09 | 80.1 | | 6.0 | 375 PVC | 0.381 | 0.013 | 0.50 | 129.3 | 1.13 | 0.09 | 62.0% |
| 525 Legget Drive (KRP) | E-23, E-24, F-4, F-5 | FUT CBMH 2 | FUT STMMH 3 | 0.02 | 0.90 | 0.05 | 0.85 | 10.90 | 99.66 | 84.8 | | 9.8 | 450 PVC | 0.4572 | 0.013 | 0.25 | 148.7 | 0.91 | 0.18 | 57.0% |
| | | | | | | | | | | | | | | | | | | | | |
| 525 Legget Drive (KRP) | E-22 | Building | FUT STMMH 3 | 0.54 | 0.90 | 1.35 | 1.35 | 10.00 | 104.19 | 140.8 | | 4.2 | 300 PVC | 0.3048 | 0.013 | 0.50 | 71.3 | 0.98 | 0.07 | 197.3% |
| | | | | | | | | | | | | | | | | | | | | |
| 525 Legget Drive (KRP) | E-22-E24, F-4, F-5 | FUT STMMH 3 | FUT STMMH 4 | 0.00 | - | 0.00 | 2.20 | 11.08 | 98.81 | 217.6 | | 9.7 | 525 PVC | 0.5334 | 0.013 | 0.20 | 200.6 | 0.90 | 0.18 | 108.4% |
| | | | | | | | | | | | | | | | | | | | | |
| 525 Legget Drive (KRP) | F-1, F-2. F-3 | CAP | FUT STMMH 4 | 0.16 | 0.90 | 0.40 | 0.40 | 10.00 | 104.19 | 41.7 | | 3.0 | 450 PVC | 0.4572 | 0.013 | 1.00 | 297.4 | 1.81 | 0.03 | 14.0% |
| | | | | | | | | | | | | | | | | | | | | |
| 525 Legget Drive (KRP) | E-22-E-24, F1-5 | FUT STMMH 4 | FUT STMMH "H" | 0.00 | - | 0.00 | 2.60 | 11.26 | 97.97 | 254.9 | | 46.8 | 525 PVC | 0.5334 | 0.013 | 0.20 | 200.6 | 0.90 | 0.87 | 127.1% |
| | | | | | | | | | | | | | | | | | | | | |
| 525 Legget Drive (KRP) | A1-A6, E07-E24, F1-F6 | FUT STMMH "H" | FUT STMMH "I" | 0.02 | 0.90 | 0.05 | 8.39 | 14.60 | 84.88 | 711.7 | **57.7** | 35.9 | 975 CONC | 0.9906 | 0.013 | 0.24 | 1145.4 | 1.49 | 0.40 | 67.2% |
| 525 Legget Drive (KRP) | A1-A6, E07-E24, F1-F8 | FUT STMMH "I" | FUT STMMH "J" | 0.23 | 0.83 | 0.53 | 8.92 | 15.00 | 83.56 | 745.0 | **57.7** | 22.1 | 975 CONC | 0.9906 | 0.013 | 0.24 | 1145.4 | 1.49 | 0.25 | 70.1% |
| 525 Legget Drive (KRP) | A1-A6, E07-E24, F1-F8 | FUT STMMH "J" | FUT STMMH "K" | 0.00 | - | 0.00 | 8.92 | 15.25 | 82.77 | 745.0 | **57.7** | 24.7 | 975 CONC | 0.9906 | 0.013 | 0.24 | 1145.4 | 1.49 | 0.28 | 70.1% |
| 525 Legget Drive (KRP) | A1-A6, E07-E24, F1-F8 | FUT STMMH "K" | SWM POND | 0.00 | - | 0.00 | 8.92 | 15.52 | 81.90 | 745.0 | **57.7** | 7.7 | 975 CONC | 0.9906 | 0.013 | 0.24 | 1145.4 | 1.49 | 0.09 | 70.1% |
| **Totals** | | | | **4.82** | | | | | | | | **922.1** | | | | | | | | |

### Demand Equation / Parameters

**1. Q =** 2.78 ACI

### Definitions

**Q =** Peak flow in litres per second (L/s)
**A =** Area in hectares (ha)
**C =** Weighted runoff coefficient (increased by 25% for 100-year)
**I =** Rainfall intensity in millimeters per hour (mm/hr)

Rainfall intensity is based on City of Ottawa IDF data presented in the City of Ottawa - Sewer Design Guidelines

### Capacity Equation

**Q full =** $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

### Definitions

**Q full =** Capacity (L/s)
**n =** Manning coefficient of roughness (0.013)
**$A_p$ =** Pipe flow area ($m^2$)
**R** = Hydraulic Radius of wetted area (dia./4 for full pipes)
**So =** Pipe slope/gradient

### Notes

1) Refer to the Novatech Report "Development Servicing Study and Stormwater Management Report - Nokia Ottawa Innovation Campus" (R-2023-082) for on-site storm drainage and stormwater details.
2) Refer to the Novatech Report "Sanitary and Storm Trunk Sewer Design Brief - Nokia Ottawa Innovation Campus" (R-2024-130) for off-site storm drainage and stormwater details.
3) Refer to Novatech Drawings C100 and C500 for the storm structure designations, storm pipe details and control structure tables.
4) Refer to Novatech Drawing C501 and associated storm sewer design sheet for STM drainage areas that contribute to southern STM Sewer on KRP Lands.
5) Stormwater flows from drainage areas A-0a and A-0b do not enter the storm sewer in Lifestyle Street, hence are not tributary to the northern STM Sewer on KRP Lands and have therefore been excluded from this design sheet.

# STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

**Novatech Project #:** 123043
**Project Name:** Nokia Ottawa Innovation Campus
**Date:** 2/7/2025
**Input By:** KD
**Reviewed By:** FST
**Drawing Reference:** C501

**Storm Design Event =** 5 Year

## 520 & 570 March Road - Nokia Ottawa Innovation Campus
## Southern Outlet through KRP Lands
## 1:5 Year Storm Event

**Legend:**
- Design Input by User
- As-Built Input by User
- Cumulative Cell
- Calculated Design Cell Output
- Calculated Uncontrolled Peak Flow Cell Output
- Design Input Restricted Peak Flow Cell

**Reference:** City of Ottawa - Sewer Design Guidelines (2012 and TBs)
MOE - Design Guidelines for Sewage Works (2008)

| Location | | | | Flow | | | | | | | | Design Capacity / Proposed Sewer Pipe Sizing / Design | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area ID | From MH | To MH | Area A (ha.) | Runoff Coefficient C | Indivi. 2.78 AC | Accum. 2.78 AC | Time of Conc. Tc (min.) | Rain Intensity I (mm/hr) | Total Uncontrolled Peak Flow Q (L/s) | Total Restricted Peak Flow (L/s) | Pipe Length (m) | Pipe Size (mm) and Material | Pipe ID Actual (m) | Roughness n | Design Grade So (%) | Capacity Qfull (L/s) | Full Flow Velocity (m/s) | Time of Flow (min.) | Q / Qfull |
| Legget Drive | B-1 | Lab Building | CBMH 266 | 0.80 | 0.90 | 1.99 | 1.99 | 10.00 | 104.19 | 207.2 | | 1.0 | 450 PVC | 0.4572 | 0.013 | 1.00 | 297.4 | 1.81 | 0.01 | 69.7% |
| Legget Drive | B-1 | CBMH 266 | STMMH 118 | 0.00 | 0.90 | 0.00 | 0.00 | 10.01 | 104.14 | Flows controlled by ICD | **41.0** | 2.2 | 300 PVC | 0.3048 | 0.013 | 0.50 | 71.3 | 0.98 | 0.04 | 57.5% |
| Legget Drive | B-1 | STMMH 118 | EX STMMH L1 | 0.00 | 0.90 | 0.00 | 0.00 | 10.05 | 103.95 | | **41.0** | 10.3 | 525 CONC | 0.5334 | 0.013 | 0.18 | 190.3 | 0.85 | 0.20 | 21.5% |
| Legget Drive | B-0a, B-1, L-1 | EX STMMH L1 | EX STMMH L2 | 0.39 | 0.52 | 0.56 | 0.56 | 10.25 | 102.90 | 58.0 | **41.0** | 65.6 | 525 CONC | 0.5334 | 0.013 | 0.18 | 190.3 | 0.85 | 1.28 | 52.0% |
| Legget Drive | B-0a, B1, L1-2 | EX STMMH L2 | EX STMMH L3 | 0.21 | 0.55 | 0.32 | 0.88 | 11.53 | 96.74 | 85.6 | **41.0** | 72.4 | 525 CONC | 0.5334 | 0.013 | 0.17 | 185.0 | 0.83 | 1.46 | 68.4% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-2 | CB 201 | SWM TANK | 0.05 | 0.66 | 0.09 | 0.09 | 10.00 | 104.19 | 9.6 | | 8.0 | 250 PVC | 0.254 | 0.013 | 0.50 | 43.9 | 0.87 | 0.15 | 21.8% |
| 570 March Road | B-2 | SWM TANK | CBMH 254 | 0.00 | - | 0.00 | 0.09 | 10.15 | 103.39 | 9.6 | | 11.3 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.23 | 16.0% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-2 | CB 207 | CBMH 253 | 0.08 | 0.66 | 0.14 | 0.14 | 10.00 | 104.19 | 14.8 | | 14.3 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.29 | 24.7% |
| 570 March Road | B-2 | CBMH 253 | CBMH 254 | 0.10 | 0.66 | 0.18 | 0.32 | 10.29 | 102.68 | 33.4 | | 5.7 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.12 | 55.9% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-2 | CBMH 254 | CBMH 257 | 0.01 | 0.66 | 0.02 | 0.44 | 10.38 | 102.21 | 45.3 | | 14.2 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.29 | 75.9% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-2 | CB 206 | CBMH 255 | 0.03 | 0.66 | 0.06 | 0.06 | 10.00 | 104.19 | 6.5 | | 7.0 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.14 | 10.9% |
| 570 March Road | B-2 | CBMH 255 | CBMH 256 | 0.04 | 0.66 | 0.07 | 0.13 | 10.14 | 103.45 | 13.6 | | 21.7 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.44 | 22.8% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-2 | LD 1 | CBMH 256 | 0.04 | 0.66 | 0.08 | 0.08 | 10.00 | 104.19 | 7.8 | | 9.7 | 250 PVC | 0.254 | 0.013 | 0.35 | 36.7 | 0.72 | 0.22 | 21.4% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-2 | CBMH 256 | CBMH 257 | 0.04 | 0.66 | 0.08 | 0.28 | 10.58 | 101.20 | 21.2 | | 22.1 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.45 | 35.6% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-2 | CBMH 257 | CBMH 258 | 0.07 | 0.66 | 0.13 | 0.85 | 10.67 | 100.76 | 80.1 | | 28.2 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.50 | 74.0% |
| 570 March Road | B-2 | CBMH 258 | CBMH 259 | 0.05 | 0.66 | 0.10 | 0.95 | 11.17 | 98.40 | 89.4 | | 16.8 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.30 | 82.6% |
| 570 March Road | B-2 | CBMH 259 | CBMH 260 | 0.01 | 0.66 | 0.02 | 0.97 | 11.46 | 97.05 | 91.1 | | 60.5 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 1.06 | 84.2% |
| 570 March Road | B-2 | CBMH 260 | STMMH 107 | 0.09 | 0.66 | 0.17 | 1.14 | 12.53 | 92.51 | Flows controlled by ICD | **48.0** | 7.3 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.13 | 44.4% |
| 570 & 520 March Road | B-2 | STMMH 107 | STMMH 108 | 0.00 | - | 0.00 | 1.14 | 12.65 | 91.99 | | **48.0** | 96.0 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 1.69 | 44.4% |
| Access Route | B-2 | STMMH 108 | STMMH 109 | 0.00 | - | 0.00 | 1.14 | 14.34 | 85.75 | | **48.0** | 65.5 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 1.15 | 44.4% |
| | | | | | | | | | | | | | | | | | | | | |
| 520 March Road | C-1 | CB 208 | STMMH 109 | 0.64 | 0.20 | 0.36 | 0.36 | 10.00 | 104.19 | Flows controlled by ICD | **27.0** | 9.0 | 300 PVC | 0.3048 | 0.013 | 1.00 | 100.9 | 1.38 | 0.11 | 26.8% |
| | | | | | | | | | | | | | | | | | | | | |
| Access Route | B-2, C-1 | STMMH 109 | STMMH 111 | 0.00 | - | 0.00 | 1.49 | 15.49 | 82.01 | | **75.0** | 23.0 | 450 PVC | 0.4572 | 0.013 | 0.35 | 176.0 | 1.07 | 0.36 | 42.6% |
| | | | | | | | | | | | | | | | | | | | | |
| 570 March Road | B-3 | Parking Garage | SWM TANK | 1.00 | 0.90 | 2.51 | 2.51 | 10.00 | 104.19 | 261.7 | | 1.6 | 375 PVC | 0.381 | 0.013 | 1.00 | 365.8 | 1.60 | 0.02 | 71.5% |
| 570 March Road | B-3 | SWM TANK | STMMH 110 | 0.00 | - | 0.00 | 2.51 | 10.02 | 104.11 | 261.7 | | 3.8 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.07 | 241.8% |
| 570 March Road | B-3 | STMMH 110 | STMMH 111 | 0.19 | 0.86 | 0.44 | 2.95 | 10.08 | 103.75 | Flows controlled by ICD | **46.0** | 22.9 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.40 | 42.5% |
| | | | | | | | | | | | | | | | | | | | | |
| Access Route | B2-B3, C-1 | STMMH 111 | STMMH 112 | 0.00 | - | 0.00 | 0.00 | 15.85 | 80.91 | | **121.0** | 7.6 | 450 PVC | 0.4572 | 0.013 | 0.32 | 168.3 | 1.02 | 0.12 | 71.9% |
| | | | | | | | | | | | | | | | | | | | | |
| Access Route | C-2 | CBMH 261 | STMMH 112 | 0.08 | 0.90 | 0.19 | 0.19 | 10.00 | 104.19 | Flows controlled by ICD | **15.0** | 23.2 | 300 PVC | 0.3048 | 0.013 | 0.35 | 59.7 | 0.82 | 0.47 | 25.1% |
| | | | | | | | | | | | | | | | | | | | | |
| Access Route | B2-B3, C1-C2 | STMMH 112 | STMMH 113 | 0.00 | - | 0.00 | 0.19 | 15.97 | 80.54 | | **136.0** | 62.7 | 450 PVC | 0.4572 | 0.013 | 0.35 | 176.0 | 1.07 | 0.97 | 77.3% |
| Access Route | B2-B3, C1-C2 | STMMH 113 | STMMH 114 | 0.00 | - | 0.00 | 0.19 | 16.95 | 77.75 | | **136.0** | 22.1 | 450 PVC | 0.4572 | 0.013 | 0.35 | 176.0 | 1.07 | 0.34 | 77.3% |
| Access Route | B2-B3, C1-C2 | STMMH 114 | OGS UNIT 2 | 0.00 | - | 0.00 | 0.19 | 17.29 | 76.82 | | **136.0** | 11.3 | 450 PVC | 0.4572 | 0.013 | 0.35 | 176.0 | 1.07 | 0.18 | 77.3% |
| | | | | | | | | | | | | | | | | | | | | |

# STORM SEWER DESIGN SHEET

NOVATECH
Engineers, Planners & Landscape Architects

| Location | | | | Flow | | | | | | | | Design Capacity / Proposed Sewer Pipe Sizing / Design | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Area ID | From MH | To MH | Area A (ha.) | Runoff Coefficient C | Indivi. 2.78 AC | Accum. 2.78 AC | Time of Conc. Tc (min.) | Rain Intensity I (mm/hr) | Total Uncontrolled Peak Flow Q (L/s) | Total Restricted Peak Flow (L/s) | Pipe Length (m) | Pipe Size (mm) and Material | Pipe ID Actual (m) | Roughness n | Design Grade So (%) | Capacity Qfull (L/s) | Full Flow Velocity (m/s) | Time of Flow (min.) | Q / Qfull |
| Access Route | B-4 | CB 211 | CBMH 262 | 0.24 | 0.88 | 0.60 | 0.60 | 10.00 | 104.19 | 62.1 | | 25.7 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.45 | 57.4% |
| Access Route | B-4 | CBMH 262 | CBMH 263 | 0.25 | 0.88 | 0.62 | 1.21 | 10.45 | 101.87 | 124.8 | | 10.4 | 450 PVC | 0.4572 | 0.013 | 0.35 | 176.0 | 1.07 | 0.16 | 70.9% |
| Access Route | B-4 | CBMH 263 | STMMH 116 | 0.18 | 0.88 | 0.45 | 1.66 | 10.61 | 101.06 | 169.9 | | 12.9 | 450 PVC | 0.4572 | 0.013 | 0.45 | 199.5 | 1.22 | 0.18 | 85.2% |
| Access Route | B-4 | STMMH 115 | STMMH 116 | 0.08 | 0.88 | 0.19 | 0.19 | 10.00 | 104.19 | 19.6 | | 8.4 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.15 | 18.1% |
| Access Route | B-4 | STMMH 116 | OGS UNIT 2 | 0.00 | - | 0.00 | 1.85 | 10.79 | 100.20 | Flows controlled by ICD | **35.0** | 12.6 | 375 PVC | 0.381 | 0.013 | 0.35 | 108.2 | 0.95 | 0.22 | 32.3% |
| Access Route/Legget Drive | B2-B4, C1-C2 | OGS UNIT 2 | EX. STMMH L3 | 0.00 | - | 0.00 | 2.03 | 17.47 | 76.35 | | **171.0** | 12.9 | 450 PVC | 0.4572 | 0.013 | 0.40 | 188.1 | 1.15 | 0.19 | 90.9% |
| 500 March Road | B-0b, C-0, S-1 | EX. STMMH L4 | EX. STMMH L3 | 2.14 | 0.72 | 4.25 | 4.25 | 14.30 | 85.89 | Flows controlled by ICD | **167.7** | 18.3 | 600 CONC | 0.6096 | 0.013 | 0.33 | 368.0 | 1.26 | 0.24 | 45.6% |
| Legget Drive | B0-4, C0-4, L1-2, S-1 | EX. STMMH L3 | EX. STMMH "A" | 0.00 | - | 0.00 | 0.00 | 17.65 | 75.86 | 85.6 | **379.7** | 30.0 | 825 CONC | 0.8382 | 0.013 | 0.50 | 1058.9 | 1.92 | 0.26 | 43.9% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S-1 | EX. STMMH "A" | EX. STMMH "B" | 0.00 | - | 0.00 | 0.00 | 17.91 | 75.19 | 85.6 | **379.7** | 50.1 | 825 CONC | 0.8382 | 0.013 | 0.50 | 1058.9 | 1.92 | 0.44 | 43.9% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S-1 | EX. STMMH "B" | EX. STMMH "C" | 0.00 | - | 0.00 | 0.00 | 18.35 | 74.10 | 85.6 | **379.7** | 46.8 | 825 CONC | 0.8382 | 0.013 | 0.50 | 1058.9 | 1.92 | 0.41 | 43.9% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S-1 | EX. STMMH "C" | EX. STMMH "D" | 0.00 | - | 0.00 | 0.00 | 18.76 | 73.11 | 85.6 | **379.7** | 12.8 | 825 CONC | 0.8382 | 0.013 | 1.00 | 1497.5 | 2.71 | 0.08 | 31.1% |
| 525 Legget Drive (KRP) | TC1-TC5 | EX. CBMH | EX. STMMH "D" | 1.31 | 0.82 | 2.99 | 2.99 | 10.00 | 104.19 | 311.9 | | 53.9 | 600 PVC | 0.7096 | 0.013 | 0.17 | 396.0 | 1.00 | 0.90 | 78.8% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S-1, TC1-5 | EX. STMMH "D" | EX. STMMH "E" | 0.00 | - | 0.00 | 2.99 | 18.83 | 72.92 | 397.5 | **379.7** | 15.3 | 900 CONC | 0.9144 | 0.013 | 0.27 | 981.3 | 1.49 | 0.17 | 79.2% |
| 525 Legget Drive (KRP) | TD-1 | EX. CBMH | EX. STMMH "E" | 0.84 | 0.75 | 1.75 | 1.75 | 10.00 | 104.19 | 182.5 | | 49.0 | 300 PVC | 0.3048 | 0.013 | 1.60 | 127.6 | 1.75 | 0.47 | 143.0% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S1, TC1-5, TD-1 | EX. STMMH "E" | EX. STMMH "F" | 0.00 | - | 0.00 | 4.75 | 19.00 | 72.51 | 344.1 | **379.7** | 37.5 | 900 CONC | 0.9144 | 0.013 | 0.20 | 844.6 | 1.29 | 0.49 | 85.7% |
| 515 Legget Drive (KRP) | TD-2 | Building | EX. STMMH "F" | 0.14 | 0.90 | 0.35 | 0.35 | 10.00 | 104.19 | 36.5 | | 38.0 | 200 PVC | 0.2032 | 0.013 | 0.30 | 18.7 | 0.58 | 1.10 | 194.7% |
| 525 Legget Drive (KRP) | H-1 | Hotel | EX. STMMH "F" | 0.72 | 0.85 | 1.70 | 1.70 | 10.00 | 104.19 | 177.3 | | 15.5 | 200 PVC | 0.2032 | 0.013 | 0.71 | 28.8 | 0.89 | 0.29 | 614.9% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S1, TC1-5, TD1-2 | EX. STMMH "F" | EX. STMMH "G" | 0.00 | - | 0.00 | 6.80 | 19.49 | 71.39 | 485.2 | **379.7** | 64.8 | 900 CONC | 0.9144 | 0.013 | 0.48 | 1308.4 | 1.99 | 0.54 | 66.1% |
| 515 Legget Drive (KRP) | TD-3, TD-4 | EX. CBMH | EX. STMMH "G" | 2.84 | 0.75 | 5.92 | 5.92 | 10.00 | 104.19 | 617.0 | | 79.0 | 450 CONC | 0.4572 | 0.013 | 0.50 | 210.3 | 1.28 | 1.03 | 293.4% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S1, TC1-5, TD1-4, H-1 | EX. STMMH "G" | EX. STMMH "H" | 0.00 | - | 0.00 | 12.72 | 20.03 | 70.18 | 892.6 | **379.7** | 22.5 | 975 CONC | 0.9906 | 0.013 | 1.20 | 2561.1 | 3.32 | 0.11 | 49.7% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S1, TC1-5, TD1-4, H-1 | EX. STMMH "H" | EX. STMMH "I" | 0.00 | - | 0.00 | 12.72 | 20.15 | 69.93 | 892.6 | **379.7** | 46.8 | 1050 CONC | 1.0668 | 0.013 | 0.24 | 1395.6 | 1.56 | 0.50 | 91.2% |
| 525 Legget Drive (KRP) | B0-4, C0-4, L1-2, S1, TC1-5, TD1-4, H-1 | EX. STMMH "I" | SWM POND | 0.00 | - | 0.00 | 12.72 | 20.65 | 68.87 | 892.6 | **379.7** | 42.9 | 1050 CONC | 1.0668 | 0.013 | 0.44 | 1889.7 | 2.11 | 0.34 | 67.3% |
| **Totals** | | | | **11.87** | | | | | | | | **1432.1** | | | | | | | | |

### Demand Equation / Parameters

**1. Q =** 2.78 ACI

### Capacity Equation

**Q full =** $1000*(1/n)*A_p*R^{2/3}*So^{0.5}$

### Definitions

**Q =** Peak flow in litres per second (L/s)
**A =** Area in hectares (ha)
**C =** Weighted runoff coefficient (increased by 25% for 100-year)
**I =** Rainfall intensity in millimeters per hour (mm/hr)

Rainfall intensity is based on City of Ottawa IDF data presented in the City of Ottawa - Sewer Design Guidelines

### Definitions

**Q full =** Capacity (L/s)
**n =** Manning coefficient of roughness (0.013)
**$A_p$ =** Pipe flow area ($m^2$)
**R** = Hydraulic Radius of wetted area (dia./4 for full pipes)
**So =** Pipe slope/gradient

### Notes

1) Refer to the Novatech Report "Development Servicing Study and Stormwater Management Report - Nokia Ottawa Innovation Campus" (R-2023-082) for on-site storm drainage and stormwater details.
2) Refer to the Novatech Report "Sanitary and Storm Trunk Sewer Design Brief - Nokia Ottawa Innovation Campus" (R-2024-130) for off-site storm drainage and stormwater details.
3) Refer to Novatech Drawings C100 and C501 for the storm structure designations, storm pipe details and control structure tables.
4) Refer to Novatech Drawing C500 and associated storm sewer design sheet for STM drainage areas that contribute to the northern STM Sewer on KRP Lands.

# APPENDIX F

## Inlet Control Device (ICD) Information

# IPEX Tempest™ Inlet Control Devices

## Municipal Technical Manual Series

## Vol. I, 2nd Edition

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## 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.



NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

## PRODUCT INFORMATION: TEMPEST HF & MHF ICD

### Product Description

Our HF, HF Sump and MHF ICD's are designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter or 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 5 preset flow curves, these ICDs have the ability to provide constant flow rates: 9lps (143 gpm) and greater

### Product Function



**TEMPEST HF (High Flow):** designed to manage moderate to higher flows 15 L/s (240 gpm) or greater and prevent the propagation of odour and floatables. With this device, the cross-sectional area of the device is larger than the orifice diameter and has been designed to limit head losses. The HF ICD can also be ordered without flow control when only odour and floatable control is required.



**TEMPEST HF (High Flow) Sump:** The height of a sewer outlet pipe in a catch basin is not always conveniently located. At times it may be located very close to the catch basin floor, not providing enough sump for one of the other TEMPEST ICDs with universal back plate to be installed. In these applications, the HF Sump is offered. The HF Sump offers the same features and benefits as the HF ICD; however, is designed to raise the outlet in a square or round catch basin structure. When installed, the HF sump is fixed in place and not easily removed. Any required service to the device is performed through a clean-out located in the top of the device which can be often accessed from ground level.



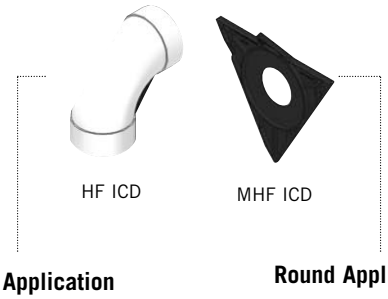
**TEMPEST MHF (Medium to High Flow):**
The MHF plate or plug is designed to control flow rates 9 L/s (143 gpm) or greater. It is not designed to prevent the propagation of odour and floatables.

### Product Construction

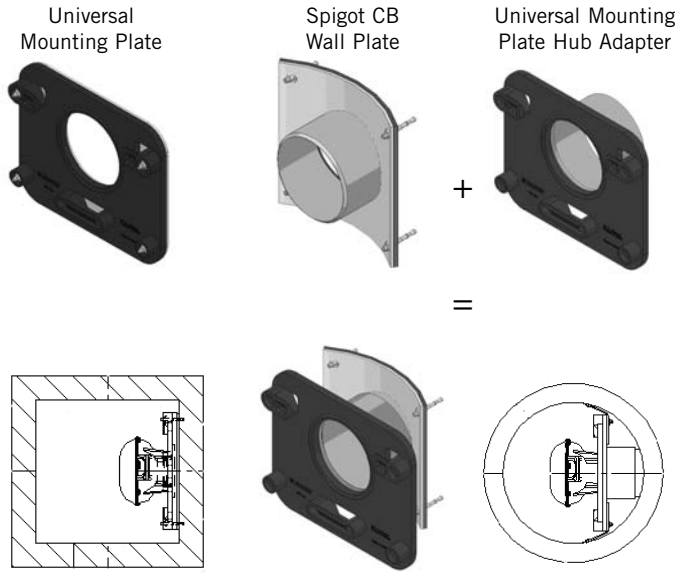
The HF, HF Sump and MHF ICDs are built to be light weight at a maximum weight of 6.8 Kg (14.6 lbs).

### Product Applications

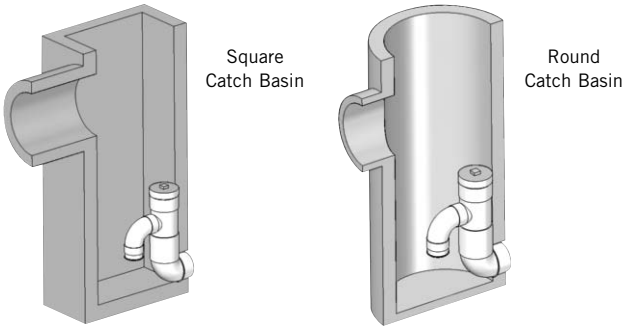
The HF and MHF ICD's are available to accommodate both square and round applications:




**Square Application** **Round Application**



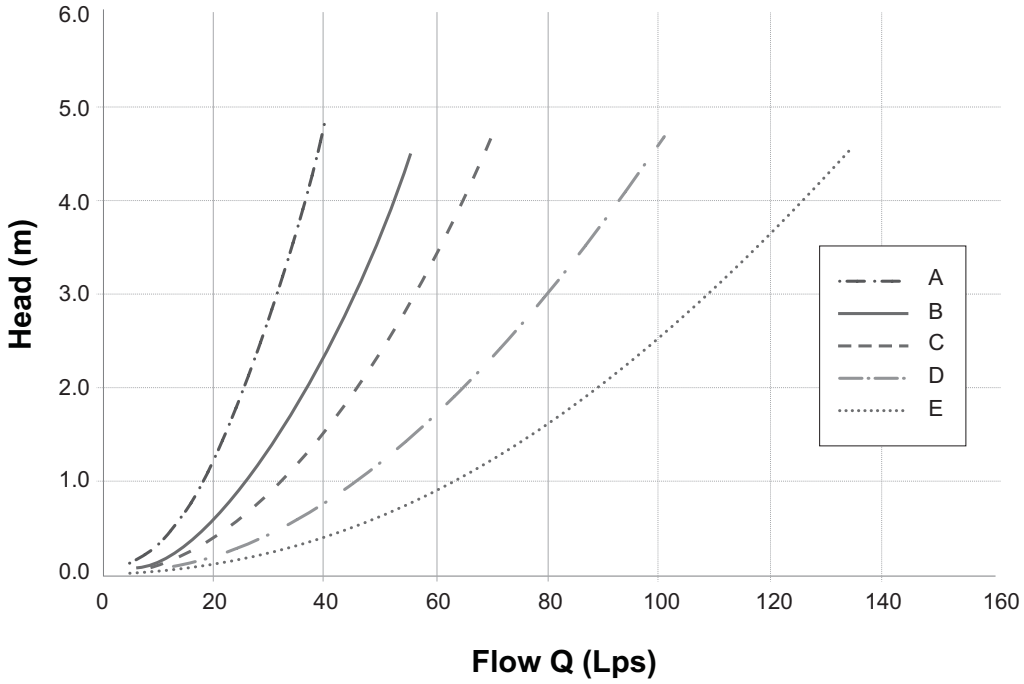

The HF Sump is available to accommodate low to no sump applications in both square and round catch basins:






NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

## Chart 3: HF & MHF Preset Flow Curves






NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters

## PRODUCT INSTALLATION

**Instructions to assemble a TEMPEST HF or MHF ICD into a Square Catch Basin:**

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 wall 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 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 wall 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 HF or MHF 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 round catch basin spigot adaptor 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 spigot CB 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 CB wall plate and the catch basin wall.
6. Put 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 hub adapter should touch the catch basin wall.
7. From ground above using a reach bar, lower the 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 wall 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.
- 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.



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**Instructions to assemble a TEMPEST HF Sump into a Square or 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, mastic tape and metal strapping
   - Material: (2) concrete anchor 3/8 x 3-1/2, (2) washers, (2) nuts, HF Sump pieces (2).
2. Apply solvent cement to the spigot end of the top half of the sump. Apply solvent cement to the hub of the bottom half of the sump. Insert the spigot of the top half of the sump into the hub of the bottom half of the sump.
3. Install the 8" spigot of the device into the outlet pipe. Use the mastic tape to seal the device spigot into the outlet pipe. You should use a level to be sure that the fitting is standing at the vertical.
4. Use an impact drill with a 3/8" concrete bit to make a series of 2 holes along each side of the body throat. The depth of the hole should be between 1-1/2" to 2-1/2". Clean the concrete dust from the 2 holes.
5. Install the anchors (2) in the holes by using a hammer. Put the nuts on the top of the anchors to protect the threads when you hit the anchors. Remove the nuts from the ends of the anchors.
6. Cut the metal strapping to length and connect each end of the strapping to the anchors. Screw the nuts in place with a maximum torque of 40 N.m (30 lbf-ft). The device should be completely flush with the catch basin wall.

**⚠ WARNING**

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- 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.
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ICD's shall have no moving parts.

### Materials

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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.

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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.

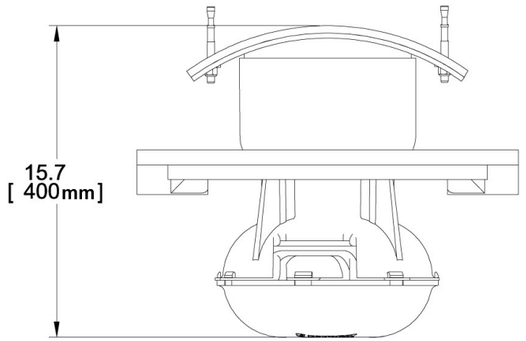
### Installation

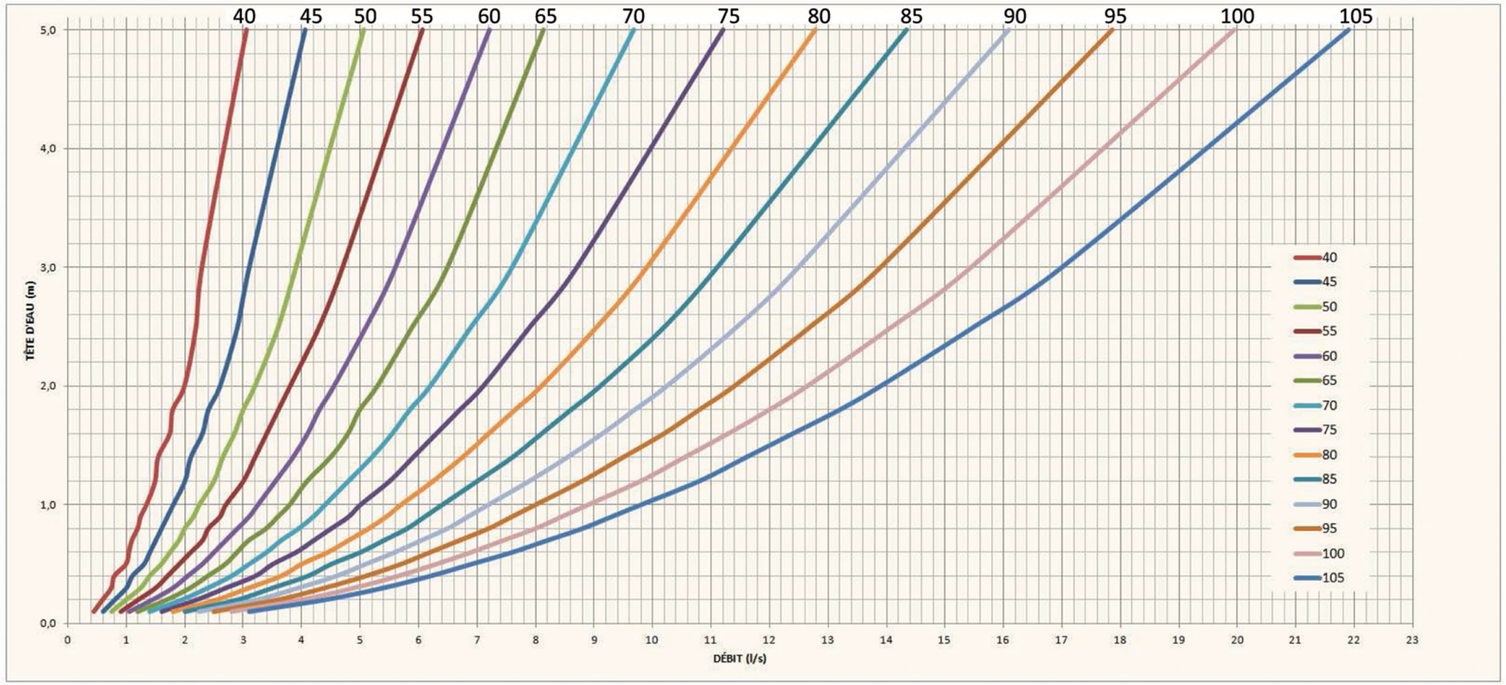
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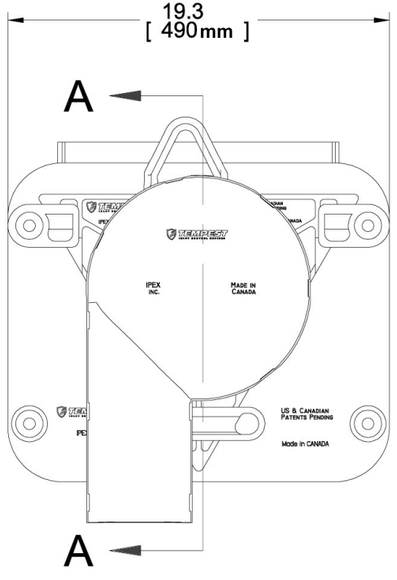


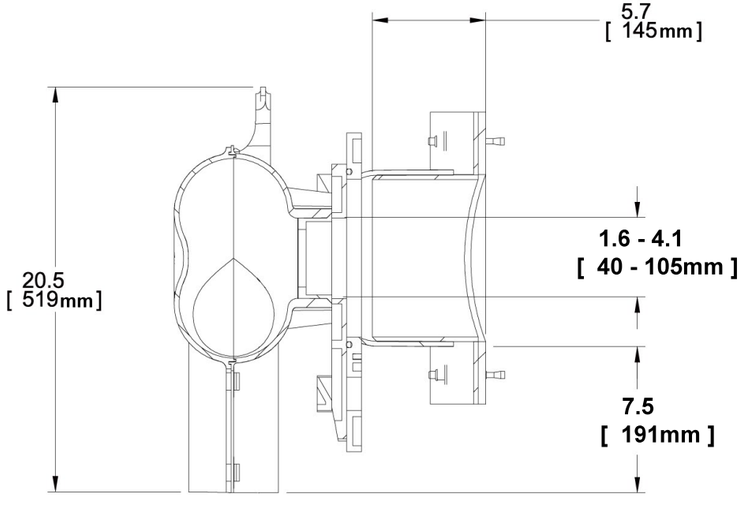


NOTE: Do not use or test the products in this manual with compressed air or other gases including air-over-water-boosters




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 G

## Control Flow Roof Drain Information

# Adjustable Accutrol Weir

Tag: _____

# Adjustable Flow Control for Roof Drains

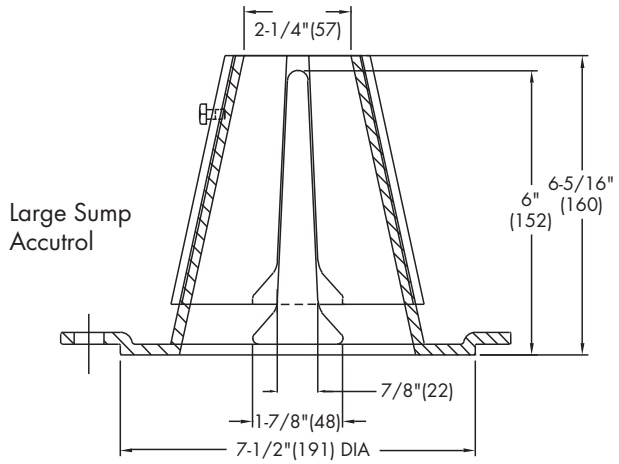
**ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)**

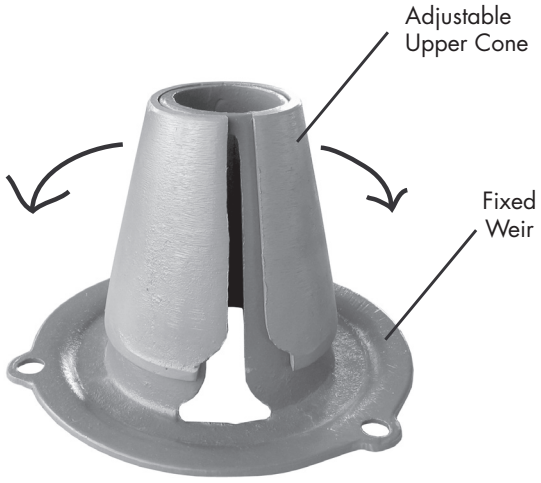
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the 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 _____

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

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**Latin America:** Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com

*A Watts Water Technologies Company*



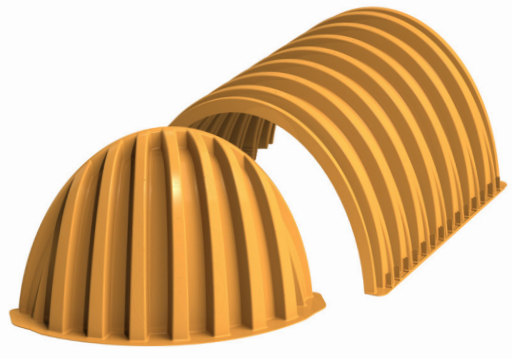
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# APPENDIX H

## Underground Stormwater Storage Chamber Information

# StormTech® MC-3500 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



**Nominal Chamber Specifications**
(not to scale)

**Size (L x W x H)**
90” x 77” x 45”
2286 mm x 1956 mm x 1143 mm

**Chamber Storage**
109.9 ft³ (3.11 m³)

**Min. Installed Storage***
175.0 ft³ (4.96 m³)

**Weight**
134 lbs (60.8 kg)

**Shipping**
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 6” (150 mm) of stone between chambers/ end caps and 40% stone porosity.

**Nominal End Cap Specifications**
(not to scale)

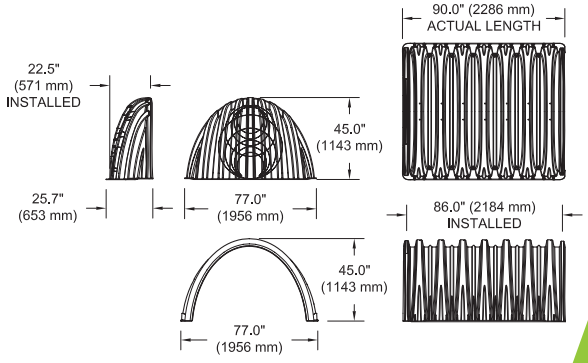
**Size (L x W x H)**
26.5” x 71” x 45.1”
673 mm x 1803 mm x 1145 mm

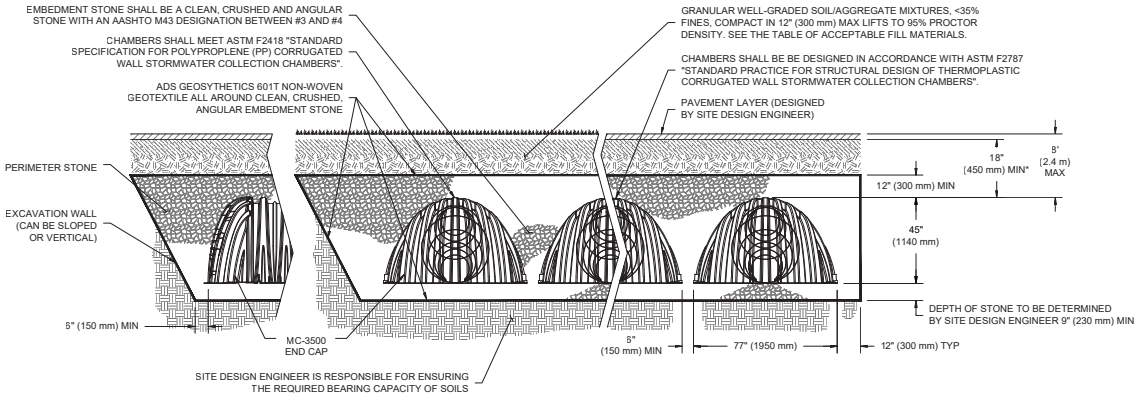
**End Cap Storage**
14.9 ft³ (0.42 m³)

**Min. Installed Storage***
45.1 ft³ (1.28 m³)

**Weight**
49 lbs (22.2 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 6” (150 mm) of stone perimeter, 6” (150 mm) of stone between chambers/ end caps and 40% stone porosity.




*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

ADS StormTech™

# StormTech MC-3500 Specifications

## Storage Volume Per Chamber

| | Bare Chamber Storage ft³ (m³) | Chamber and Stone Foundation Depth in. (mm) | | | |
|---|---|---|---|---|---|
| | | 9 in (230 mm) | 12 in (300 mm) | 15 in (375 mm) | 18 in (450 mm) |
| Chamber | 109.9 (3.11) | 175.0 (4.96) | 179.9 (5.09) | 184.9 (5.24) | 189.9 (5.38) |
| End Cap | 14.9 (0.42) | 45.1 (1.28) | 46.6 (1.32) | 48.3 (1.37) | 49.9 (1.41) |

**Note:** Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

## Amount of Stone Per Chamber

| English Tons (yds³) | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in | 12 in | 15 in | 18 in |
| Chamber | 8.5 (6.0) | 9.1 (6.5) | 9.7 (6.9) | 10.4 (7.4) |
| End Cap | 3.9 (2.8) | 4.1 (2.9) | 4.3 (3.1) | 4.5 (3.2) |
| **Metric Kilograms (m³)** | **230 mm** | **300 mm** | **375 mm** | **450 mm** |
| Chamber | 7711 (4.6) | 8255 (5.0) | 8800 (5.3) | 9435 (5.7) |
| End Cap | 3538 (2.1) | 3719 (2.2) | 3901 (2.4) | 4082 (2.5) |

**Note:** Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

## Volume Excavation Per Chamber yd³ (m³)

| | Stone Foundation Depth | | | |
|---|---|---|---|---|
| | 9 in (230 mm) | 12 in (300 mm) | 15 in (375mm) | 18 in (450 mm) |
| Chamber | 11.9 (9.1) | 12.4 (9.5) | 12.8 (9.8) | 13.3 (10.2) |
| End Cap | 4.0 (3.1) | 4.1 (3.3) | 4.3 (3.3) | 4.4 (3.4) |

**Note:** Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

**Working on a project?**
**Visit us at adspipe.com/stormtech and utilize the Design Tool**

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800-821-6710

# APPENDIX I

## Stormwater Quality Control Treatment Unit Information

## Kynan Dsa

**From:** Jessica Steffler <jessica.steffler@RinkerPipe.com>
**Sent:** Sunday, October 27, 2024 8:58 AM
**To:** Kynan Dsa
**Cc:** Brandon O'Leary
**Subject:** FW: [EXTERNAL] EFO Sizing Request - 570 March Road: Nokia Ottawa Innovation Campus (123043)
**Attachments:** 123043-GP-OGS-MU.pdf; Stormceptor EFO8 Sizing Report-570 March Rd - South Outlet.pdf; Stormceptor EFO6 Sizing Report-570 March Rd - North Outlet.pdf; Stormceptor EFO - Oil Grit Separator Specification (rev 12-23).pdf; EFO6-DETAIL.pdf; EFO8-DETAIL.pdf; Stormceptor EF Owner's Manual_7-26-18 (1).pdf

Kynan,

I have sized both units based on the parameters provided. The recommended unit for the south is the Stormceptor EFO8 and for the North is the Stormceptor EFO6 unit. I have attached both sizing reports for you to review. Also attached you will find the standard drawings for both units and specification, the owner's manual and information on the Quality Assurance Program. The budgetary price of each unit includes the unit itself, delivery to site and the Quality Assurance Program. See pricing below:

Stormceptor EFO6 $36,312
Stormceptor EFO8 $53,124.

Stormceptor EFO6 Capacities
Maximum Treatment Flow Rate: 23.4 L/s
Maintenance Sediment Volume: 760 L
Maximum Sediment Capacity: 3,470 L
Maximum Hydrocarbon Storage Capacity: 610 L
Total Storage Volume: 5,070 L

Stormceptor EFO8 Capacities
Maximum Treatment Flow Rate: 41.6 L/s
Maintenance Sediment Volume: 1,810 L
Maximum Sediment Capacity: 8,780 L
Maximum Hydrocarbon Storage Capacity: 1,070 L
Total Storage Volume: 12,090 L

Please reach out if you have any questions.

Jessica Steffler

**From:** Kynan Dsa <k.dsa@novatech-eng.com>
**Sent:** Tuesday, October 22, 2024 10:45 AM
**To:** Brandon O'Leary <Brandon.OLeary@forterrabp.com>
**Cc:** Francois Thauvette <f.thauvette@novatech-eng.com>
**Subject:** [EXTERNAL] EFO Sizing Request - 570 March Road: Nokia Ottawa Innovation Campus (123043)

**CAUTION: This email originated from outside of the organization. Exercise caution when opening attachments or clicking links, especially from *UNKNOWN* senders.**

Hi Brandon,

I received your contact information from Steve Matthews (Novatech) and appreciate your time and consideration for this request.

We are currently working on a project that requires two (2) separate stormwater quality control units to treat water from the paved drive aisles on-site, some of the proposed buildings, and landscaped areas. The project proposes to develop an R&D lab, office building, parking garage, and at-grade commercial units as part of the new Nokia Ottawa Innovation Campus, located at 570 March Road in the City of Ottawa. Stormwater flows from the site will be directed to two separate outlets that both ultimately outlet to a stormwater management pond. Two separate stormwater quality control units will therefore be required.
The project details are as follows:

North Outlet:

- Tributary Area = 1.014 ha.
- Imperviousness: Cw = 0.90
- Time of concentration = 10min
- IDF Curve = City of Ottawa (104.19mm/hr for 5-year event, 178.56mm/hr for 100-year event)
- Anticipated (Controlled) Peak Flows = 57.6 L/s
- The proposed unit for the north outlet will be installed on an existing 375mm dia. PVC outlet pipe with one new 375 dia. PVC inlet pipe at 160 degrees of separation through the structure and approximately 2.25m of cover on both pipes.

South Outlet:

- Tributary Area: 3.235 ha.
- Imperviousness: Cw = 0.73
- Time of concentration = 10min
- IDF Curve = City of Ottawa (104.19mm/hr for 5-year event, 178.56mm/hr for 100-year event)
- Anticipated (Controlled) Peak Flows = 165.0 L/s
- The proposed unit for the south outlet will be installed on a new 450mm dia. PVC outlet pipe with the following inlet pipes:
    - One new 375mm dia. PVC inlet pipe at 180 degrees of separation through the structure and 90 degrees of separation from the other inlet pipe.

- One new 450mm dia. PVC inlet pipe at 90 degrees of separation through the structure and 90 degrees of separation from the other inlet pipe.

We have a requirement to provide a water quality control of 80% TSS removal based on correspondence from the Mississippi Valley Conservation Authority. A standard particle distribution (Fines) should be adequate for the design. Anticipated peak flows are based on a previously approved drainage plan for the stormwater management pond. On-site attenuation and detention will be provided through the use of ICDs within the storm structures and underground stormwater storage tanks. Please find attached a markup of the proposed site servicing plan for a sketch of the area and proposed water quality treatment unit locations (highlighted in yellow).

Can you please size two (2) separate EFO units for us and provide the design details as well as an approximate cost estimate.

We will also need the following information on each unit for our SWM Report:

- % of net annual TSS removal
- % of net annual treatment volume for the tributary area
- The treatment capacity in L/s
- The sediment storage capacity in $m^3$
- The oil storage capacity in L
- The total unit storage capacity in L

Thank you for your time and consideration in this matter. If there is any further information you require, please do not hesitate to call.

Thanks,

**Kynan D'sa**, B.A.Sc. (Engineering) (He/Him)
**NOVATECH**
Engineers, Planners & Landscape Architects
240 Michael Cowpland Drive, Suite 200, Ottawa, ON, K2M 1P6
Tel: 613.254.9643 Ext. 276 | Cell: 705.821.2278
The information contained in this email message is confidential and is for exclusive use of the addressee.

Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

# Stormceptor® EF Sizing Report

## Imbrium® Systems
## ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

10/27/2024

| | |
|---|---|
| Province: | Ontario |
| City: | Ottawa |
| Nearest Rainfall Station: | OTTAWA CDA RCS |
| Climate Station Id: | 6105978 |
| Years of Rainfall Data: | 20 |

| | |
|---|---|
| Site Name: | North Outlet |

| | |
|---|---|
| Drainage Area (ha): | 1.014 |
| Runoff Coefficient 'c': | 0.90 |

| | |
|---|---|
| Particle Size Distribution: | Fine |
| Target TSS Removal (%): | 80.0 |

| | |
|---|---|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 29.45 |
| Oil / Fuel Spill Risk Site? | Yes |
| Upstream Flow Control? | No |
| Peak Conveyance (maximum) Flow Rate (L/s): | |
| Influent TSS Concentration (mg/L): | 200 |
| Estimated Average Annual Sediment Load (kg/yr): | 1173 |
| Estimated Average Annual Sediment Volume (L/yr): | 954 |

| | |
|---|---|
| Project Name: | 570 March Rd. |
| Project Number: | - |
| Designer Name: | Jessica Steffler |
| Designer Company: | Forterra Pipe & Precast |
| Designer Email: | jessica.steffler@RinkerPipe.com |
| Designer Phone: | 519-239-6958 |
| EOR Name: | Kynan D'sa |
| EOR Company: | Novatech |
| EOR Email: | k.dsa@novatech-eng.com |
| EOR Phone: | 613-254-9643 |

### Net Annual Sediment (TSS) Load Reduction Sizing Summary

| Stormceptor Model | TSS Removal Provided (%) |
|---|---|
| EFO4 | 74 |
| EFO6 | 85 |
| EFO8 | 92 |
| EFO10 | 95 |
| EFO12 | 97 |

**Recommended Stormceptor EFO Model: EFO6**

**Estimated Net Annual Sediment (TSS) Load Reduction (%): 85**

**Water Quality Runoff Volume Capture (%): > 90**

imbrium

## THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

## PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

## PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

| Particle Size (µm) | Percent Less Than | Particle Size Fraction (µm) | Percent |
|---|---|---|---|
| 1000 | 100 | 500-1000 | 5 |
| 500 | 95 | 250-500 | 5 |
| 250 | 90 | 150-250 | 15 |
| 150 | 75 | 100-150 | 15 |
| 100 | 60 | 75-100 | 10 |
| 75 | 50 | 50-75 | 5 |
| 50 | 45 | 20-50 | 10 |
| 20 | 35 | 8-20 | 15 |
| 8 | 20 | 5-8 | 10 |
| 5 | 10 | 2-5 | 5 |
| 2 | 5 | <2 | 5 |

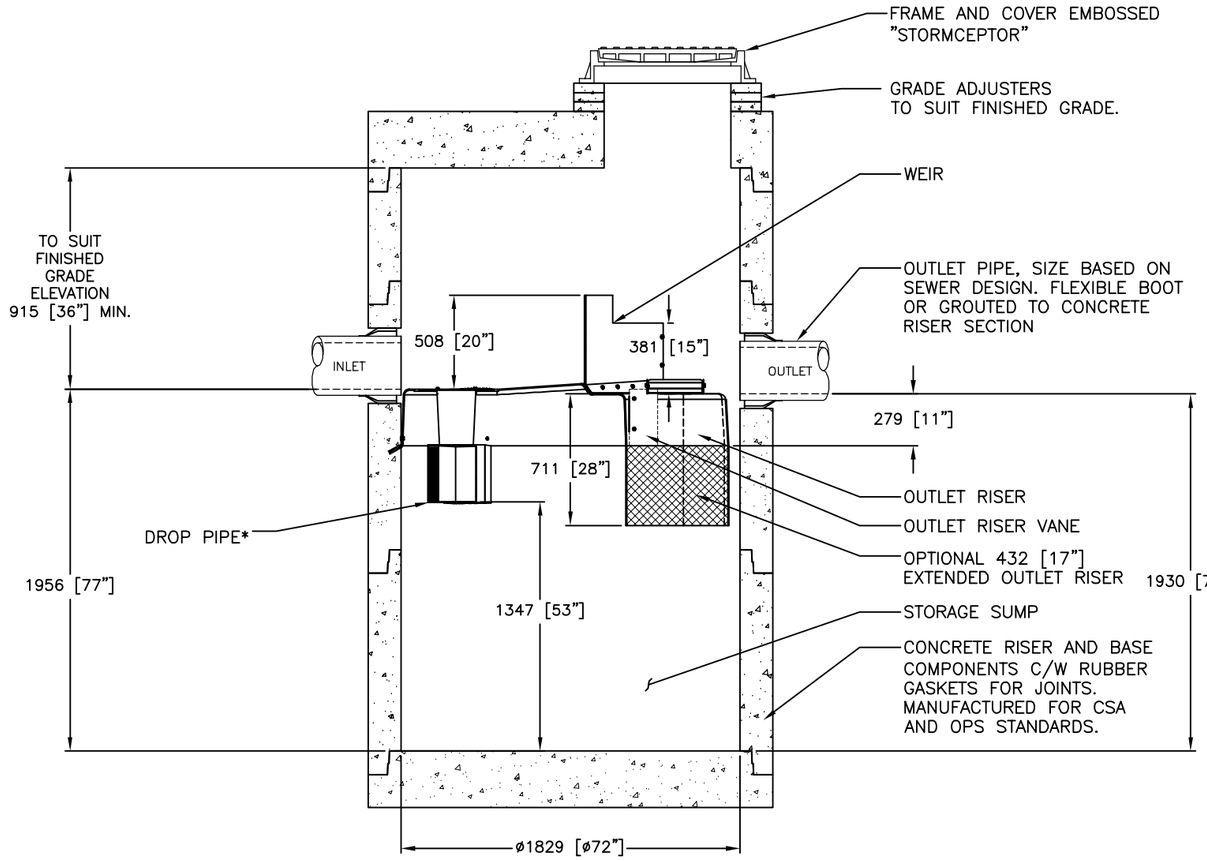
# Stormceptor® EF Sizing Report

| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|---|---|---|---|---|---|---|---|
| 0.50 | 8.6 | 8.6 | 1.27 | 76.0 | 29.0 | 100 | 8.6 | 8.6 |
| 1.00 | 20.3 | 29.0 | 2.54 | 152.0 | 58.0 | 100 | 20.3 | 29.0 |
| 2.00 | 16.2 | 45.2 | 5.07 | 304.0 | 116.0 | 95 | 15.3 | 44.3 |
| 3.00 | 12.0 | 57.2 | 7.61 | 457.0 | 174.0 | 87 | 10.4 | 54.7 |
| 4.00 | 8.4 | 65.6 | 10.15 | 609.0 | 232.0 | 82 | 6.9 | 61.6 |
| 5.00 | 5.9 | 71.6 | 12.69 | 761.0 | 289.0 | 79 | 4.7 | 66.3 |
| 6.00 | 4.6 | 76.2 | 15.22 | 913.0 | 347.0 | 77 | 3.5 | 69.9 |
| 7.00 | 3.1 | 79.3 | 17.76 | 1066.0 | 405.0 | 74 | 2.3 | 72.1 |
| 8.00 | 2.7 | 82.0 | 20.30 | 1218.0 | 463.0 | 71 | 1.9 | 74.1 |
| 9.00 | 3.3 | 85.3 | 22.83 | 1370.0 | 521.0 | 68 | 2.3 | 76.4 |
| 10.00 | 2.3 | 87.6 | 25.37 | 1522.0 | 579.0 | 66 | 1.5 | 77.9 |
| 11.00 | 1.6 | 89.2 | 27.91 | 1674.0 | 637.0 | 64 | 1.0 | 78.9 |
| 12.00 | 1.3 | 90.5 | 30.44 | 1827.0 | 695.0 | 64 | 0.8 | 79.7 |
| 13.00 | 1.7 | 92.2 | 32.98 | 1979.0 | 752.0 | 63 | 1.1 | 80.8 |
| 14.00 | 1.2 | 93.5 | 35.52 | 2131.0 | 810.0 | 63 | 0.8 | 81.6 |
| 15.00 | 1.2 | 94.6 | 38.06 | 2283.0 | 868.0 | 63 | 0.7 | 82.3 |
| 16.00 | 0.7 | 95.3 | 40.59 | 2436.0 | 926.0 | 62 | 0.4 | 82.7 |
| 17.00 | 0.7 | 96.1 | 43.13 | 2588.0 | 984.0 | 62 | 0.5 | 83.2 |
| 18.00 | 0.4 | 96.5 | 45.67 | 2740.0 | 1042.0 | 61 | 0.2 | 83.4 |
| 19.00 | 0.4 | 96.9 | 48.20 | 2892.0 | 1100.0 | 59 | 0.2 | 83.7 |
| 20.00 | 0.2 | 97.1 | 50.74 | 3044.0 | 1158.0 | 58 | 0.1 | 83.8 |
| 21.00 | 0.5 | 97.5 | 53.28 | 3197.0 | 1215.0 | 57 | 0.3 | 84.1 |
| 22.00 | 0.2 | 97.8 | 55.81 | 3349.0 | 1273.0 | 55 | 0.1 | 84.2 |
| 23.00 | 1.0 | 98.8 | 58.35 | 3501.0 | 1331.0 | 54 | 0.5 | 84.8 |
| 24.00 | 0.3 | 99.1 | 60.89 | 3653.0 | 1389.0 | 53 | 0.1 | 84.9 |
| 25.00 | 0.0 | 99.1 | 63.43 | 3806.0 | 1447.0 | 51 | 0.0 | 84.9 |
| 30.00 | 0.9 | 100.0 | 76.11 | 4567.0 | 1736.0 | 42 | 0.4 | 85.3 |
| 35.00 | 0.0 | 100.0 | 88.80 | 5328.0 | 2026.0 | 36 | 0.0 | 85.3 |
| 40.00 | 0.0 | 100.0 | 101.48 | 6089.0 | 2315.0 | 32 | 0.0 | 85.3 |
| 45.00 | 0.0 | 100.0 | 114.17 | 6850.0 | 2605.0 | 28 | 0.0 | 85.3 |
| **Estimated Net Annual Sediment (TSS) Load Reduction =** | | | | | | | | **85 %** |

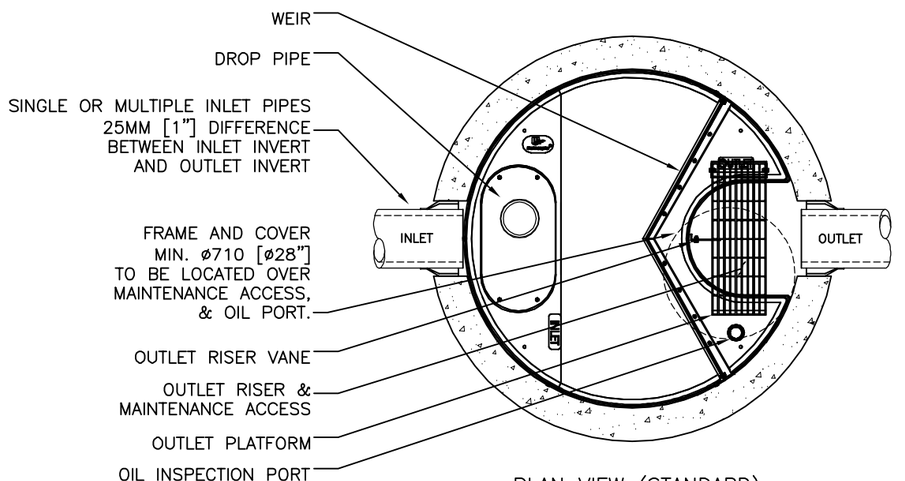
*Climate Station ID*: 6105978 *Years of Rainfall Data*: 20

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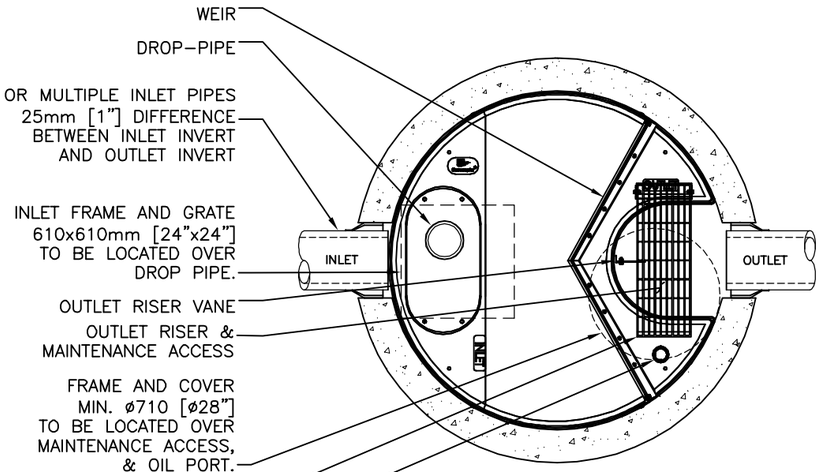
# DRAWING NOT TO BE USED FOR CONSTRUCTION




SECTION VIEW




PLAN VIEW (STANDARD)




PLAN VIEW (INLET TOP)

**GENERAL NOTES:**

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m$^2$ (27.9 gpm/ft$^2$) FOR STORMCEPTOR EF6 AND 535 L/min/m$^2$ (13.1 gpm/ft$^2$) FOR STORMCEPTOR EFO6 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

**INSTALLATION NOTES**

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

# STANDARD DETAIL
# NOT FOR CONSTRUCTION

## SITE SPECIFIC DATA REQUIREMENTS

| | | | | | |
|---|---|---|---|---|---|
| STORMCEPTOR MODEL | EFO6 | | | | |
| STRUCTURE ID | | | | | * |
| HYDROCARBON STORAGE REQ'D (L) | | | | | * |
| WATER QUALITY FLOW RATE (L/s) | | | | | * |
| PEAK FLOW RATE (L/s) | | | | | * |
| RETURN PERIOD OF PEAK FLOW (yrs) | | | | | * |
| DRAINAGE AREA (HA) | | | | | * |
| DRAINAGE AREA IMPERVIOUSNESS (%) | | | | | * |
| PIPE DATA: | I.E. | MAT'L | DIA | SLOPE % | HGL |
| INLET #1 | * | * | * | * | * |
| INLET #2 | * | * | * | * | * |
| OUTLET | * | * | * | * | * |

* PER ENGINEER OF RECORD

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| MARK | DATE | REVISION DESCRIPTION | BY |
|---|---|---|---|
| 1 | 6/8/18 | OUTLET PLATFORM | JSK |
| 0 | 05/26/17 | INITIAL RELEASE | JSK |
| #### | #### | #### | #### |
| #### | #### | #### | #### |
| #### | #### | #### | #### |
| #### | #### | #### | #### |

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9J9
TF 800-565-4801 CA 416-980-5900 INTL +1-416-980-5900
THE STORMCEPTOR® SYSTEM IS PROTECTED BY ONE OR MORE OF THE FOLLOWING PATENTS:
No. 2,208,824 / EUROPE 1,747,071 / EUROPE 1,982,961 / EUROPE 2,021,838 / EUROPE Extra Heavy Duty / Hydrocarbon Storage / Inlet Pipe Invert Offset / Inlet Pipe Size 1,219 mm [48"] / Inlet Pipe Size 1,372 mm [54"] / Inlet Pipe Size 1,524 mm [60"] / Inlet Pipe Size 1,829 mm [72"] / Inlet Pipe Size 2,134 mm [84"] / Inlet Pipe Size 2,438 mm [96"] / Inlet Pipe Size 3,048 mm [120"] / Inlet Pipe Size 3,658 mm [144"] / Inlet Pipe Size 4,267 mm [168"] / Inlet Pipe Size 4,877 mm [192"] / Inlet Pipe Size 5,486 mm [216"] / Inlet Pipe Size 6,096 mm [240"] / Inlet Pipe Size 6,706 mm [264"] / Inlet Pipe Size 7,315 mm [288"] / Inlet Pipe Size 7,925 mm [312"] / Inlet Pipe Size 8,534 mm [336"] / Inlet Pipe Size 9,144 mm [360"] / Inlet Pipe Size 9,753 mm [384"] / Inlet Pipe Size 10,363 mm [408"] / Inlet Pipe Size 10,972 mm [432"] / Inlet Pipe Size 11,582 mm [456"] / Inlet Pipe Size 12,192 mm [480"] / Inlet Pipe Size 12,801 mm [504"] / Inlet Pipe Size 13,411 mm [528"] / Inlet Pipe Size 14,020 mm [552"] / 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/ Inlet Pipe Size 327,964 mm [12912"] / Inlet Pipe Size 328,574 mm [12936"] / Inlet Pipe Size 329,184 mm [12960"] / In

Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

# Stormceptor® EF Sizing Report

## Imbrium® Systems
## ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

10/27/2024

| | |
|---|---|
| Province: | Ontario |
| City: | Ottawa |
| Nearest Rainfall Station: | OTTAWA CDA RCS |
| Climate Station Id: | 6105978 |
| Years of Rainfall Data: | 20 |

| | |
|---|---|
| Site Name: | South Outlet |

| | |
|---|---|
| Drainage Area (ha): | 3.235 |
| Runoff Coefficient 'c': | 0.73 |

| | |
|---|---|
| Particle Size Distribution: | Fine |
| Target TSS Removal (%): | 80.0 |

| | |
|---|---|
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 76.22 |
| Oil / Fuel Spill Risk Site? | Yes |
| Upstream Flow Control? | No |
| Peak Conveyance (maximum) Flow Rate (L/s): | |
| Influent TSS Concentration (mg/L): | 200 |
| Estimated Average Annual Sediment Load (kg/yr): | 2555 |
| Estimated Average Annual Sediment Volume (L/yr): | 2078 |

| | |
|---|---|
| Project Name: | 570 March Rd. |
| Project Number: | - |
| Designer Name: | Jessica Steffler |
| Designer Company: | Forterra Pipe & Precast |
| Designer Email: | jessica.steffler@RinkerPipe.com |
| Designer Phone: | 519-239-6958 |
| EOR Name: | Kynan D'sa |
| EOR Company: | Novatech |
| EOR Email: | k.dsa@novatech-eng.com |
| EOR Phone: | 613-254-9643 |

### Net Annual Sediment (TSS) Load Reduction Sizing Summary

| Stormceptor Model | TSS Removal Provided (%) |
|---|---|
| EFO4 | 55 |
| EFO6 | 71 |
| EFO8 | 81 |
| EFO10 | 86 |
| EFO12 | 90 |

**Recommended Stormceptor EFO Model: EFO8**

**Estimated Net Annual Sediment (TSS) Load Reduction (%): 81**

**Water Quality Runoff Volume Capture (%): > 90**

imbrium

## THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

## PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

## PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

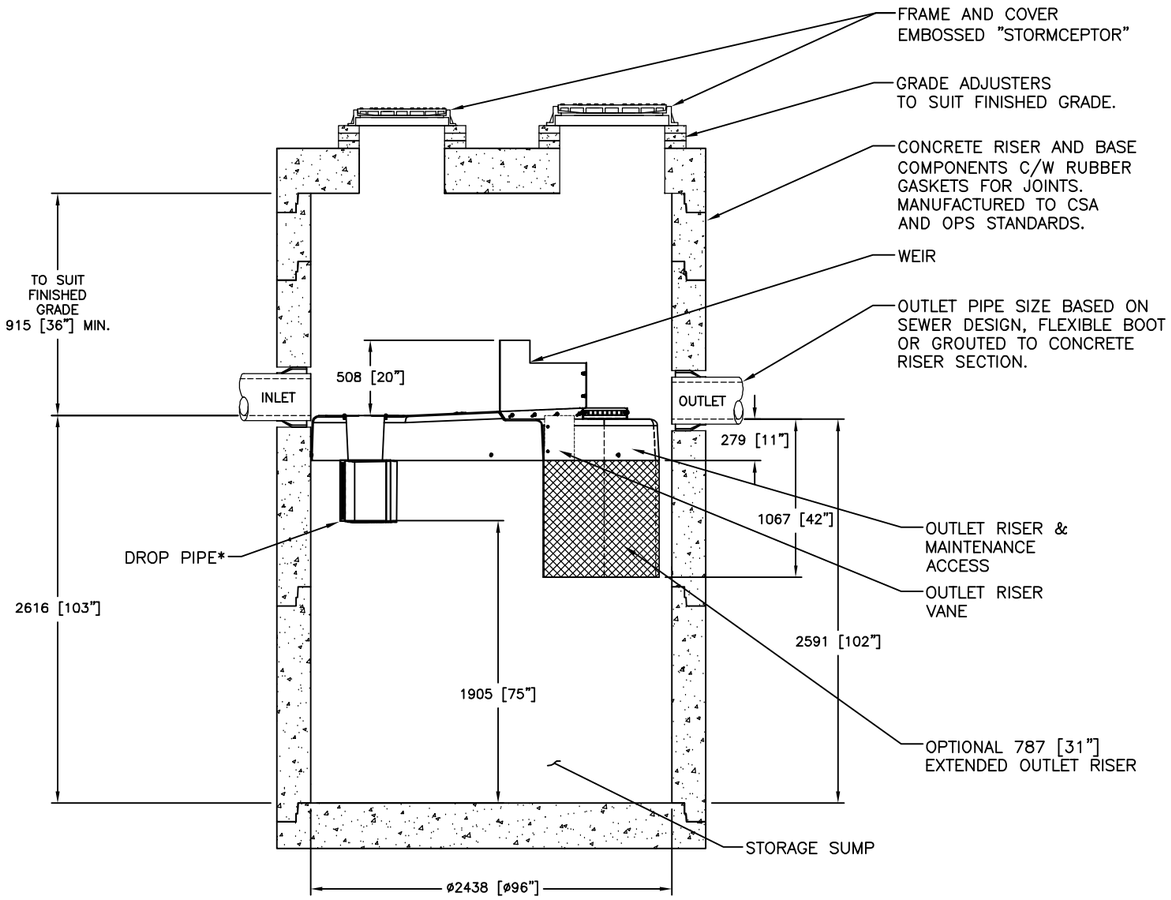
| Particle Size (µm) | Percent Less Than | Particle Size Fraction (µm) | Percent |
|---|---|---|---|
| 1000 | 100 | 500-1000 | 5 |
| 500 | 95 | 250-500 | 5 |
| 250 | 90 | 150-250 | 15 |
| 150 | 75 | 100-150 | 15 |
| 100 | 60 | 75-100 | 10 |
| 75 | 50 | 50-75 | 5 |
| 50 | 45 | 20-50 | 10 |
| 20 | 35 | 8-20 | 15 |
| 8 | 20 | 5-8 | 10 |
| 5 | 10 | 2-5 | 5 |
| 2 | 5 | <2 | 5 |

# Stormceptor® EF Sizing Report

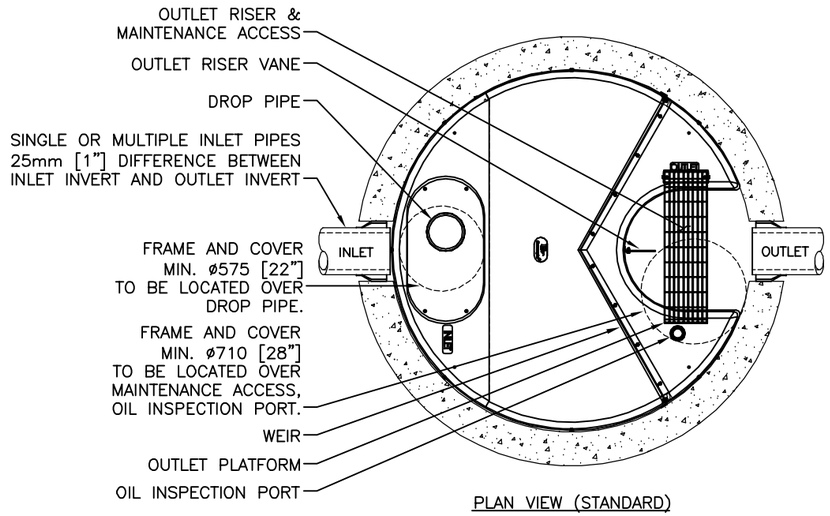
| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|---|---|---|---|---|---|---|---|
| 0.50 | 8.6 | 8.6 | 3.28 | 197.0 | 42.0 | 100 | 8.6 | 8.6 |
| 1.00 | 20.3 | 29.0 | 6.57 | 394.0 | 84.0 | 98 | 20.0 | 28.6 |
| 2.00 | 16.2 | 45.2 | 13.13 | 788.0 | 168.0 | 88 | 14.3 | 43.0 |
| 3.00 | 12.0 | 57.2 | 19.70 | 1182.0 | 251.0 | 81 | 9.7 | 52.6 |
| 4.00 | 8.4 | 65.6 | 26.26 | 1576.0 | 335.0 | 77 | 6.5 | 59.2 |
| 5.00 | 5.9 | 71.6 | 32.83 | 1970.0 | 419.0 | 73 | 4.3 | 63.5 |
| 6.00 | 4.6 | 76.2 | 39.39 | 2363.0 | 503.0 | 69 | 3.2 | 66.7 |
| 7.00 | 3.1 | 79.3 | 45.96 | 2757.0 | 587.0 | 66 | 2.0 | 68.7 |
| 8.00 | 2.7 | 82.0 | 52.52 | 3151.0 | 670.0 | 64 | 1.8 | 70.5 |
| 9.00 | 3.3 | 85.3 | 59.09 | 3545.0 | 754.0 | 63 | 2.1 | 72.6 |
| 10.00 | 2.3 | 87.6 | 65.65 | 3939.0 | 838.0 | 63 | 1.4 | 74.0 |
| 11.00 | 1.6 | 89.2 | 72.22 | 4333.0 | 922.0 | 62 | 1.0 | 75.0 |
| 12.00 | 1.3 | 90.5 | 78.78 | 4727.0 | 1006.0 | 62 | 0.8 | 75.8 |
| 13.00 | 1.7 | 92.2 | 85.35 | 5121.0 | 1090.0 | 59 | 1.0 | 76.8 |
| 14.00 | 1.2 | 93.5 | 91.91 | 5515.0 | 1173.0 | 58 | 0.7 | 77.5 |
| 15.00 | 1.2 | 94.6 | 98.48 | 5909.0 | 1257.0 | 56 | 0.6 | 78.2 |
| 16.00 | 0.7 | 95.3 | 105.04 | 6303.0 | 1341.0 | 54 | 0.4 | 78.6 |
| 17.00 | 0.7 | 96.1 | 111.61 | 6696.0 | 1425.0 | 52 | 0.4 | 78.9 |
| 18.00 | 0.4 | 96.5 | 118.17 | 7090.0 | 1509.0 | 49 | 0.2 | 79.1 |
| 19.00 | 0.4 | 96.9 | 124.74 | 7484.0 | 1592.0 | 46 | 0.2 | 79.3 |
| 20.00 | 0.2 | 97.1 | 131.30 | 7878.0 | 1676.0 | 44 | 0.1 | 79.4 |
| 21.00 | 0.5 | 97.5 | 137.87 | 8272.0 | 1760.0 | 42 | 0.2 | 79.6 |
| 22.00 | 0.2 | 97.8 | 144.43 | 8666.0 | 1844.0 | 40 | 0.1 | 79.7 |
| 23.00 | 1.0 | 98.8 | 151.00 | 9060.0 | 1928.0 | 38 | 0.4 | 80.1 |
| 24.00 | 0.3 | 99.1 | 157.56 | 9454.0 | 2011.0 | 36 | 0.1 | 80.2 |
| 25.00 | 0.0 | 99.1 | 164.13 | 9848.0 | 2095.0 | 35 | 0.0 | 80.2 |
| 30.00 | 0.9 | 100.0 | 196.95 | 11817.0 | 2514.0 | 29 | 0.3 | 80.5 |
| 35.00 | 0.0 | 100.0 | 229.78 | 13787.0 | 2933.0 | 25 | 0.0 | 80.5 |
| 40.00 | 0.0 | 100.0 | 262.60 | 15756.0 | 3352.0 | 22 | 0.0 | 80.5 |
| 45.00 | 0.0 | 100.0 | 295.43 | 17726.0 | 3771.0 | 20 | 0.0 | 80.5 |
| **Estimated Net Annual Sediment (TSS) Load Reduction =** | | | | | | | | **80 %** |

*Climate Station ID*: 6105978 *Years of Rainfall Data*: 20

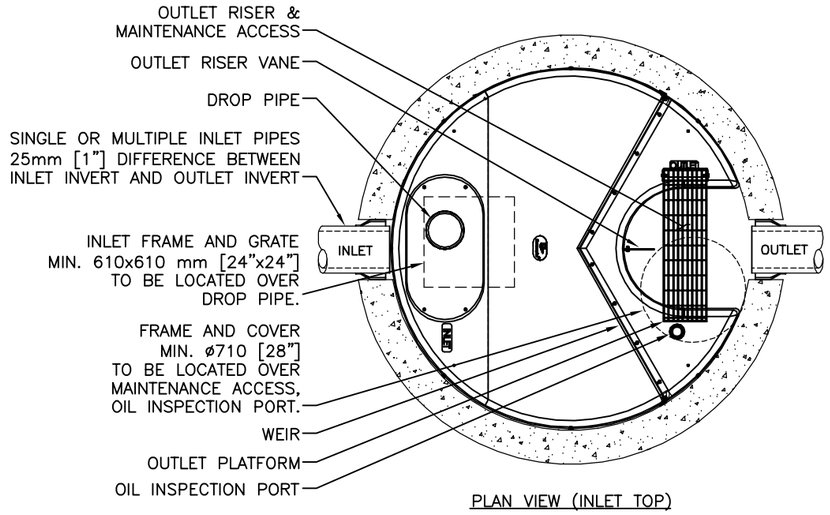
# DRAWING NOT TO BE USED FOR CONSTRUCTION




SECTION VIEW




PLAN VIEW (STANDARD)




PLAN VIEW (INLET TOP)

**GENERAL NOTES:**

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m$^2$ (27.9 gpm/ft$^2$) FOR STORMCEPTOR EF8 AND 535 L/min/m$^2$ (13.1 gpm/ft$^2$) FOR STORMCEPTOR EFO8 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

**INSTALLATION NOTES**

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

# STANDARD DETAIL
# NOT FOR CONSTRUCTION

## SITE SPECIFIC DATA REQUIREMENTS

| | | | | | |
|---|---|---|---|---|---|
| STORMCEPTOR MODEL | EFO8 | | | | |
| STRUCTURE ID | | | | | * |
| HYDROCARBON STORAGE REQ'D (L) | | | | | * |
| WATER QUALITY FLOW RATE (L/s) | | | | | * |
| PEAK FLOW RATE (L/s) | | | | | * |
| RETURN PERIOD OF PEAK FLOW (yrs) | | | | | * |
| DRAINAGE AREA (HA) | | | | | * |
| DRAINAGE AREA IMPERVIOUSNESS (%) | | | | | * |
| PIPE DATA: | I.E. | MAT'L | DIA | SLOPE % | HGL |
| INLET #1 | * | * | * | * | * |
| INLET #2 | * | * | * | * | * |
| OUTLET | * | * | * | * | * |

* PER ENGINEER OF RECORD

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If discrepancies between the supplied information upon which this drawing is based and actual conditions are encountered, these discrepancies must be reported to Imbrium immediately for re-evaluation of the design. Imbrium accepts no liability for design based on inaccurate, incomplete or inaccurate information supplied by others.

| MARK | DATE | REVISION DESCRIPTION | BY |
|---|---|---|---|
| 1 | 6/8/18 | OUTLET PLATFORM | JSK |
| 0 | 5/26/17 | INITIAL RELEASE | JSK |

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9A9
TF 800-565-6801 CA 416-665-8600 INTL +1-416-665-8600

| | |
|---|---|
| DATE: | 10/13/2017 |
| DESIGNED: JSK | DRAWN: JSK |
| CHECKED: BSF | APPROVED: * |
| PROJECT No.: EFO8 | SEQUENCE No.: * |
| SHEET: | 1 OF 1 |

I:\IMBRIUM\PRODUCTS\STORMCEPTOR EF\40 DRAWINGS & DETAILS\STANDARD DETAILS\EFO8 STANDARD DETAILS\EFO8-DETAIL.DWG 4/12/2019 11:07 AM

# APPENDIX J

## KRP Stormwater Drainage Brief Excerpts

# SANITARY AND STORM TRUNK SEWER DESIGN BRIEF

# KANATA RESEARCH PARK LANDS

Prepared By:

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

August 8, 2014
Revised September 25, 2014
Issued to MOE November 12, 2014

Novatech File: 114060
Ref: R-2014-114

management facility (SWMF) No. 1 located on the KRP lands. This SWM pond was designed to accommodate flow from the drainage areas shown on the Storm Drainage Area Plan (98066-STM). An MOE Certificate of Approval (MOE C of A No. 8125-4MTJ36) was obtained for the SWMF. Refer to **Appendix A** for a copy of the MOE C of A.

Storm Sewer Design Sheets have been provided in **Appendix C** for the on-site storm sewer system and the trunk storm sewer system from Legget Drive to the existing Stormwater Management Facility No.1. The following list of sewers identifies the storm sewer reaches for which a new MOE ECA is required. Refer to the enclosed Storm Drainage Area Plan (114060-STM, C201) for details.

- From New STM MH 4 to New STM MH 3
- From New STM MH 3 to New STM MH 2
- From New STM MH 2 to New STM MH 1
- From New STM MH 1 to New STM MH 1A
- From New STM MH 1A to EX. STM MH 2
- From EX. STM MH 2 to EX. STM MH 3
- From EX. STM MH 3 to EX. STM MH D
- From EX. STM MH D to EX. STM MH 6
- From EX. STM MH 6 to EX. STM MH 4
- From EX. STM MH 4 to EX. SWMF No. 1

## 3.1 Storm Design Flows

Storm flows shown in the Storm Sewer Design Sheet were determined as described in the following section of the report. The properties on the west side of Legget Drive, including the subject site (500 March Road), require on-site detention as the developed sites exceed the allowable runoff coefficient of 0.75.

### 3.1.1 *Newbridge Parking Lot*

Stormwater runoff from the paved parking lot is currently being controlled by an inlet control device (ICD) installed in the outlet pipe of CBMH 4 to a maximum release rate of 152 L/s prior to being directed into the existing storm sewer in Legget Drive. Refer to **Appendix D** for details regarding this previously constructed site.

### 3.1.2 *Vacant Land (Future Parking south of Newbridge Parking Lot)*

Should the vacant land between the Newbridge Parking and the subject site (500 March Road) be developed in the future, flows will have to be controlled to a maximum release rate of 83.1 L/s prior to being discharged into the storm sewer in Legget Drive. Refer to **Appendix E** for detailed calculations.

### 3.1.3 *Sites on the East side of Legget Drive*

The tributary flows from areas on the east side of Legget Drive were designed with actual runoff coefficients and did not require on-site detention. Data for these areas is provided in the enclosed Storm Sewer Design Sheets. Refer to **Appendix C** for details.

# APPENDIX K

## Engineering Drawings

## LEGEND

- SAN MH 1 — PROPOSED SANITARY MANHOLE AND SEWER
- CBMH 250 — PROPOSED CATCHBASIN MANHOLE
- STMMH 100 — PROPOSED STORM MANHOLE AND SEWER
- CB 200 — PROPOSED CATCHBASIN
- LD 1 — PROPOSED LANDSCAPE DRAIN
- THERMAL INSULATION FOR SHALLOW SEWERS
- PROPOSED WATERMAIN / WATER SERVICE
- HYD — PROPOSED HYDRANT AND VALVE
- PROPOSED WATER METER AND REMOTE METER
- V&VB — PROPOSED VALVE BOX
- VC — PROPOSED VALVE CHAMBER
- RED — PROPOSED REDUCER
- PROPOSED SIAMESE CONNECTION
- PROPOSED BARRIER CURB (PER SC1.1)
- DC — PROPOSED DEPRESSED CURB (PER SC1.1)
- CC — PROPOSED CURB CUT
- ICD — PROPOSED INLET CONTROL DEVICE
- FFE — PROPOSED FINISHED FLOOR ELEVATION
- USF — PROPOSED UNDERSIDE OF FOOTING ELEVATION
- PROPOSED TRENCH DRAIN
- PROPOSED BUILDING ENTRANCE
- EXISTING CONCRETE CURB
- SAMMH — EXISTING SANITARY MANHOLE
- CBMH — EXISTING CATCHBASIN MANHOLE
- STMMH — EXISTING STORM MANHOLE
- CB — EXISTING CATCHBASIN
- HYD — EXISTING HYDRANT & VALVE
- WV — EXISTING TREES / VEGETATION
- EX GP — EXISTING UTILITY POLE C/W GUY WIRES
- EXISTING FENCE
- EXISTING LIGHT STANDARD
- X — REMOVALS

## 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. 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.
6. REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL, ORGANIC MATERIAL AND DEBRIS UNLESS OTHERWISE INSTRUCTED BY ENGINEER. EXCAVATE AND REMOVE FROM SITE ANY CONTAMINATED MATERIAL. ALL CONTAMINATED MATERIAL SHALL BE DISPOSED OF AT A LICENSED LANDFILL FACILITY.
7. ALL ELEVATIONS ARE GEODETIC.
8. REFER TO GEOTECHNICAL REPORT (No. PG1264241-RPT-1, DATED MARCH 6, 2024) PREPARED BY GHD, FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE ARCHITECT'S DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
10. REFER TO DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2023-082) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.

## 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 AND CHLORINATION OF THE WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR IN THE PRESENCE CITY OF OTTAWA FORCES.
2. SPECIFICATIONS:

| ITEM | SPEC. No. | REFERENCE |
|---|---|---|
| VALVE 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 |
| INSULATION ADJACENT TO OPEN STRUCTURES | W23 | CITY OF OTTAWA |
| VALVE BOX ASSEMBLY | W24 | CITY OF OTTAWA |
| WATERMAIN | PVC DR 18 | |
| WATERMAIN CROSSING BELOW SEWER | W25 | CITY OF OTTAWA |
| WATERMAIN CROSSING ABOVE SEWER | W25.2 | CITY OF OTTAWA |

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, UNLESS OTHERWISE INDICATED.
5. WATER SERVICE IS TO BE CONSTRUCTED TO WITHIN 1.0m OF FOUNDATION WALL AND CAPPED.

## 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 |
| STORM / SANITARY MANHOLE (1200mmØ) | 701.010 | OPSD |
| CBL FRAME & COVER | S19.1 | CITY OF OTTAWA |
| SANITARY MH FRAME & COVER | S24 | CITY OF OTTAWA |
| STORM / CBMH MANHOLE FRAME AND COVER | S24.1 | CITY OF OTTAWA |
| WATERTIGHT MH FRAME AND COVER | 401.030 | OPSD |
| LANDSCAPE DRAIN (ELBOW, COVER & PIPE) | 525 / 532 | CITY OF OTTAWA |
| SEWER TRENCH | S6 | CITY OF OTTAWA |
| INSULATION FOR SHALLOW SEWERS | S35 | CITY OF OTTAWA |
| STORM SEWER | PVC DR 35 | |
| SANITARY SEWER | PVC DR 35 | |
| CATCHBASIN LEAD | PVC DR 35 | |

3. ALL STORM AND SANITARY SERVICE LATERALS SHALL BE EQUIPPED WITH BACKFLOW PREVENTION DEVICES AS PER THE CITY OF OTTAWA STANDARD DETAILS S14 AND S14.1 OR S14.2.
4. INSULATE ALL PIPES (SAN/STM) THAT HAVE LESS THAN 1.8m COVER WITH HI-40 INSULATION PER CITY OF OTTAWA STANDARD DETAIL S35. 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. ALL SEWERS AND WATERMAINS LOCATED PARALLEL TO EACH OTHER ARE TO BE CONSTRUCTED IN SEPARATE TRENCHES MAINTAINING A CLEAR HORIZONTAL SEPARATION DISTANCE OF 2.5 METRES. AS PER MECP F-6-1 STANDARDS.
7. 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.
8. 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.
9. 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.
10. ALL STORM MANHOLES AND CATCHBASIN MANHOLES ARE TO HAVE 300mm SUMPS UNLESS OTHERWISE INDICATED. ALL CATCHBASINS ARE TO HAVE 600mm SUMPS.
11. ALL CATCHBASINS, MANHOLES AND/OR CATCHBASIN MANHOLES THAT ARE TO HAVE ICD'S INSTALLED WITHIN THEM ARE TO HAVE 600mm SUMPS.
12. ALL WEEPING TILE CONNECTIONS TO BE MADE TO THE PROPOSED STORM SEWER SYSTEM DOWNSTREAM OF ANY INLET CONTROL DEVICES.
13. CONTRACTOR TO TELEVISE (CCTV) ALL PROPOSED SEWERS, 200mmØ OR GREATER PRIOR TO BASE COURSE ASPHALT. UPON COMPLETION OF CONTRACT, THE CONTRACTOR IS RESPONSIBLE TO FLUSH AND CLEAN ALL SEWERS & APPURTENANCES.
14. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GENERAL PLAN OF SERVICES INDICATING ALL SERVICING AS-BUILT INFORMATION SHOWN ON THIS PLAN. AS-BUILT INFORMATION MUST INCLUDE: PIPE MATERIAL, SIZES, LENGTHS, SLOPES, INVERT AND T/G ELEVATIONS, STRUCTURE LOCATIONS, VALVE AND HYDRANT LOCATIONS, TYMM ELEVATIONS AND ANY ALIGNMENT CHANGES, ETC.

## BENCHMARK NOTES:

1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD, SIGNED AND DATED FEBRUARY 20, 2022.

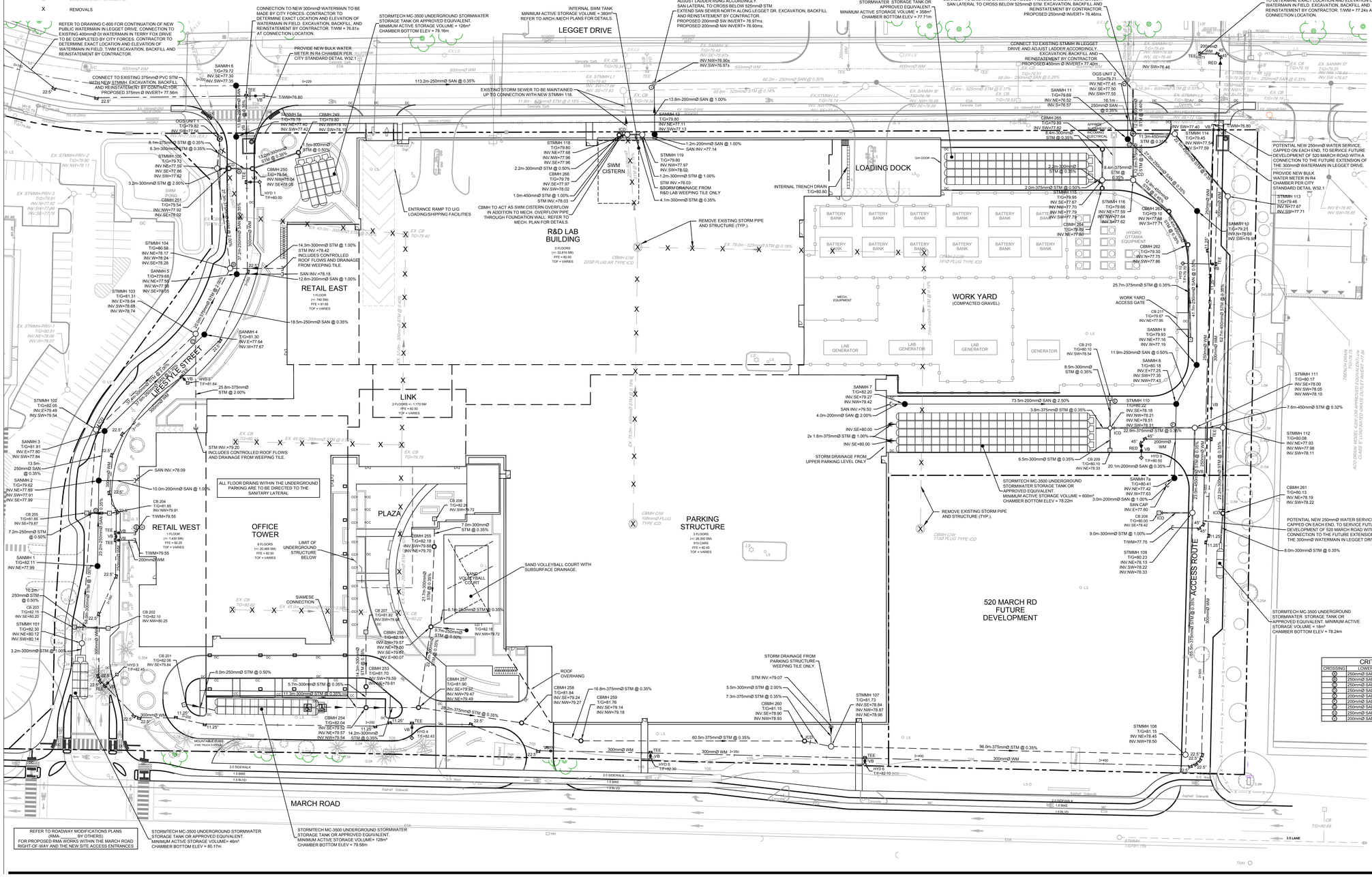
### PROPOSED WATERMAIN TABLE

| Station | F/G ELEVATION | TOP OF WATERMAIN | DESCRIPTION |
|---|---|---|---|
| 3+000.00 | 79.65 | 76.81 | 300mmØ WM TEE CONNECTION TO NEW 300mmØ WM |
| 3+002.50 | 79.60 | 76.84 | CROSS UNDER EX. 100mm GAS LINE |
| 3+006.25 | 79.67 | 76.89 | CROSS UNDER EX. ROGERS LINE |
| 3+007.50 | 79.70 | 76.90 | CROSS UNDER EX. HYDRO LINE |
| 3+010.00 | 79.80 | 76.94 | VALVE AT PROPERTY LINE |
| 3+010.50 | 79.77 | 76.95 | BULK WATER METER IN R4 CHAMBER |
| 3+019.60 | 79.58 | 77.05 | CROSS UNDER NEW STORM SEWER. INV = 78.03 |
| 3+023.25 | 79.73 | 77.11 | 150mm HYDRANT 1 TEE |
| 3+046.65 | 80.50 | 77.40 | CROSS UNDER NEW STORM SERVICE LATERAL. INV = 78.32 |
| 3+047.65 | 80.52 | 77.41 | 22.5° HORIZONTAL BEND |
| 3+048.25 | 80.54 | 77.42 | CROSS UNDER NEW SANITARY SERVICE LATERAL. INV = 78.07 |
| 3+053.55 | 80.76 | 77.49 | 11.25° VERTICAL BEND |
| 3+057.05 | 80.89 | 78.32 | 11.25° VERTICAL VEND |
| 3+067.60 | 81.28 | 78.32 | 22.5° HORIZONTAL BEND |
| 3+076.60 | 81.35 | 78.32 | CROSS UNDER NEW STORM SERVICE LATERAL. INV = 78.84 |
| 3+080.45 | 81.39 | 78.32 | 22.5° VERTICAL BEND |
| 3+081.75 | 81.40 | 78.86 | 150mm HYDRANT 2 TEE |
| 3+083.05 | 81.41 | 79.39* | 22.5° VERTICAL BEND |
| 3+104.10 | 81.81 | 79.46 | 22.5° HORIZONTAL BEND |
| 3+110.40 | 81.95 | 79.46 | 22.5° HORIZONTAL BEND |
| 3+117.40 | 81.90 | 79.46 | CROSS OVER NEW SANITARY SERVICE LATERAL. INV = 78.03 |
| 3+120.70 | 81.93 | 79.46 | 22.5° HORIZONTAL BEND |
| 3+126.20 | 81.90 | 79.46 | 22.5° HORIZONTAL BEND |
| 3+131.75 | 82.02 | 79.49 | 200mm WATER SERVICE TEE |
| 3+132.75 | 82.03 | 79.49 | VALVE & VALVE BOX |
| 3+133.75 | 82.04 | 79.49 | 200mm WATER SERVICE TEE |
| 3+143.50 | 82.09 | 79.54 | 22.5° HORIZONTAL BEND |
| 3+154.50 | 82.11 | 79.66 | 22.5° HORIZONTAL BEND |
| 3+158.50 | 82.15 | 79.70 | CROSS UNDER NEW CB 202 LEAD. INV = 80.24 |

| Station | F/G ELEVATION | TOP OF WATERMAIN | DESCRIPTION |
|---|---|---|---|
| 3+171.40 | 82.28 | 79.84 | 22.5° HORIZONTAL BEND |
| 3+172.95 | 82.30 | 79.84 | 22.5° HORIZONTAL BEND |
| 3+174.60 | 82.30 | 79.84 | 150mm HYDRANT 3 TEE |
| 3+185.90 | 82.37 | 79.84 | 22.5° HORIZONTAL BEND |
| 3+187.40 | 82.34 | 79.84 | 22.5° HORIZONTAL BEND |
| 3+197.25 | 82.15 | 79.73 | 11.25° HORIZONTAL BEND |
| 3+205.30 | 82.27 | 79.71 | 11.25° HORIZONTAL BEND |
| 3+225.00 | 82.25 | 79.65 | - |
| 3+251.50 | 82.14 | 79.57 | 11.25° HORIZONTAL BEND |
| 3+255.40 | 82.19 | 79.56 | 11.25° HORIZONTAL BEND |
| 3+261.40 | 82.04 | 79.55 | 150mm HYDRANT 4 TEE |
| 3+277.40 | 82.00 | 79.51 | 22.5° HORIZONTAL BEND |
| 3+297.00 | 81.92 | 79.51 | 22.5° HORIZONTAL BEND |
| 3+300.30 | 81.94 | 79.50 | VALVE & VALVE BOX |
| 3+325.00 | 82.25 | 79.46 | - |
| 3+327.21 | 82.15 | 79.45 | 150mm HYDRANT 5 TEE |
| 3+350.00 | 82.03 | 79.40 | - |
| 3+375.00 | 81.70 | 79.35 | - |
| 3+385.40 | 81.90 | 79.33 | 150mm HYDRANT 6 TEE |
| 3+400.00 | 81.80 | 79.30 | - |
| 3+425.00 | 81.70 | 79.25 | - |
| 3+445.40 | 81.60 | 79.21 | 11.25° VERTICAL BEND |
| 3+448.40 | 81.30 | 78.61 | 11.25° VERTICAL BEND |
| 3+473.50 | 81.20 | 78.61 | 22.5° HORIZONTAL BEND |
| 3+475.00 | 81.18 | 78.60 | 22.5° HORIZONTAL BEND |
| 3+476.50 | 81.15 | 78.59 | 11.25° HORIZONTAL BEND |
| 3+478.00 | 81.11 | 78.58 | 11.25° HORIZONTAL BEND |
| 3+500.00 | 80.75 | 78.20 | - |
| 3+525.00 | 80.40 | 77.85 | - |

| Station | F/G ELEVATION | TOP OF WATERMAIN | DESCRIPTION |
|---|---|---|---|
| 3+535.50 | 80.30 | 77.65 | 11.25° HORIZONTAL BEND |
| 3+537.40 | 80.25 | 77.64 | 11.25° HORIZONTAL BEND |
| 3+550.00 | 80.20 | 77.55 | - |
| 3+563.50 | 80.13 | 77.45 | 200mm TEE CONNECTED TO HYDRANT 9 |
| 3+566.60 | 80.10 | 77.43 | CROSS UNDER NEW STORM SEWER. INV = 77.99 |
| 3+571.90 | 80.08 | 77.39 | VALVE & VALVE BOX |
| 3+600.00 | 79.71 | 77.19 | - |
| 3+611.00 | 79.50 | 77.10 | 150mm HYDRANT 10 TEE |
| 3+625.00 | 79.28 | 76.94 | - |
| 3+641.60 | 79.34 | 76.88 | BULK WATER METER IN R4 CHAMBER |
| 3+647.40 | 79.44 | 76.83 | VALVE & VALVE BOX AT PROPERTY LINE |
| 3+649.40 | 79.36 | 76.80 | 22.5° VERTICAL BEND |
| 3+650.40 | 79.34 | 76.40 | CROSS UNDER EX. BELL LINE |
| 3+651.10 | 79.33 | 76.05 | CROSS UNDER EX. ROGERS LINE |
| 3+652.00 | 79.32 | 75.65 | CROSS UNDER EX. TELUS LINE |
| 3+653.00 | 79.31 | 75.25 | CROSS UNDER EX. 100mm GAS LINE |
| 3+654.00 | 79.28 | 74.82 | 22.5° VERTICAL BEND |
| 3+656.10 | 79.28 | 74.82 | CROSS UNDER EX. 600mm STORM SEWER. INV = 77.28 |
| 3+659.25 | 79.33 | 74.82 | CROSS UNDER EX. 750mm STORM SEWER. INV = 77.20 |
| 3+660.50 | 79.32 | 74.82 | CROSS UNDER EX. 250mm SANITARY SEWER. INV = 76.54 |
| 3+663.50 | 79.26 | 74.82 | CROSS UNDER EX. 600mm WATERMAIN. INV = 75.42 |
| 3+666.00 | 79.32 | 74.82 | REDUCER TO 200mm WATERMAIN |
| 3+667.00 | 79.31 | 74.82 | 45° HORIZONTAL BEND |
| 3+668.20 | 79.31 | 74.82 | 45° HORIZONTAL BEND |
| 3+669.20 | 79.32 | 74.82 | 45° VERTICAL BEND |
| 3+671.60 | 79.33 | 77.32* | 45° VERTICAL BEND |
| 3+672.60 | 79.33 | 77.32* | 200mmØ WM TEE CONNECTION TO EX. 200mmØ WM |

*INSULATION REQUIRED PER CITY DETAIL S35.


REFER TO DRAWING C-600 FOR CONTINUATION OF NEW PUBLIC WATERMAIN IN LEGGET DRIVE. CONNECTION TO EXISTING 400mmØ DI WATERMAIN IN TERRY FOX DRIVE TO BE COMPLETED BY CITY FORCES. CONTRACTOR TO DETERMINE EXACT LOCATION AND ELEVATION OF WATERMAIN IN FIELD. TYMM EXCAVATION, BACKFILL AND REINSTATEMENT BY CONTRACTOR.
CONNECTION TO NEW 300mmØ WATERMAIN TO BE MADE BY CITY FORCES. CONTRACTOR TO DETERMINE EXACT LOCATION AND ELEVATION OF WATERMAIN IN FIELD. EXCAVATION, BACKFILL AND REINSTATEMENT BY CONTRACTOR. TYMM = 76.81s AT CONNECTION LOCATION.
STORMTECH MC-3500 UNDERGROUND STORMWATER STORAGE TANK OR APPROVED EQUIVALENT. MINIMUM ACTIVE STORAGE VOLUME = 126m³ CHAMBER BOTTOM ELEV = 78.16m
INTERNAL SWM TANK MINIMUM ACTIVE STORAGE VOLUME = 360m³ REFER TO ARCH./MECH FLAND FIRST DETAILS.
LEGGET DRIVE
CONNECT TO EXISTING SANMH AND ADJUST ACCESS LADDER ACCORDINGLY. ADJUST LADDER RUNG ACCORDINGLY. SAN LATERAL TO CROSS BELOW 525mmØ STM. EXTEND SAN SEWER NORTH ALONG LEGGET DR. EXCAVATION, BACKFILL AND REINSTATEMENT BY CONTRACTOR. PROPOSED 200mmØ SW INVERT= 78.97ms. PROPOSED 200mmØ NW INVERT= 78.90ms.
STORMTECH MC-3500 UNDERGROUND STORMWATER STORAGE TANK OR APPROVED EQUIVALENT. MINIMUM ACTIVE STORAGE VOLUME = 356m³ CHAMBER BOTTOM ELEV = 77.71m
CONNECT TO EXISTING STMMH IN LEGGET DRIVE AND ADJUST LADDER ACCORDINGLY. EXCAVATION, BACKFILL AND REINSTATEMENT BY CONTRACTOR. PROPOSED 450mm Ø INVERT= 77.40m
CONNECTION TO EXISTING 200mmØ PVC WATERMAIN TO BE COMPLETED BY CITY FORCES. CONTRACTOR TO DETERMINE EXACT LOCATION AND ELEVATION OF WATERMAIN IN FIELD. EXCAVATION, BACKFILL AND REINSTATEMENT BY CONTRACTOR. TYMM = 77.24s AT CONNECTION LOCATION.
CONNECT TO EXISTING 375mmØ PVC STM WITH NEW STMMH. EXCAVATION, BACKFILL AND REINSTATEMENT BY CONTRACTOR. PROPOSED 375mm Ø INVERT= 77.56m
PROVIDE NEW BULK WATER METER IN R4 CHAMBER PER CITY STANDARD DETAIL W32.1
EXISTING STORM SEWER TO BE MAINTAINED UP TO CONNECTION WITH NEW STMMH 1
SWM CISTERN
CBMH to ACT as SWM CISTERN OVERFLOW IN ADDITION TO MECH. OVERFLOW PIPE THROUGH FOUNDATION WALL. REFER TO MECH. PLAN FOR DETAILS.
ENTRANCE RAMP TO L/G LOADING/SHIPPING FACILITIES
R&D LAB BUILDING
5 FLOORS (+/- 32,810 SM) FFE = 83.0 TOF = VARIES
REMOVE EXISTING STORM PIPE AND STRUCTURE (TYP.).
LOADING DOCK
INTERNAL TRENCH DRAIN T/G=80.80
WORK YARD (COMPACTED GRAVEL)
MECH. EQUIPMENT
LAB GENERATOR
GENERATOR
HYDRO OTTAWA EQUIPMENT
RETAIL EAST
1 FLOOR (+/- 740 SM) FFE = 81.65 TOF = VARIES
RETAIL WEST
1 FLOOR (+/- 1,430 SM) FFE = 82.25 TOF = VARIES
OFFICE TOWER
8 FLOORS (+/- 20,465 SM) FFE = 82.50 TOF = VARIES
LIMIT OF UNDERGROUND STRUCTURE BELOW
LINK
2 FLOORS +/- 1,170 SM FFE = 82.50 TOF = VARIES
PLAZA
ALL FLOOR DRAINS WITHIN THE UNDERGROUND PARKING ARE TO BE DIRECTED TO THE SANITARY LATERAL
PARKING STRUCTURE
3 FLOORS (+/- 28,350 SM) 910 CARS FFE = 82.50 TOF = VARIES
SAND VOLLEYBALL COURT WITH SUBSURFACE DRAINAGE.
SAND VOLLEYBALL COURT
SIAMESE CONNECTION
STORM DRAINAGE FROM PARKING STRUCTURE WEEPING TILE ONLY.
ROOF OVERHANG
520 MARCH RD FUTURE DEVELOPMENT
ACCESS ROUTE
POTENTIAL NEW 250mmØ WATER SERVICE, CAPPED ON EACH END, TO SERVICE FUTURE DEVELOPMENT OF 520 MARCH ROAD WITH A CONNECTION TO THE FUTURE EXTENSION OF THE 300mmØ WATERMAIN IN LEGGET DRIVE.
PROVIDE NEW BULK WATER METER IN R4 CHAMBER PER CITY STANDARD DETAIL W32.1
POTENTIAL NEW 250mmØ WATER SERVICE CAPPED ON EACH END, TO SERVICE FUTURE DEVELOPMENT OF 520 MARCH ROAD WITH A CONNECTION TO THE FUTURE EXTENSION OF THE 300mmØ WATERMAIN IN LEGGET DRIVE.
STORMTECH MC-3500 UNDERGROUND STORMWATER STORAGE TANK OR APPROVED EQUIVALENT. MINIMUM ACTIVE STORAGE VOLUME = 18m³ CHAMBER BOTTOM ELEV = 78.24m
REMOVE EXISTING STORM PIPE AND STRUCTURE (TYP.).
REFER TO ROADWAY MODIFICATIONS PLANS (RMA— BY OTHERS) FOR PROPOSED RMA WORKS WITHIN THE MARCH ROAD RIGHT-OF-WAY AND THE NEW SITE ACCESS ENTRANCES
STORMTECH MC-3500 UNDERGROUND STORMWATER STORAGE TANK OR APPROVED EQUIVALENT. *MINIMUM ACTIVE STORAGE VOLUME= 46m³ CHAMBER BOTTOM ELEV = 80.17m
STORMTECH MC-3500 UNDERGROUND STORMWATER STORAGE TANK OR APPROVED EQUIVALENT. *MINIMUM ACTIVE STORAGE VOLUME= 128m³ CHAMBER BOTTOM ELEV = 79.58m
MARCH ROAD
LIFESTYLE STREET
SANMH 1 T/G=82.11 INV.NE=77.99
SANMH 2 T/G=79.62 INV.NE=77.89 INV.SW=77.91 INV.SE=77.99
SANMH 3 T/G=81.91 INV.E=77.80 INV.SW=77.84
SANMH 4 T/G=81.30 INV.E=77.64 INV.NW=77.67
SANMH 5 T/G=79.69 INV.NE=77.59 INV.NW=77.89 INV.SE=79.05
SANMH 6 T/G=79.72 INV.SE=77.30 INV.SW=77.35
SANMH 7 T/G=82.20 INV.SE=79.27 INV.NW=79.42
SANMH 8 T/G=80.18 INV.E=77.25 INV.SW=77.35 INV.NW=77.43
SANMH 9 T/G=79.93 INV.NE=77.16 INV.NW=77.19
SANMH 10 T/G=79.21 INV.N=75.66 INV.SW=76.58
SANMH 11 T/G=78.69 INV.NE=76.52 INV.S=76.57
SANMH 12 T/G=79.80 INV.NE=77.71 INV.SW=77.13
SANMH 13 T/G=79.80 INV.NE=77.77 INV.SW=77.40
SANMH 5a T/G=79.78 INV.NE=77.40 INV.SW=77.42
SANMH 7a T/G=80.41 INV.NE=77.42 INV.W=77.63 INV.SW=77.70
CBMH 249 T/G=79.80 INV.NW=78.10 INV.SW=78.15
CBMH 250 T/G=79.54 INV.NW=78.04 INV.SE=78.06
CBMH 251 T/G=79.54 INV.NW=77.92 INV.SE=78.02
CBMH 253 T/G=81.70 INV.SW=79.59 INV.SE=79.61
CBMH 254 T/G=82.04 INV.SE=79.82 INV.NE=79.57 INV.NW=79.54
CBMH 255 T/G=82.18 INV.SW=79.74 INV.NW=79.70
CBMH 257 T/G=81.90 INV.SE=79.82 INV.NW=79.47 INV.NE=79.49
CBMH 258 T/G=81.84 INV.SE=79.24 INV.NW=79.27
CBMH 259 T/G=81.76 INV.SE=79.14 INV.NW=79.18
CBMH 260 T/G=81.15 INV.SE=78.90 INV.NW=78.93
CBMH 261 T/G=80.13 INV.NE=78.19 INV.SW=78.22
CBMH 262 T/G=79.18 INV.N=77.68 INV.S=77.71
CBMH 264 T/G=79.83 INV.NE=77.80
CBMH 265 T/G=79.69 INV.NW=77.82
CB 200 T/G=79.54
CB 201 T/G=82.06 INV.SE=79.94
CB 202 T/G=82.10 INV.NW=80.25
CB 203 T/G=82.15 INV.SE=80.20
CB 204 T/G=81.85 INV.NW=79.91
CB 205 T/G=81.85 INV.SE=79.87
CB 206 T/G=82.20 INV.SW=79.72
CB 207 T/G=81.82 INV.SW=79.74
CB 208 T/G=80.00 INV.SE=78.42
CB 209 T/G=80.10 INV.NE=78.33
CB 210 T/G=80.10 INV.SW=78.54
CB 211 T/G=79.80 INV.NE=77.95
CB 212 T/G=79.80 INV.NE=77.70
CB 213 T/G=79.80 INV.NE=77.45
STMMH 101 T/G=82.30 INV.NE=80.12 INV.SW=80.14
STMMH 102 T/G=82.05 INV.E=79.49 INV.SW=79.54
STMMH 103 T/G=81.31 INV.E=78.64 INV.SW=78.68 INV.NW=78.74
STMMH 104 T/G=80.58 INV.NE=78.17 INV.W=78.24 INV.SE=78.28
STMMH 105 T/G=79.73 INV.NE=77.59 INV.NW=77.62 INV.SE=77.82
STMMH 107 T/G=81.73 INV.NW=77.87 INV.NE=78.96
STMMH 108 T/G=81.15 INV.NE=78.45 INV.NW=78.50
STMMH 109 T/G=80.23 INV.NE=78.13 INV.SW=78.22 INV.NW=78.33
STMMH 110 T/G=80.22 INV.SE=78.18 INV.NW=78.21 INV.NE=78.51 INV.SW=78.51
STMMH 111 T/G=80.17 INV.SE=78.00 INV.SW=78.05 INV.NW=78.10
STMMH 112 T/G=80.08 INV.NE=77.93 INV.NW=77.98 INV.SW=78.11
STMMH 113 T/G=79.46 INV.NW=77.67 INV.SW=77.71
STMMH 114 T/G=79.45 INV.NW=77.54 INV.SE=77.59
STMMH 116 T/G=79.66 INV.NE=77.59 INV.NW=77.64 INV.SW=77.62
STMMH 118 T/G=79.80 INV.NE=77.68 INV.NW=77.96 INV.SE=77.96 INV.SW=78.02
STMMH 119 T/G=79.80 INV.NW=77.97 INV.SW=78.02
STMH INV.=78.03
STORM DRAINAGE FROM R&D LAB WEEPING TILE ONLY
STM INV.=79.07
HYD 1 T/F=80.00
HYD 2 T/F=81.64
HYD 3 T/F=82.45
HYD 4 T/F=82.43
HYD 5 T/F=82.30
HYD 6 T/F=82.10
ICD
RED
TEE
VB
V&VB
DC
CC
OH DOOR
LS
EX. STMMH-PRS-1 T/G=80.51 INV.NE=78.08 INV.W=78.03
EX. STMMH-PRS-2 T/G=79.90 INV.NW=78.11
EX. STMMH-PRS-3 T/G=79.91 INV.N=77.82 INV.SW=77.78
EX. SANMH-PRS-1 T/G=79.97 INV.NW=77.92 INV.SE=77.97
EX. SANMH-PRS-2 T/G=79.97 INV.NW=77.92 INV.SE=77.97
EX. SANMH-PRS-3 T/G=79.97 INV.NW=77.92 INV.SE=77.97
EX. SANMH 'A' T/G=79.49 INV.NW=77.68 INV.SE=77.68
EX. SANMH 'B' T/G=79.76 INV.NW=78.69 INV.SE=78.49
EX. SANMH 'C' T/G=79.49 INV.NW=77.68 INV.SE=77.68
EX. SANMH 'D' T/G=79.16 INV.NW=78.54 INV.SW=78.64
EX. STMMH L1 T/G=79.85 INV.NW=77.68 INV.SE=77.63
EX. STMMH L2 T/G=79.74 INV.NW=78.69 INV.SE=78.49
EX. STMMH L3 T/G=79.74 INV.NW=78.69 INV.SE=78.49
EX. STMMH L4 T/G=79.74 INV.NW=78.69 INV.SE=78.49
EX. STMMH L5 T/G=79.84 INV.NW=78.69 INV.SE=78.49
EX. STMMH L6 T/G=79.84 INV.NW=78.69 INV.SE=78.49
EX. STMMH L7 T/G=79.84 INV.NW=78.69 INV.SE=78.49
EX. STMMH L8 T/G=79.84 INV.NW=78.69 INV.SE=78.49
EX. CB T/G=79.34
EX. CB T/G=79.40
EX. CB T/G=79.79
EX. CB T/G=79.53
EX. CB T/G=79.16
EX. CB T/G=79.19
EX. CB T/G=80.69
EX. 600mm WM
EX. 300mm WM
EX. 200mm WM
EX. 150mm WM
EX. 100mm GAS
EX. ROGERS
EX. TELUS
EX. HYDRO
EX. BELL
EX. 750mm STM
EX. 600mm STM
EX. 525mm STM
EX. 450mm STM
EX. 375mm STM
EX. 300mm STM
EX. 250mm SAN
EX. 200mm SAN
EX. 150mm SAN
EX. 100mm SAN
EX. 600mm SAN
EX. 525mm SAN
EX. 450mm SAN
EX. 375mm SAN
EX. 300mm SAN

## LEGEND

| | |
|---|---|
| 81.65 / 81.65 | PROPOSED ELEVATION / *EXISTING ELEVATION* |
| × 81.50 | EXISTING ELEVATION |
| 81.60 | PROPOSED INTERNAL ELEVATION |
| 81.68 TW / 81.68 BW | PROPOSED TOP OF WALL ELEVATION / PROPOSED LOW ELEVATION |
| 82.50 | PROPOSED FINISHED FLOOR ELEVATION |
| 2.0% | GRADE AND DIRECTION |
| | MAXIMUM 3:1 SIDESLOPE |
| | EMERGENCY OVERLAND FLOW ROUTE |
| SAN MH 1 | PROPOSED SANITARY MANHOLE |
| CBMH 3 | PROPOSED CATCHBASIN MANHOLE |
| STM MH 1 | PROPOSED STORM MANHOLE |
| CB | PROPOSED CATCHBASIN |
| LD 1 | PROPOSED LANDSCAPE DRAIN |
| HYD / VASVB | PROPOSED HYDRANT AND VALVE |
| VC | PROPOSED VALVE CHAMBER |
| 1.0% | APPROXIMATE LIMIT OF REINSTATEMENT AREA |
| 1.0% | PROPOSED SWALE CENTRE LINE |
| | PROPOSED BARRIER CURB (PER SC1.1) |
| DC | PROPOSED DEPRESSED CURB (PER SC1.1) |
| CC | PROPOSED CURB CUT |
| ICD | PROPOSED INLET CONTROL DEVICE |
| FFE | PROPOSED FINISHED FLOOR ELEVATION |
| USF | PROPOSED UNDERSIDE OF FOOTING ELEVATION |
| | PROPOSED BUILDING ENTRANCE |
| | PROPOSED SAMCEE CONNECTION |
| | PROPOSED SILT FENCING (OPSD 219.110) |
| | PROPOSED TRENCH DRAIN |
| MM | PROPOSED MUD MAT / CONSTRUCTION ENTRANCE |
| | PROPOSED FILTER BAG |
| 1:5 YR / 1:100 YR | APPROXIMATE PONDING LIMITS |
| SAMH | *EXISTING CONCRETE CURB* |
| CBMH | *EXISTING SANITARY MANHOLE* |
| STMH | *EXISTING CATCHBASIN MANHOLE* |
| CB | *EXISTING STORM MANHOLE* |
| HYD | *EXISTING CATCHBASIN* |
| EX.CB | *EXISTING HYDRANT & VALVE* |
| | *EXISTING TREES / VEGETATION* |
| | *EXISTING UTILITY POLE C/W GUY WIRES* |
| | *EXISTING FENCE* |
| | *EXISTING LIGHT STANDARD* |
| X | REMOVALS |
| | FULL ASPHALT OVERLAY PER CITY STANDARD R10 |

## PAVEMENT STRUCTURES:

HEAVY DUTY (LIFESTYLE STREET)
40mm HL3
80mm HL8
150mm GRANULAR "A"
650mm GRANULAR "B" TYPE I

HEAVY DUTY (ACCESS ROADS AND LOADING DOCK)
40mm HL3
150mm GRANULAR "A"
650mm GRANULAR "B" TYPE I

## 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.
8. REFER TO GEOTECHNICAL REPORT (No. PG12646241-RPT-2, DATED FEBRUARY 7, 2025), PREPARED BY GHD, FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECT'S AND LANDSCAPE DRAWINGS FOR BUILDING AND HARD SURFACE AREAS AND DIMENSIONS.
10. REFER TO DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2023-082) PREPARED BY NOVATECH ENGINEERING CONSULTANTS LTD.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.

**Erosion and Sediment Control Responsibilities:**

| | ESC Measure | Symbol | Specification | During Construction: Installation Responsibility | During Construction: Inspection/Maintenance Responsibility | During Construction: Inspection Frequency | After Construction Prior to Final Acceptance: Removal Responsibility | After Final Acceptance: Inspection/Maintenance Responsibility |
|---|---|---|---|---|---|---|---|---|
| Temporary Measures | Silt Fence | | OPSD 219.110 | Developer's Contractor | Developer's Contractor | Weekly (as a minimum) | Consultant | Developer's Contractor |
| | Filter Fabric | Location as indicated in ESC Note #2 | Erosion and Sediment Control Notes | Developer's Contractor | Developer's Contractor | Weekly (as a minimum) | Consultant | Developer's Contractor |
| | Mud Mat | [M.M] | Drawing Details | Developer's Contractor | Developer's Contractor | Weekly (as a minimum) | Developer's Contractor | Developer's Contractor |
| | Dust Control | Location as Required Around Site | Erosion and Sediment Control Notes | Developer's Contractor | Developer's Contractor | Weekly (as a minimum) | Consultant | Developer's Contractor |
| | Stockpiled Material Stockpiling | Location as Required by Contractor | Erosion and Sediment Control Notes | Developer's Contractor | Developer's Contractor | Weekly (as a minimum) | Developer's Contractor | Developer's Contractor |
| | Sediment Basin (Temporary or pumped out of excavations) | Location as Required by Contractor | - - - | Developer's Contractor | Developer's Contractor | After Every Rainstorm | Developer's Contractor | Developer's Contractor |

## GRADING NOTES:

1. ALL TOPSOIL, ORGANIC OR DELETERIOUS MATERIAL MUST BE ENTIRELY REMOVED FROM BENEATH THE PROPOSED FILLED AREAS AS DIRECTED BY THE SITE ENGINEER OR GEOTECHNICAL ENGINEER.
2. EXPOSED SUBGRADES IN PROPOSED PAVED AREAS SHALL BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF GRANULARS.
3. ANY SOFT AREAS EVIDENT FROM THE PROOF ROLLING SHOULD BE SUB-EXCAVATED AND REPLACED WITH SUITABLE MATERIAL THAT IS FROST COMPATIBLE WITH THE EXISTING SOILS AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. THE GRANULAR BASE SHOULD BE COMPACTED TO AT LEAST 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY VALUE. ANY ADDITIONAL GRANULAR FILL USED BELOW THE PROPOSED PAVEMENT SHOULD BE COMPACTED TO AT LEAST 98% 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). MOUNTABLE CURBS ARE TO BE PER CITY OF OTTAWA STANDARD (SC1.3).
9. ALL RETAINING WALLS OF AT LEAST 0.6m IN HEIGHT SHALL HAVE FENCING/RAILING ALONG TOP SURFACE OF WALL PER OBC ARTICLE 9.8.8.1.
10. ALL BIO-SWALES SHALL BE CONSTRUCTED BASED ON THE SPECIFICATIONS PROVIDED ON THE APPROVED LANDSCAPED PLAN, WHICH ARE GENERALLY BASED ON THE CITY OF OTTAWA STANDARD L20.
11. REFER TO LANDSCAPE PLAN FOR PLANTING AND OTHER LANDSCAPE FEATURE DETAILS.
12. CONTRACTOR TO PROVIDE THE CONSULTANT WITH A GRADING PLAN INDICATING AS-BUILT ELEVATIONS OF ALL DESIGN GRADES SHOWN ON THIS PLAN.

## BENCHMARK NOTES:

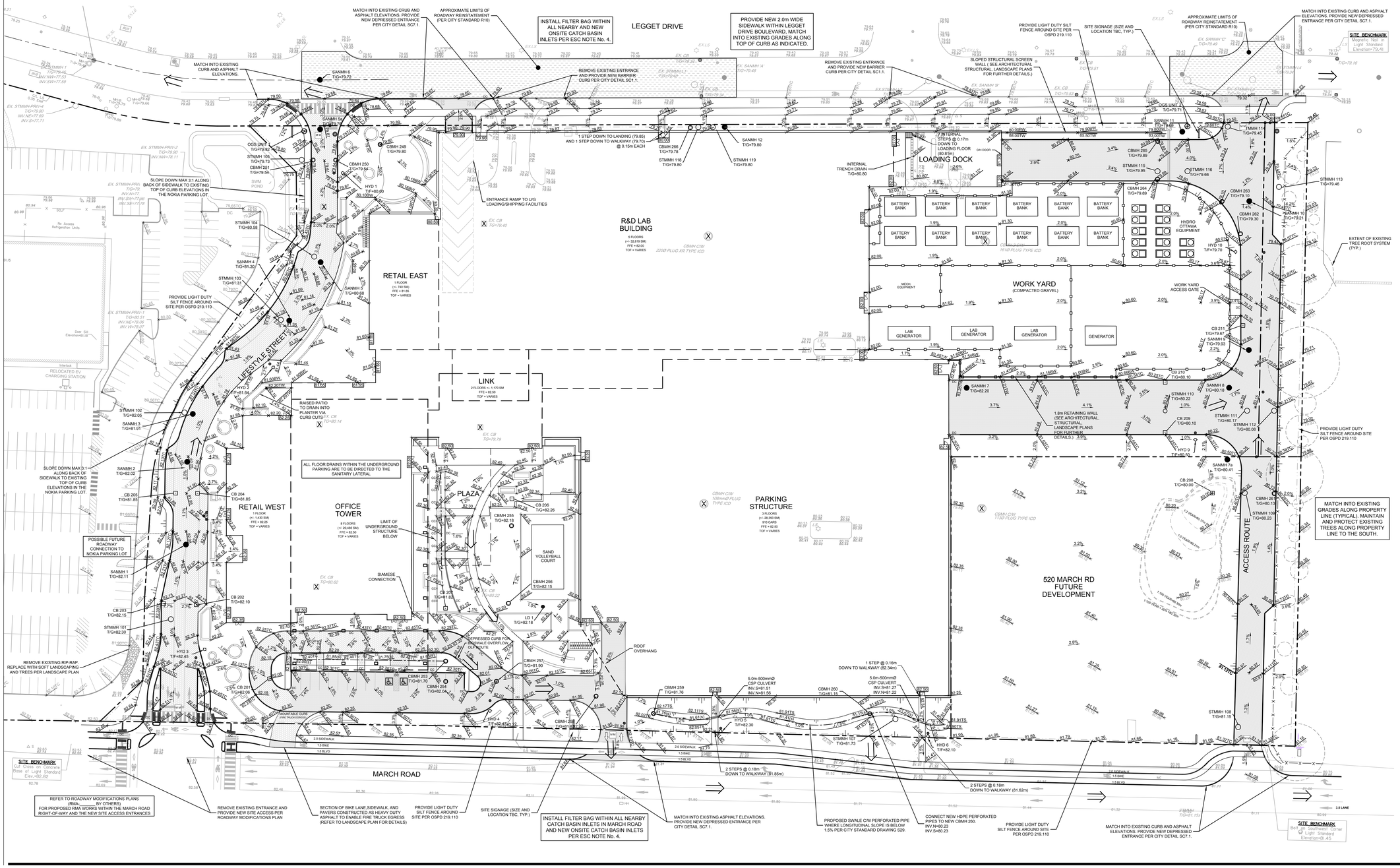
1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLLEBEKK LTD, SIGNED AND DATED FEBRUARY 20, 2022.

## EROSION AND SEDIMENT CONTROL NOTES :

1. 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.
2. ALL EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA. THEY ARE TO BE APPROPRIATE TO THE SITE CONDITIONS, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.) AND DURING ALL PHASES OF SITE PREPARATION AND CONSTRUCTION. THESE PRACTICES ARE TO BE IMPLEMENTED IN ACCORDANCE WITH THE CURRENT BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL AND SHOULD INCLUDE AS A MINIMUM THOSE MEASURES INDICATED ON THE PLAN.
3. 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.
4. TO PREVENT SURFACE EROSION FROM ENTERING ANY STORM SEWER SYSTEM DURING CONSTRUCTION, FILTER CLOTH 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.
5. 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.
6. 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.
7. 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 REMOVED OR REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE ENGINEER.
8. 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.
9. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
10. ROADWAYS ARE TO BE SWEPT AS REQUIRED OR AS DIRECTED BY THE ENGINEER AND/OR THE MUNICIPALITY.
11. 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.

## LEGGET DRIVE REINSTATEMENT:

1. RESTORE ALL DISTURBED R.O.W. AREAS TO EXISTING CONDITIONS OR BETTER TO THE SATISFACTION OF MUNICIPAL AUTHORITIES. ASPHALT TO MEET PG 58-34 "TRAFFIC LEVEL B" STANDARDS FOR MINOR COLLECTOR ROADS AS PER CITY SPECIFICATION F-3106.
2. REINSTATE ALL DISTURBED ROADWAY AREAS AND SAW CUT & KEYGRIND ASPHALT AT ALL ROAD CUTS / ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARD R10.
3. REINSTATE LINE PAINTING AS REQUIRED TO THE SATISFACTION OF MUNICIPAL AUTHORITIES.




# NOKIA Ottawa Campus

570 March Rd, Kanata Ottawa ON K2K 2T6

**BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4**


**Gensler**

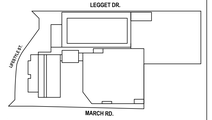
5005 Greenville Ave, Dallas TX 75206 — Tel 214.273.1500

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**Architectural Site Planning**
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**Structural Engineering**
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**Noise Report**
Gradient Wind — Joshua.foster@gradientwind.com
**Transportation Planners**
Stantec — Angelo.renon@stantec.com


| △ Date | Description |
|---|---|
| SEP 12/24 | ISSUED FOR SITE PLAN CONTROL APPROVAL |
| NOV 15/24 | REVISED PER CITY COMMENTS |
| FEB 07/25 | REVISED PER CITY COMMENTS |


**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


**Key Plan**




**Seal / Signature**

LICENSED PROFESSIONAL ENGINEER — F.S. THAUVETTE — 100041590 — February 6, 2025 — PROVINCE OF ONTARIO

**Project Name**
Nokia Ottawa Campus

**Project Number**
027.7946.000

**Description**
GRADING AND EROSION AND SEDIMENT CONTROL PLAN

**Scale**
1 : 400

# C200

City Project no: D07-12-24-0149

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Plan #19202

## LEGEND

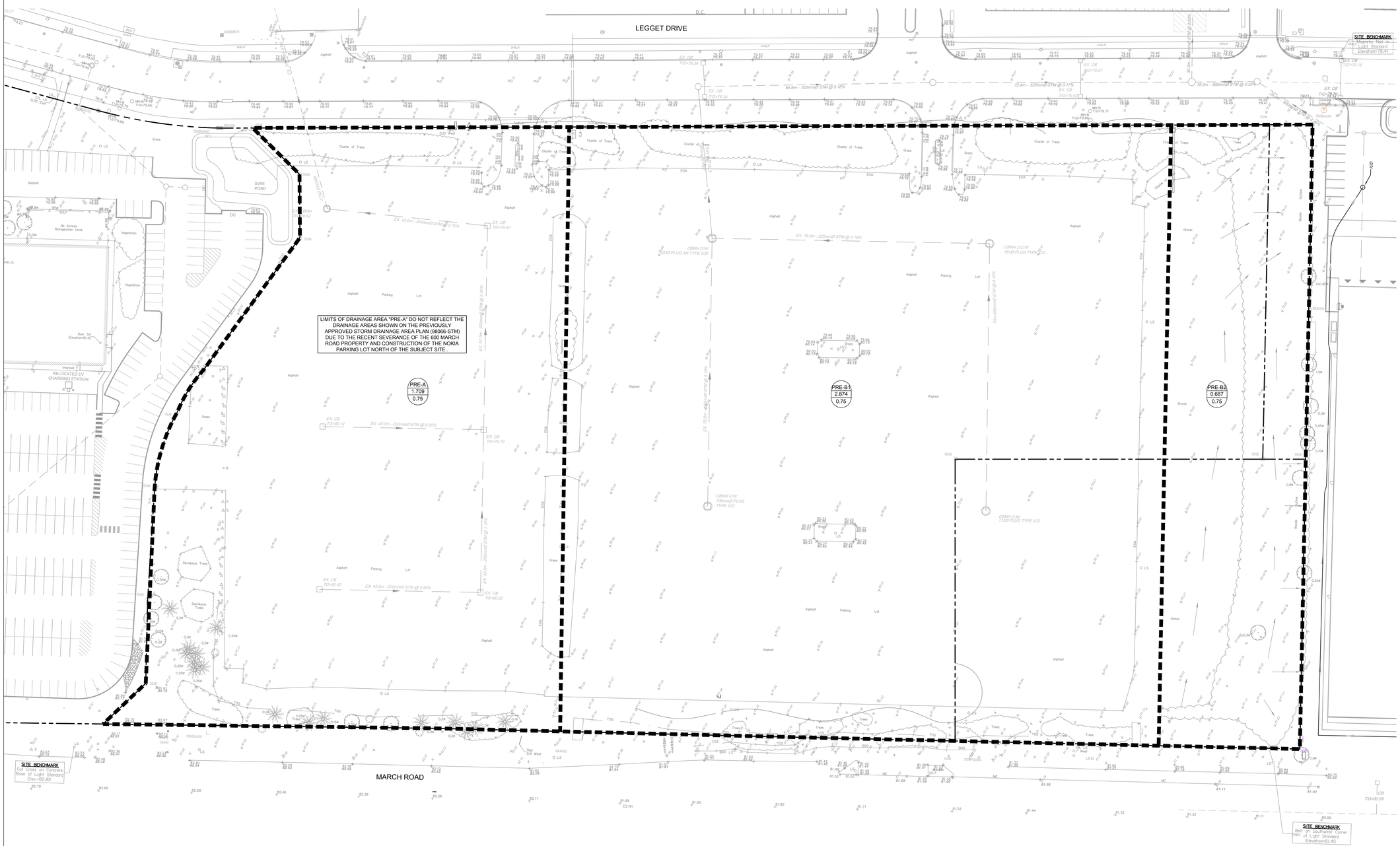
- DRAINAGE AREA LIMITS
- PRE-DEVELOPMENT AREA ID
- PRE-DEVELOPMENT DRAINAGE AREA (ha)
- 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- EXISTING CONCRETE CURB
- EXISTING VALVE & VALVE BOX
- EXISTING SERVICE POST
- EXISTING HYDRANT
- EXISTING CATCHBASIN
- EXISTING CATCHBASIN MH
- EXISTING UTILITY POLE C/W GUY WIRES
- EXISTING DRAINAGE DIRECTION ARROWS
- EXISTING OVERLAND FLOW

## 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.
8. REFER TO GEOTECHNICAL REPORT (No. PG12646241-RPT-2, DATED FEBRUARY 7, 2025) FOR SUBSURFACE CONDITIONS, CONSTRUCTION RECOMMENDATIONS, AND GEOTECHNICAL INSPECTION REQUIREMENTS. THE GEOTECHNICAL CONSULTANT IS TO REVIEW ON-SITE CONDITIONS AFTER EXCAVATION PRIOR TO PLACEMENT OF THE GRANULAR MATERIAL.
9. REFER TO ARCHITECTS AND LANDSCAPE ARCHITECTS DRAWINGS FOR BUILDING AND HARDSURFACE AREAS AND DIMENSIONS.
10. REFER TO THE DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT (R-2023-082) PREPARED BY NOVATECH.
11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
12. PROVIDE LINE/PARKING PAINTING.

## BENCHMARK NOTES:

1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLEBEKK LTD, SIGNED AND DATED FEBRUARY 20, 2022.




# NOKIA Ottawa Campus

570 March Rd, KanataOttawa ON K2K 2T6


**Gensler**

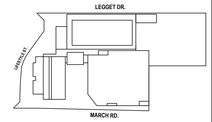
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Dallas TX 75206

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**Structural Engineering**
AAR rcarriere@aar.ca
**Noise Report**
Gradient Wind Joshua.foster@gradientwind.com
**Transportation Planners**
Stantec Angelo.renon@stantec.com


| △ Date | Description |
|---|---|
| NOV 15/24 | ISSUED FOR SITE PLAN CONTROL APPROVAL |
| FEB 07/25 | REVISED PER CITY COMMENTS |


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**Key Plan**




**Seal / Signature**

LICENSED PROFESSIONAL ENGINEER
F.S. THAUVETTE
100041399
PROVINCE OF ONTARIO

**Project Name**

Nokia Ottawa Campus

**Project Number**

027.7946.000

**Description**

PRE-DEVELOPMENT STORM DRAINAGE PLAN

**Scale**

1 : 400

# C300

City Project no: D07-12-24-0149

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Plan #19202

## LEGEND

- PROPOSED BARRIER CURB
- DC — PROPOSED DEPRESSED CURB
- CC — PROPOSED CURB CUT
- DRAINAGE AREA LIMITS
- 1:5 YR / 1:100 YR — APPROXIMATE PONDING LIMITS
- A-2 / 0.129 / 0.82 — POST-DEVELOPMENT AREA ID
- POST-DEVELOPMENT DRAINAGE AREA (ha)
- 1:5 YEAR WEIGHTED RUNOFF COEFICIENT
- STMMH — PROPOSED STORM MANHOLE
- CBMH — PROPOSED CATCHBASIN MANHOLE
- CB — PROPOSED CATCHBASIN
- RD — CONTROLLED FLOW ROOF DRAIN
- LD 1 — PROPOSED LANDSCAPE DRAIN
- PROPOSED STORM SEWER AND FLOW DIRECTION
- ICD — PROPOSED INLET CONTROL DEVICE
- EMERGENCY OVERLAND FLOW ROUTE
- PROPOSED TRENCH DRAIN
- PROPOSED BUILDING ENTRANCE / EXIT
- MAXIMUM 3:1 SIDESLOPE
- FFE — FINISHED FLOOR ELEVATION
- USF — UNDERSIDE OF FOOTING ELEVATION
- CB — EXISTING STORM MH & SEWER
- EXISTING CATCHBASIN C/W CATCHBASIN LEAD
- EXISTING CONCRETE CURB
- VALVE — EXISTING VALVE & VALVE BOX
- SP — EXISTING SERVICE POST
- HYD — EXISTING HYDRANT
- CBMH — EXISTING CATCHBASIN
- CB — EXISTING CATCHBASIN MH
- EX.UP — EXISTING UTILITY POLE C/W GUY WIRES

## GENERAL NOTES:

1. COORDINATE AND SCHEDULE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
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11. SAW CUT AND KEY GRIND ASPHALT AT ALL ROAD CUTS AND ASPHALT TIE IN POINTS AS PER CITY OF OTTAWA STANDARDS (R10).
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## BENCHMARK NOTES:

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**INLET CONTROL DEVICE DATA TABLE: AREA A-1**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE A | STMMH 102 1200mmØ | 300mmØ PVC | 12.9 | 0.71 | 80.35 | 14.4 | 55.4 $m^3$ |
| 1:5 YR | | | | 13.7 | 0.85 | 80.49 | 21.7 | |
| 1:100 YR | | | | 17.5 | 1.38 | 81.02 | 49.2 | |

**INLET CONTROL DEVICE DATA TABLE: AREA A-2**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE A | CBMH 251 1200mmØ | 300mmØ PVC | 12.4 | 0.47 | 78.54 | 44.3 | 134.0 $m^3$ |
| 1:5 YR | | | | 12.1 | 0.63 | 78.70 | 82.6 | |
| 1:100 YR | | | | 17.0 | 1.25 | 79.32 | 130.3 | |

**INLET CONTROL DEVICE DATA TABLE: AREA B-1**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE B | CBMH 266 1200mmØ | 300mmØ PVC | 22.5 | 0.28 | 78.30 | 135.8 | >400 $m^3$ |
| 1:5 YR | | | | 27.2 | 0.38 | 78.42 | 188.4 | |
| 1:100 YR | | | | 41.0 | 0.86 | 78.90 | 380.0 | |

**INLET CONTROL DEVICE DATA TABLE: AREA B-2**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE D | CBMH 260 1200mmØ | 375mmØ PVC | 31.9 | 0.72 | 79.81 | 48.3 | 163.0 $m^3$ |
| 1:5 YR | | | | 35.8 | 0.91 | 80.00 | 71.2 | |
| 1:100 YR | | | | 48.0 | 1.64 | 80.73 | 159.1 | |

**INLET CONTROL DEVICE DATA TABLE: AREA B-3**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE B | STMMH 110 1200mmØ | 375mmØ PVC | 23.7 | 0.28 | 78.64 | 222.2 | 607.7 $m^3$ |
| 1:5 YR | | | | 29.8 | 0.41 | 78.79 | 303.3 | |
| 1:100 YR | | | | 46.0 | 0.98 | 79.36 | 603.6 | |

**INLET CONTROL DEVICE DATA TABLE: AREA B-4**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE C | STMMH 116 1200mmØ | 375mmØ PVC | 19.8 | 0.33 | 78.11 | 127.4 | 365.1 $m^3$ |
| 1:5 YR | | | | 23.7 | 0.48 | 78.26 | 176.5 | |
| 1:100 YR | | | | 35.0 | 1.05 | 78.83 | 358.0 | |

**INLET CONTROL DEVICE DATA TABLE: AREA C-1**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE A | CB 208 1200mmØ | 300mmØ PVC | 26.1 | 1.65 | 80.17 | 8.6 | 65.5 $m^3$ |
| 1:5 YR | | | | 26.5 | 1.70 | 80.22 | 15.0 | |
| 1:100 YR | | | | 27.0 | 1.78 | 80.30 | 49.8 | |

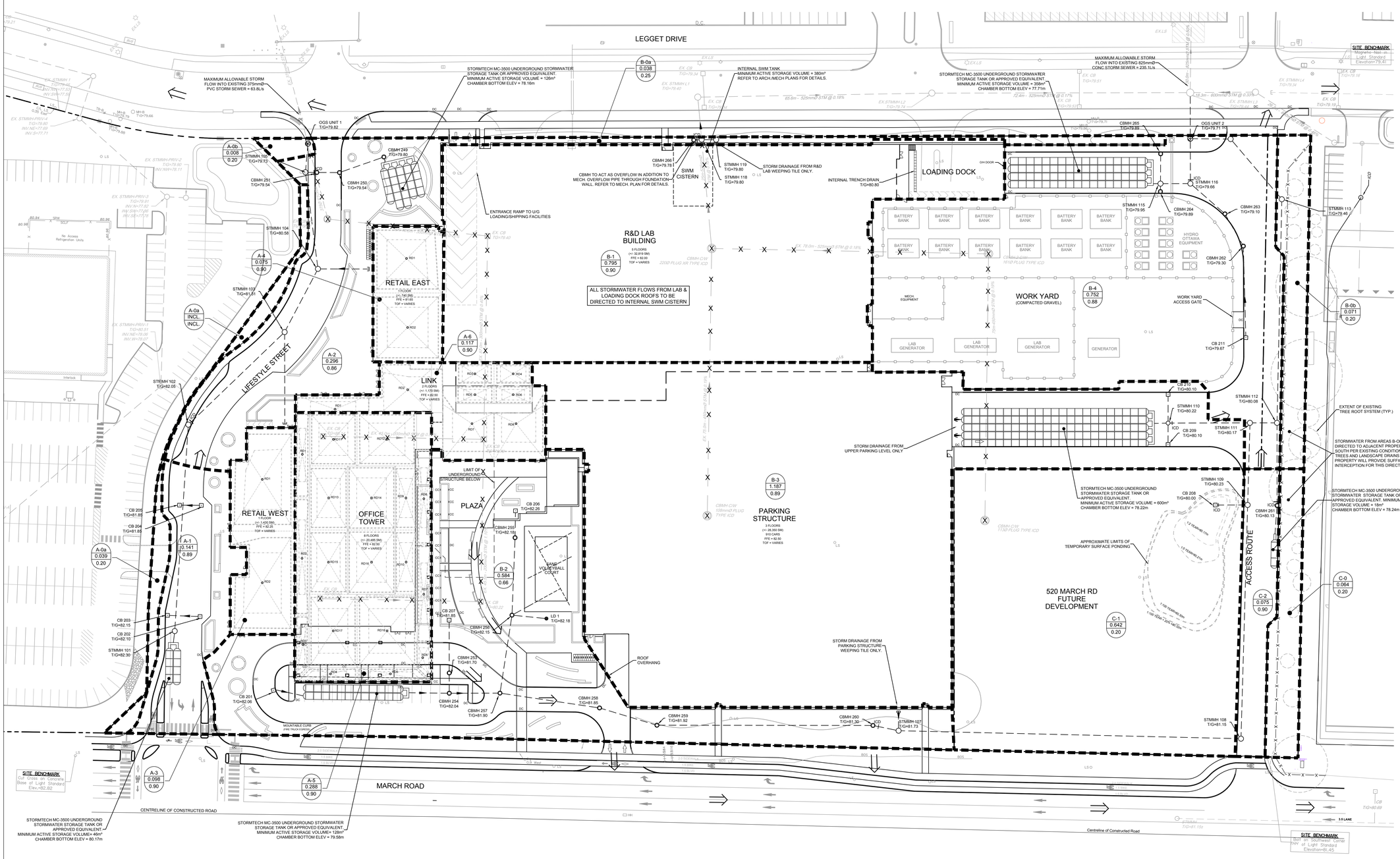
**INLET CONTROL DEVICE DATA TABLE: AREA C-2**

| DESIGN EVENT | ICD TYPE (PLUG TYPE) | OUTLET STRUCTURE | DIAMETER OF OUTLET PIPE (mm) | PEAK DESIGN FLOW (L/s) | DESIGN HEAD (m) | WATER ELEVATION (m) | VOLUME ($m^3$) | AVAILABLE STORAGE |
|---|---|---|---|---|---|---|---|---|
| 1:2 YR | IPEX TEMPEST HF TYPE A | CBMH 261 1200mmØ | 300mmØ PVC | 8.3 | 0.25 | 78.59 | 8.7 | 23.8 $m^3$ |
| 1:5 YR | | | | 10.5 | 0.40 | 78.74 | 9.5 | |
| 1:100 YR | | | | 19.0 | 1.04 | 79.38 | 21.1 | |

**ROOF DRAIN TABLE**

| AREA ID * | BUILDING | ROOF DRAIN No. (WATTS MODEL)** | ROOF DRAIN OPENING SETTING | 2 YEAR RELEASE RATE | APPROX. 2-YR PONDING DEPTH | 5-YEAR RELEASE RATE | APPROX. 5-YEAR PONDING DEPTH | 100-YEAR RELEASE RATE | APPROX. 100-YR PONDING DEPTH |
|---|---|---|---|---|---|---|---|---|---|
| A-3 | RETAIL WEST | **RD 1 (RD-100-A-ADJ)** | FULLY EXPOSED | 0.95 L/s | 8 cm | 1.26 L/s | 10 cm | 1.89 L/s | 15 cm |
| | | **RD 2 (RD-100-A-ADJ)** | FULLY EXPOSED | 0.95 L/s | 8 cm | 1.26 L/s | 10 cm | 1.89 L/s | 15 cm |
| A-4 | RETAIL EAST | RD 1 (RD-100-A-ADJ) | FULLY EXPOSED | 0.95 L/s | 8 cm | 1.26 L/s | 10 cm | 1.89 L/s | 15 cm |
| | | RD 2 (RD-100-A-ADJ) | FULLY EXPOSED | 0.95 L/s | 8 cm | 1.26 L/s | 10 cm | 1.89 L/s | 15 cm |
| A-5 | OFFICE TOWER | RD 1 (RD-100-A-ADJ) | CLOSED | **0.32 L/s** | 8 cm | **0.32 L/s** | 10 cm | **0.32 L/s** | 15 cm |
| | | RD 2 (RD-100-A-ADJ) | CLOSED | **0.32 L/s** | 8 cm | **0.32 L/s** | 10 cm | **0.32 L/s** | 15 cm |
| | | RD 3 (RD-100-A-ADJ) | CLOSED | **0.32 L/s** | 8 cm | **0.32 L/s** | 10 cm | **0.32 L/s** | 15 cm |
| | | RD 4 (RD-100-A-ADJ) | CLOSED | **0.32 L/s** | 8 cm | **0.32 L/s** | 10 cm | **0.32 L/s** | 15 cm |
| | | RD 5 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 6 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 7 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 8 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 9 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 10 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 11 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 12 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 13 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 14 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 15 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 16 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 17 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 18 (RD-100-A-ADJ) | 1/2 OPEN | 0.79 L/s | 8 cm | 0.95 L/s | 10 cm | 1.26 L/s | 15 cm |
| A-6 | LINK | RD 1 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 2 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 3 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 4 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 5 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 6 (RD-100-A-ADJ) | CLOSED | 0.32 L/s | 8 cm | 0.32 L/s | 10 cm | 0.32 L/s | 15 cm |
| | | RD 7 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |
| | | RD 8 (RD-100-A-ADJ) | 1/4 OPEN | 0.71 L/s | 8 cm | 0.79 L/s | 10 cm | 0.95 L/s | 15 cm |

* REFER TO THE 'DEVELOPMENT SERVICING STUDY AND STORMWATER MANAGEMENT REPORT' (R-2023-082) PREPARED BY NOVATECH FOR DRAINAGE AREA IDENTIFIERS AND STORMWATER MANAGEMENT DETAILS.
**ALL CONTROLLED FLOW ROOF DRAINS FOR THE PROPOSED BUILDING TO BE WATTS 'ADJUSTABLE ACCUTROL' ROOF DRAINS.




# NOKIA Ottawa Campus

570 March Rd, KanataOttawa ON K2K 2T6

**BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4**

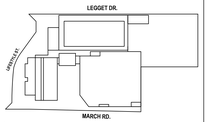

**Gensler**
5005 Greenville Ave Tel 214.273.1500
Dallas TX 75206

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**Transportation Planners**
Stantec Angelo.renon@stantec.com


| △ Date | Description |
|---|---|
| SEP 12/24 | ISSUED FOR SITE PLAN CONTROL APPROVAL |
| NOV 15/24 | REVISED PER CITY COMMENTS |
| FEB 07/25 | REVISED PER CITY COMMENTS |


**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


**Key Plan**




**Seal / Signature**

LICENSING PROFESSIONAL ENGINEER F.S. THAUVETTE 100041599 PROVINCE OF ONTARIO

**Project Name**
Nokia Ottawa Campus

**Project Number**
027.7946.000

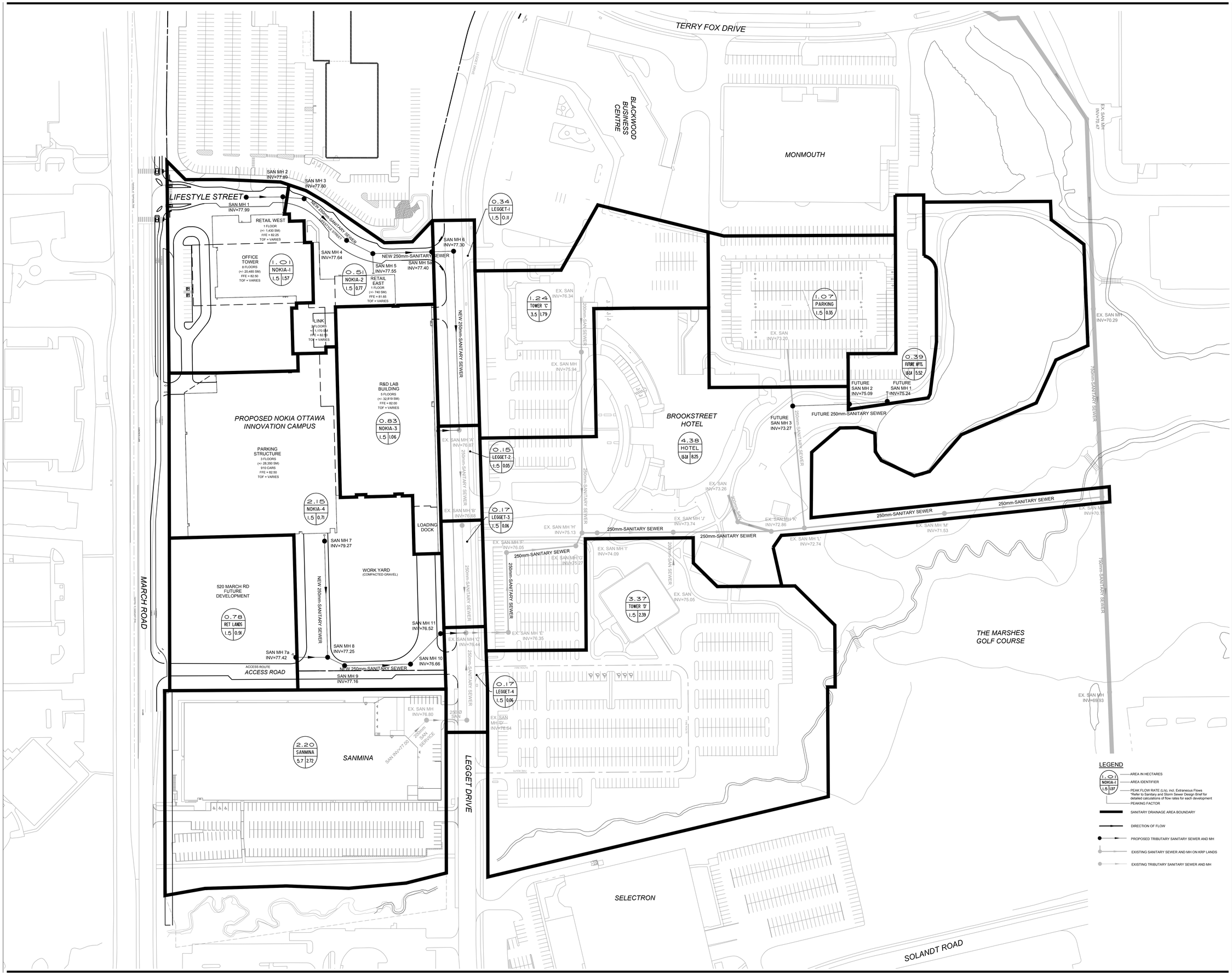
**Description**
POST-DEVELOPMENT STORMWATER MANAGEMENT PLAN

**Scale**
1 : 400

# C301

City Project no:PC2023-0229

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# NOKIA Ottawa Campus

570 March Rd, KanataOttawa ON K2K 2T6


**Gensler**

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Tel 214.273.1500

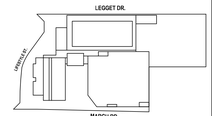
**Surveyor**
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**Civil Engineering**
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AAR. Jcarriere@aar.ca
**Noise Report**
Gradient Wind Joshua.foster@gradientwind.com
**Transportation Planners**
Stantec Angelo.renon@stantec.com


| △ Date | Description |
|---|---|
| NOV 15/24 | ISSUED FOR SITE PLAN CONTROL APPROVAL |
| FEB 07/25 | REVISED PER CITY COMMENTS |


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**Key Plan**




**Seal / Signature**

LICENSED PROFESSIONAL ENGINEER
F.B. THAUVETTE
100041999
PROVINCE OF ONTARIO

CONDITIONAL

**Project Name**
Nokia Ottawa Campus

**Project Number**
027.7946.000

**Description**
SANITARY DRAINAGE AREA PLAN

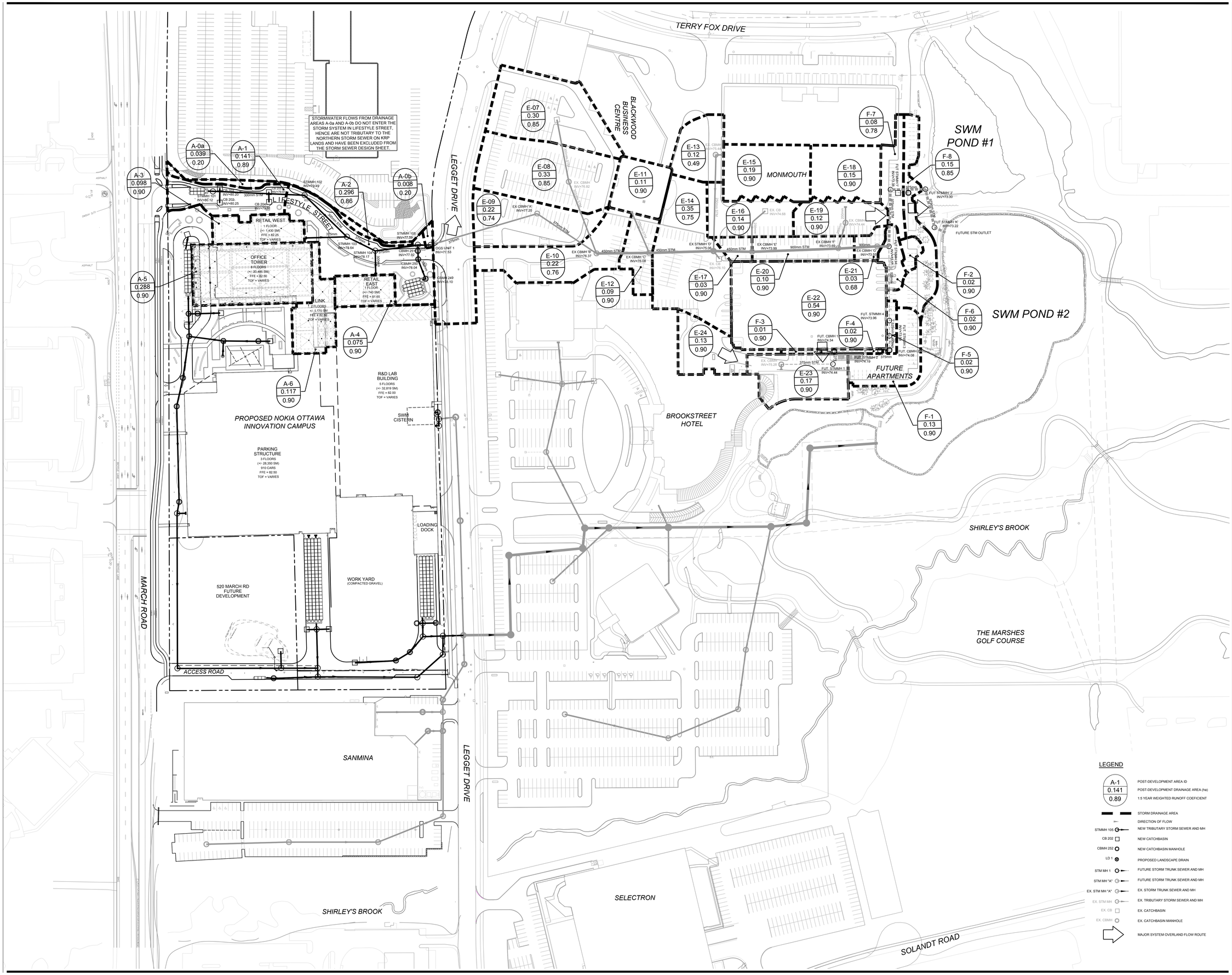
**Scale**
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**C400**

City Project no: D07-12-24-0149

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Plan #19202




# NOKIA Ottawa Campus

570 March Rd, KanataOttawa ON K2K 2T6


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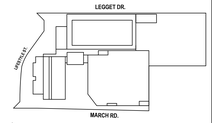
**Surveyor**
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AAR jcarriere@aar.ca
**Noise Report**
Gradient Wind Joshua.foster@gradientwind.com
**Transportation Planners**
Stantec Angelo.neron@stantec.com


| △ Date | Description |
|---|---|
| NOV 15/24 | ISSUED FOR SITE PLAN CONTROL APPROVAL |
| FEB 07/25 | REVISED PER CITY COMMENTS |


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Website www.novatech-eng.com


**Key Plan**




**Seal / Signature**

LICENSED PROFESSIONAL ENGINEERS
F.B. THAUVETTE
100041200
PROVINCE OF ONTARIO

**Project Name**

Nokia Ottawa Campus

**Project Number**

027.7946.000

**Description**

STORM DRAINAGE AREA PLAN - NORTH OUTLET

**Scale**

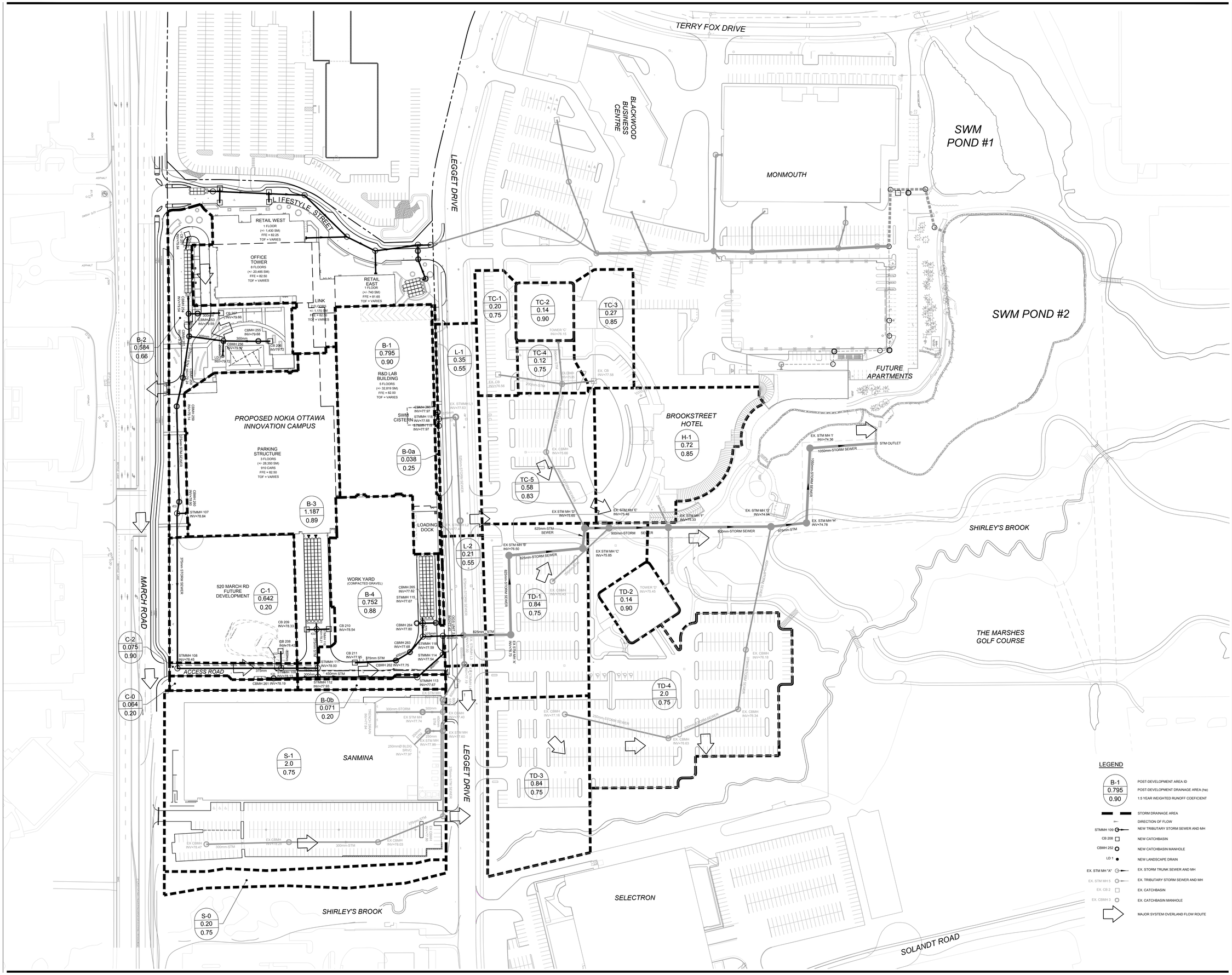
1 : 750

# C500

City Project no: D07-12-24-0149

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Plan #19202




# NOKIA Ottawa Campus

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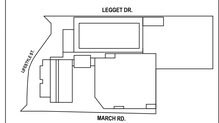
**Surveyor**
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Novatech G.Winters@novatech-eng.com
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| △ Date | Description |
|---|---|
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| FEB 07/25 | REVISED PER CITY COMMENTS |


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**Key Plan**




**Seal / Signature**

LICENSED PROFESSIONAL ENGINEER
F.S. THAUVETTE
100041999
PROVINCE OF ONTARIO

**Project Name**
Nokia Ottawa Campus

**Project Number**
027.7946.000

**Description**
STORM DRAINAGE AREA PLAN - SOUTH OUTLET

**Scale**
1 : 750

**C501**

City Project no: D07-12-24-0149

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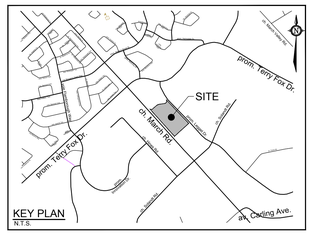
Plan #19202

## LEGEND

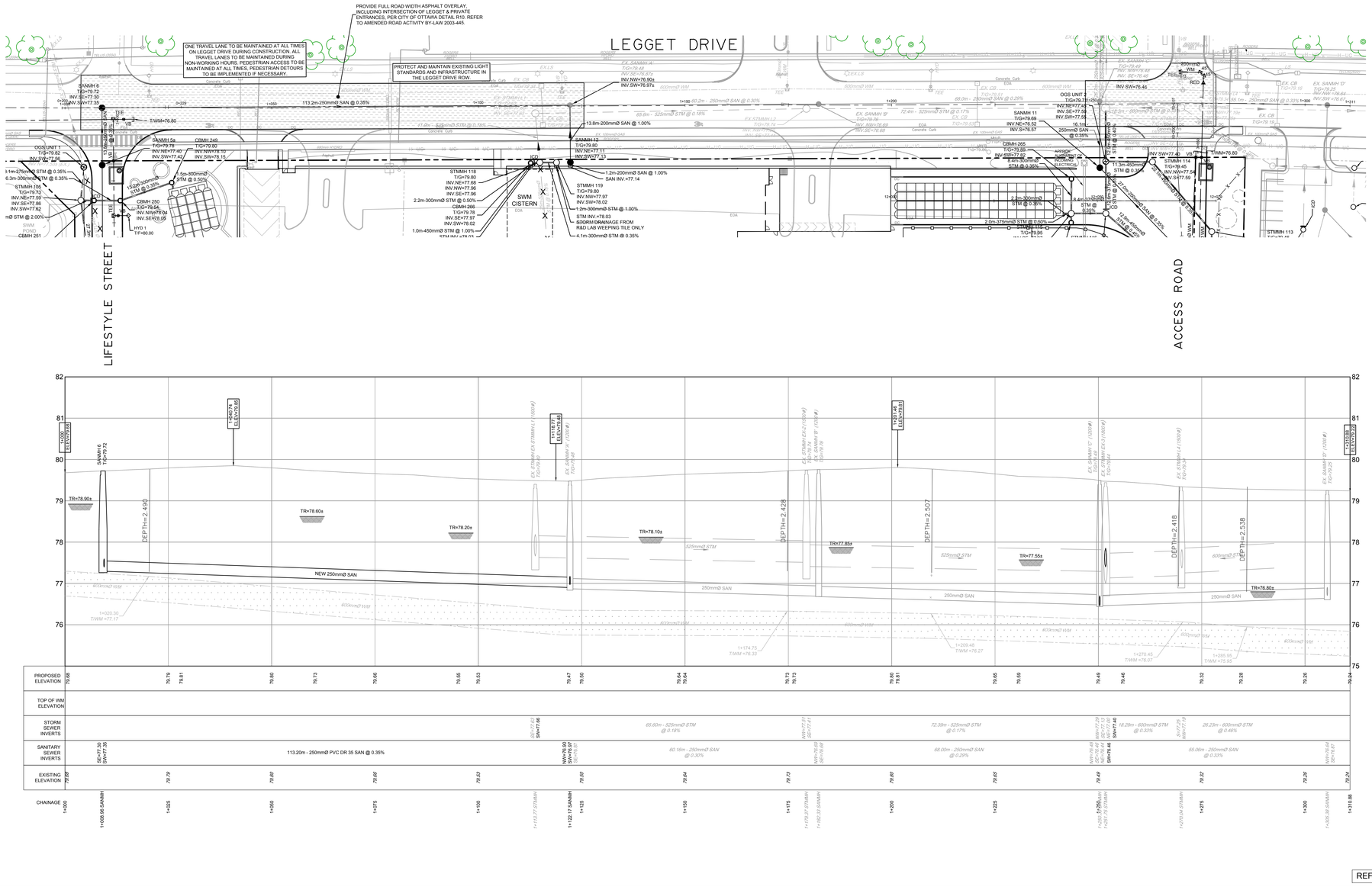
| | | | |
|---|---|---|---|
| SAN MH 1 | PROPOSED SANITARY MANHOLE AND SEWER | | PROPOSED BUILDING ENTRANCE |
| CBMH 250 | PROPOSED CATCHBASIN MANHOLE | | EXISTING CONCRETE CURB |
| STMMH 100 | PROPOSED STORM MANHOLE AND SEWER | SANMH | EXISTING SANITARY MANHOLE |
| CB 200 | PROPOSED CATCHBASIN | CBMH | EXISTING CATCHBASIN MANHOLE |
| LD 1 | PROPOSED LANDSCAPE DRAIN | STMMH | EXISTING STORM MANHOLE |
| | THERMAL INSULATION FOR SHALLOW SEWERS | CB | EXISTING CATCHBASIN |
| | PROPOSED WATERMAIN / WATER SERVICE | HYD WV | EXISTING HYDRANT & VALVE |
| HYD | PROPOSED HYDRANT AND VALVE | | EXISTING TREES / VEGETATION |
| V&VB | PROPOSED VALVE BOX | EX UP | EXISTING UTILITY POLE C/W GUY WIRES |
| VC | PROPOSED VALVE CHAMBER | | EXISTING FENCE |
| RED | PROPOSED REDUCER | | EXISTING LIGHT STANDARD |
| | PROPOSED BARRIER CURB (PER SC1.1) | X | REMOVALS |
| DC | PROPOSED DEPRESSED CURB (PER SC1.1) | | FULL ASPHALT OVERLAY PER CITY STANDARD R10 |
| CC | PROPOSED CURB CUT | | |
| ICD | PROPOSED INLET CONTROL DEVICE | | |

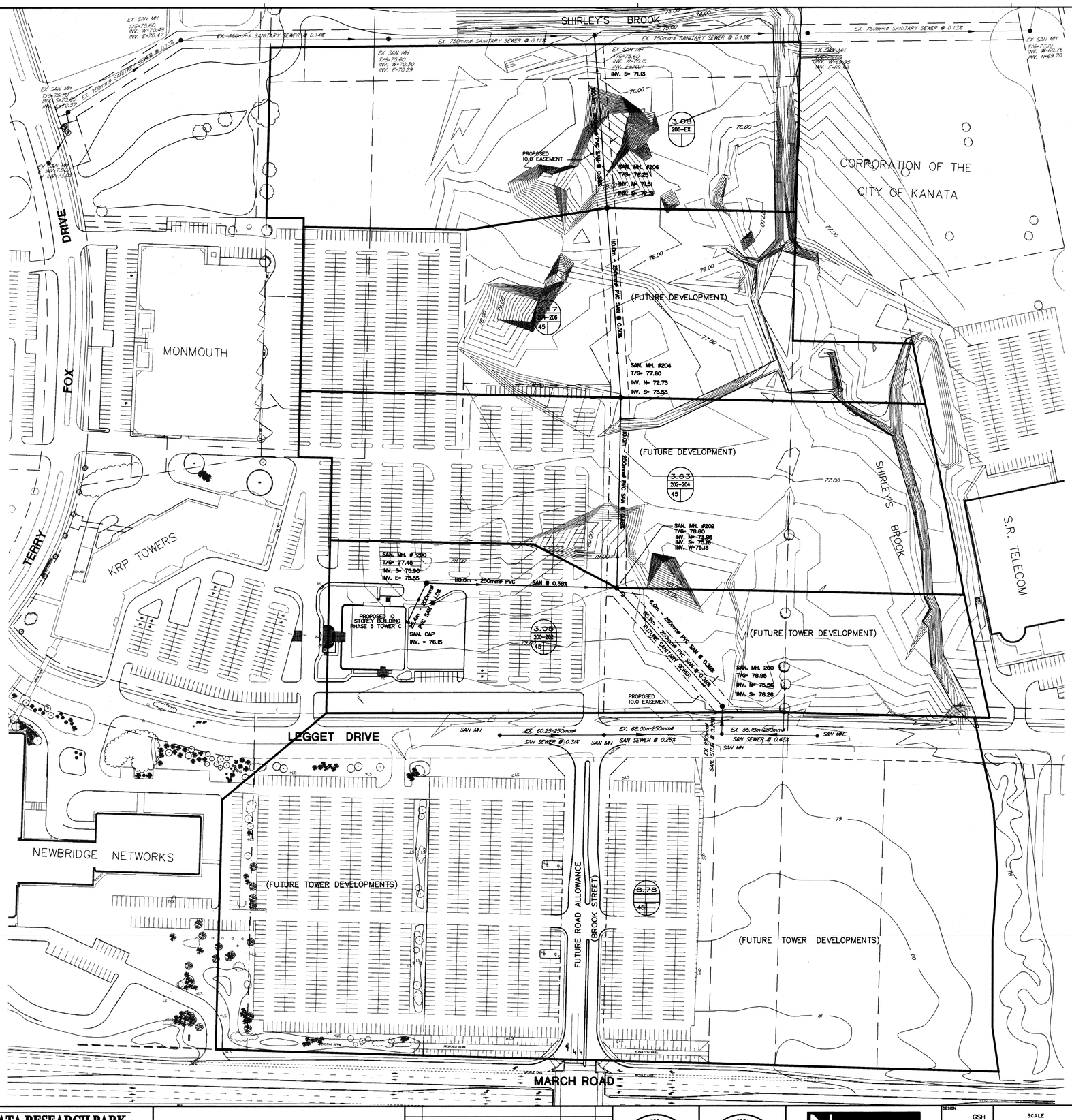
## BENCHMARK NOTES:

1. ELEVATIONS SHOWN ARE GEODETIC AND ARE REFERRED TO THE CGVD28 GEODETIC DATUM.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.
3. BENCHMARKS WERE PROVIDED ON THE TOPOGRAPHIC PLAN OF SURVEY OF BLOCK 6 AND PART OF BLOCK 1 REGISTERED PLAN 4M-642 AND PART OF LOTS 8 AND 9 CONCESSION 4, GEOGRAPHIC TOWNSHIP OF MARCH, CITY OF OTTAWA, SURVEYED BY ANNIS, O'SULLIVAN AND VOLLEBEKK LTD, SIGNED AND DATED FEBRUARY 20, 2022.



KEY PLAN
N.T.S.


LEGGET DRIVE
LIFESTYLE STREET
ACCESS ROAD
ONE TRAVEL LANE TO BE MAINTAINED AT ALL TIMES ON LEGGET DRIVE DURING CONSTRUCTION. ALL TRAVEL LANES TO BE MAINTAINED DURING NON-WORKING HOURS. PEDESTRIAN ACCESS TO BE MAINTAINED AT ALL TIMES. PEDESTRIAN DETOURS TO BE IMPLEMENTED IF NECESSARY.
PROVIDE FULL ROAD WIDTH ASPHALT OVERLAY, INCLUDING INTERSECTION OF LEGGET & PRIVATE ENTRANCES, PER CITY OF OTTAWA DETAIL R10. REFER TO AMENDED ROAD ACTIVITY BY-LAW 2003-445.
PROTECT AND MAINTAIN EXISTING LIGHT STANDARDS AND INFRASTRUCTURE IN THE LEGGET DRIVE ROW.
SANMH 6 T/G=79.72 INV.SE=77.30 INV.SW=77.32
TEE
VB
T/WM=76.80
113.2m-250mmØ SAN @ 0.35%
SANMH 12 T/G=79.80 INV.NE=77.11 INV.SW=77.13
13.8m-200mmØ SAN @ 1.00%
68.6m - 525mmØ STM @ 0.18%
SANMH 5a T/G=79.78 INV.NE=77.40 INV.SW=77.42
CBMH 249 T/G=79.80 INV.NW=78.15 INV.SW=78.15
OGS UNIT 1 T/G=79.82 INV.IN=77.25
1.1m-375mmØ STM @ 0.35%
6.3m-300mmØ STM @ 0.35%
STMMH 105 T/G=79.73 INV.NE=77.59 INV.SE=77.86 INV.SW=77.62
15.2m-300mmØ STM @ 0.50%
3.5m-300mmØ STM @ 0.50%
CBMH 250 T/G=79.54 INV.NW=78.04 INV.SE=78.09
HYD 1 T/F=80.00
STMMH 118 T/G=79.80 INV.NE=77.68 INV.NW=77.96 INV.SE=77.96
2.2m-300mmØ STM @ 0.50%
CBMH 266 T/G=79.78 INV.SE=77.97 INV.SW=78.02
1.0m-450mmØ STM @ 1.00%
STM INV.=78.03
SWM CISTERN
STMMH 119 T/G=79.80 INV.NW=77.97 INV.SW=78.02
1.2m-300mmØ STM @ 1.00%
STM INV.=76.03
STORM DRAINAGE FROM R&D LAB WEEPING TILE ONLY
4.1m-300mmØ STM @ 0.35%
1.2m-200mmØ SAN @ 1.00%
SAN INV.=77.14
CBMH 265 T/G=79.85 INV.NW=77.82 INV.SW=77.84
6.4m-300mmØ STM @ 0.35%
ARISIG AMP-25 ENCLOSURE ELECTRICAL
11.3m-450mmØ STM @ 0.35%
STMMH 114 T/G=79.45 INV.NW=77.54 INV.S=77.59
INV SW=77.40
V&VB
T/WM=76.80
2.2m-300mmØ STM @ 0.35%
8.4m-375mmØ STM @ 0.35%
2.0m-375mmØ STM @ 0.50%
STMMH 115 T/G=79.95
STMMH 113
INV SW=76.46
TEE
RED
200mmØ WM
INV.SE=77.54
INV.SW=77.55
16.1m-250mmØ SAN @ 0.35%
INV.NE=76.52
INV.S=76.57
72.4m - 525mmØ STM @ 0.17%
68.0m - 250mmØ SAN @ 0.29%
72.39m - 600mmØ STM @ 0.33%
26.23m - 600mmØ STM @ 0.46%
55.06m - 250mmØ SAN @ 0.33%
EX. SANMH 'A' T/G=79.48 INV.SE=76.87± INV.NW=76.90± INV.SW=76.97±
EX. SANMH 'B' T/G=79.36 INV.NW=76.69 INV.SE=76.68
EX. SANMH 'C' (1050ø) T/G=79.49 INV.NW=76.46 INV. SE=76.46
EX. SANMH 'D' T/G=79.29 INV.NW=76.64 INV.SW=76.64
EX. SANMH (1050ø) T/G=79.53
EX. SANMH (1050ø) T/G=79.74
EX. SANMH (1050ø) T/G=79.53
EX. SANMH (1050ø) T/G=79.48
EX. SANMH (1050ø) T/G=79.35
EX. SANMH (1050ø) T/G=79.22
EX. CB T/G=79.16
EX. CB T/G=79.19
EX. CB T/G=79.53
EX. CB T/G=79.74
EX. CB T/G=79.53
EX. CB T/G=79.48
EX. CB T/G=79.35
EX. CB




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.

KANATA RESEARCH PARK
Kanata Research Park Corporation
555 Legget Drive, Suite 504, Kanata, Ontario, Canada, K2K 2X3
(613)591-8594

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 1 | ISSUED FOR COMMENTS | DEC. 11/98 | GSH |

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER G. S. HOLOWACH PROVINCE OF ONTARIO

NOVATECH
CONSULTING ENGINEERS & PLANNERS
Suite 17, 77 Auriga Drive
Nepean, Ontario
K2E 7Z7
Telephone (613)727-1658
Facsimile (613)727-6972

| | |
|---|---|
| DESIGN | GSH |
| CHECKED | UB |
| DRAWN | DU |
| CHECKED | GSH |
| APPROVED | UB |

SCALE 1:1000

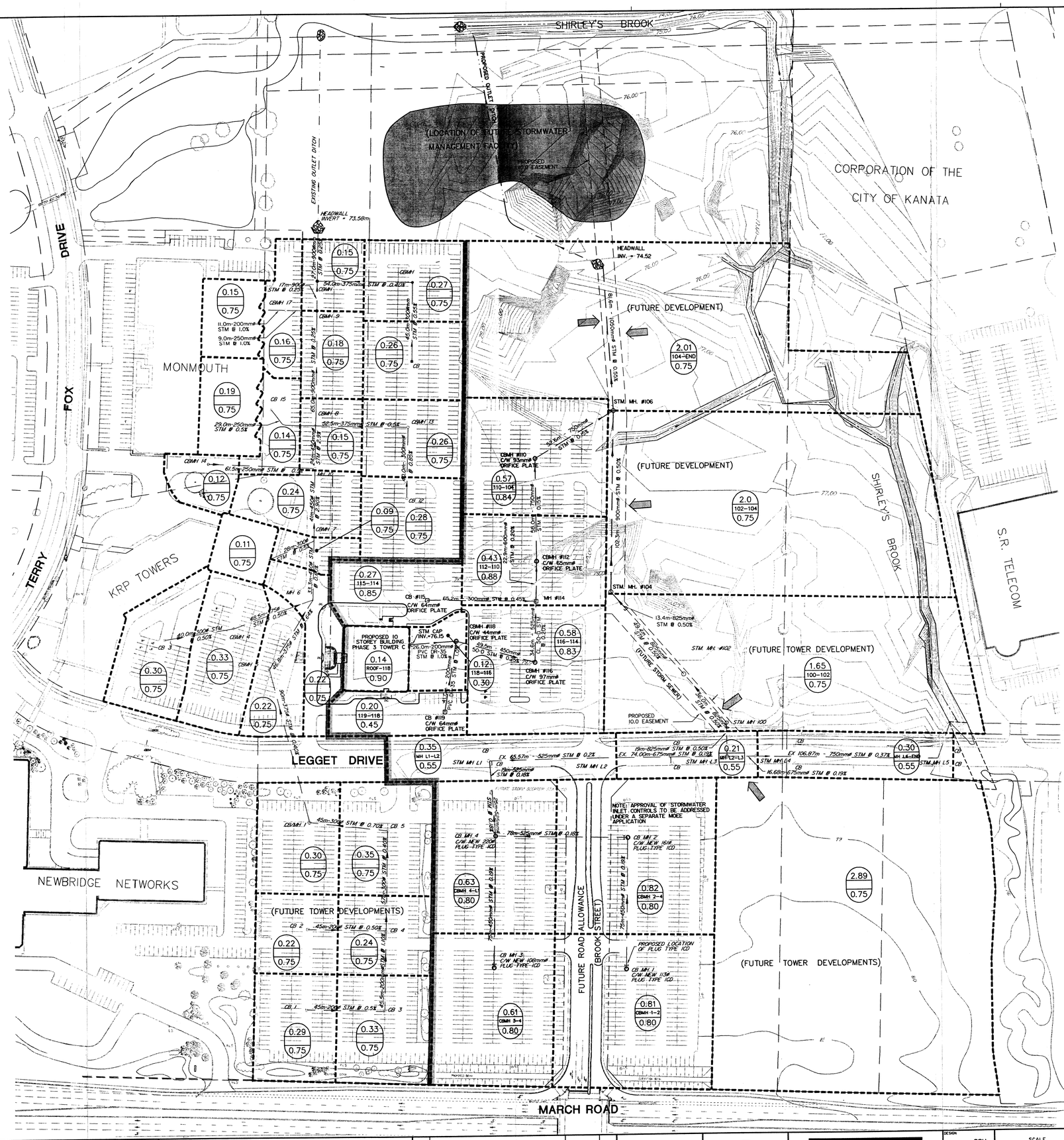
CITY OF KANATA
KANATA RESEARCH PARK
TOWER 'C' PROJECT

SANITARY DRAINAGE AREA PLAN

PROJECT No. 98066
DATE SEPTEMBER 1998
DRAWING No. 98066-SAN

PLAN.DWG - 1000mmX707mm

Dec. 15, 1998 - 13:54:28 DWG Name: L:\NOVA\W_R_P\98066\DESIGN\DWG\98066STM.DWG Updated By: DU




## LEGEND

- 2.02 / 100–102 / 0.6 — DRAINAGE AREA (hectares) / MANHOLE TO MANHOLE / RUN-OFF COEFFICIENT
- STORM DRAINAGE AREA
- STORM DRAINAGE AREA BOUNDARY
- MH #100 — EXISTING STORM SEWER AND MANHOLE
- CBMH #116 — EXISTING CATCHBASIN MANHOLE
- CB #119 — EXISTING CATCHBASIN
- DIRECTION OF FLOW
- MINOR STORM SYSTEM FLOW ROUTING (UNDEVELOPED AREAS)

NOTE:

1. RUNOFF COEFFICIENTS FOR TOWER 'C' PHASE 3 DEVELOPMENT ARE AS OUTLINED IN *"KANATA RESEARCH PARK - TOWER 'C' STORMWATER MANAGEMENT REPORT"* (NECL, Dec 1998)
2. APPROVAL OF STORMWATER INLET CONTROLS FOR THE EXISTING NEWBRIDGE PARKING LOT (PLUG TYPE ICD'S) TO BE ADDRESSED UNDER A SEPARATE MOEE APPLICATION.

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.

**KANATA RESEARCH PARK**
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(613)591-6594

| No. | REVISION | DATE | BY |
|---|---|---|---|
| 2 | REVISED STORM SEWER PER R.M.O.C. COMMENTS | APR. 15/99 | GSH |
| 1 | ISSUED FOR COMMENTS | DEC. 11/98 | GSH |

LICENSED PROFESSIONAL ENGINEER — UDO BOEHME — PROVINCE OF ONTARIO

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| DESIGN | GSH |
| CHECKED | UB |
| DRAWN | DU |
| CHECKED | GSH |
| APPROVED | UB |

SCALE: 1:1000

CITY OF KANATA
KANATA RESEARCH PARK
TOWER 'C' PROJECT

STORM DRAINAGE AREA PLAN

PROJECT No. 98066
DATE SEPTEMBER 1998
DRAWING No. 98066-STM


Plotted: Sep 09, 1999 - 1:45:15 DWG Name: J:\NOVA\K R #\98066\DESIGN\2APR99\98066STM.DWG Layout1 5/10/2007 3:00:30 PM smatthews Xrefs: EQ.pc3, B1, 1:1 Updated By: SAM